PHONEMIC AWARENESS: AN INCLUSIVE READING INTERVENTION
STUDY WITH STUDENTS WITH AUTISM

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Nalini Sinha
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Nalini Sinha

Approved:  
Dr. Ann T. Halvorsen  
Date: 10/8/13

Dr. Jacki L. Anderson  
Date: 10/8/13
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CHAPTER I

INTRODUCTION

Components of Reading: Phonemic Awareness

Phonemic awareness instruction helps children learn to read (Armbruster, Lehr, & Osborn, 2003). The purpose of this thesis is to demonstrate that phonemic awareness can be developed with students who have Autism through instruction in general education classes, and, furthermore, that doing so will significantly accelerate their subsequent reading and writing achievement. Since many children lack phonemic awareness skills and phonemic awareness is critical to learning to read and write an alphabetic script, the importance of making a place for its instruction for students with Autism is clear.

Phonemic awareness is the ability to hear, identify, and manipulate the individual sounds, phonemes, in spoken words (Armbruster, et al, 2003). It is the foundation for reading. It is the ability to detect individual speech sounds within words. This ability is a requirement for developing accurate decoding skills and strategies (McShane, 2006). Phonemic awareness is often described as part of a broader category known as phonological awareness. Phonological awareness includes the ability to work with larger units in spoken language such as syllables and rhymes, which often include more than one phoneme. Children typically find it easier to work
with these larger units (e.g., rhyming words) before proceeding to develop skills with individual phonemes (National Institute of Child Health and Human development (NICHD), 2000).

**Importance of Phonemic Awareness Instruction**

Strong phonemic awareness is considered an early indicator of eventual success in beginning reading (Muter, Hulme, Snowling & Stevenson, 2004). Phonemic awareness instruction helps children learn to read words, spell words, and comprehend text (Fuchs, Hosp & Jenkins, 2001), and has a positive overall effect on reading and spelling. A meta-analysis by the National Reading Panel (NRP) in 2000 found that instruction in phonemic awareness had a “moderate” effect on both reading skills (based on 90 comparisons) and spelling (39 comparisons). Results across several categories of assessments have shown that teaching children to manipulate phonemes in words was highly effective across all the literacy domains and outcomes (Elbro & Peterson, 2004). The No Child Left Behind Act of 2001 (NCLB) and IDEA 2004 mandate that all children, including children with Autism Spectrum Disorders, be taught to read in ways that are consistent with reading research. Teaching children to know how to read words is a technical skill. It requires knowledge of the spelling system, the speech sound system, the lesson routines, and the techniques that enable children to acquire word recognition fluency (Moats, 2005).
**Instructional Modifications**

Many struggling readers lack the prerequisite phonemic awareness skills to understand how words work, thereby rendering phonics instruction less effective (Pressley, Hampson, & Echevarria, 1998). Some children also lack mastery of the phonemic awareness tasks strongly connected to early reading and writing (RAND Reading Study Group, 2002). Children who cannot orally blend sounds to form words will struggle with decoding a word in print. Children who struggle when orally segmenting a word into its constituent sounds will struggle with spelling words when writing. These children need more time and practice to master these essential building blocks of reading. Phonemic awareness interventions are ideal for these children (Adams, 1990; Anderson, Hiebert, Scott, & Wilkinson, 1985). Children with Autism Spectrum Disorder often do not attend to the spoken word and fail to imitate speech. They may also need a great deal of structured direct instruction to hear and replicate word sounds (Wing, 1988).

**Autism**

Autism is a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, adversely affecting a child’s educational performance (American Psychiatric Association, 2002). Other characteristics often associated with Autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory
experiences (National Research Council, 2002). Autism typically appears before a child reaches the age of three, although it is not always diagnosed until the child is age four or older. It is four to five times more likely in boys than in girls (Powers, 1989). Asperger’s syndrome is a label given to some learners who fall within the Autism Spectrum. Wing (1981) was the first to suggest that Asperger’s syndrome was a subgroup of the Autism Spectrum Disorder (Frith, 1991). Students labeled with Asperger’s syndrome typically experience communication differences, struggle with change and transitions, and have intense and absorbing areas of interest (American Psychological Association, 2000). I believe Autism is a marvelous occurrence of nature, not a tragic example of the human mind gone wrong. O’Neill (1999) stated that, in many cases, Autism can also be a kind of genius undiscovered. The rise in the numbers of students with Autism Spectrum Disorders is a rapidly growing concern and the Center for Disease Control has reported one in less than 88 children in the United States being affected by ASD or related conditions.

**Importance of Reading and Reading Instruction**

Entering school does not guarantee rigorous reading instruction. If not given explicit reading instruction in those early years (K-3), students usually have a hard time catching up (Juel, 1988, as cited in Coyne, 2006, Felton & Pepper, 1995). If not reading fluently by Third grade, students face a serious risk for reading problems and dropping out of school. After third grade, students having difficulty in reading almost never become good readers (Coyne, 2006). Learning to read should be fun for any
child, but when it comes to children with Autism, you have to reach to them on their level, so make sure you chose a method that meets their needs (Evans, 2007). Providing structure and organization in classrooms or any other learning environment on a student’s level of understanding can help to alleviate or moderate these problems and the resultant ineffective learning situations (Abisgold, 2007). The use of phonemic awareness and its relationship to reading acquisition has also been recognized as a valuable teaching technique (Smith, 2007). It’s not just the time spent with a book in hand, but rather the intensity and volume of high-success reading that determines a student’s progress in learning to read (Allington, 2012). Understanding what one has read is the goal of reading. But too often, students with Autism and struggling readers get interventions that focus on basic skills in isolation, rather than on reading connected text for meaning (Kuhn, 2009, Torgesen, Morgan, & Davis, 2007).

Reading is often considered to be the most important area of education (National Reading Panel, 2000: Snow, Burns, and Griffen, 1998). Skill in reading is a prerequisite for achieving competence in learning activities in content-area classes such as social studies, science, math and vocational education and for successful post secondary education and employment. Second, students with Autism and students with learning and behavior disabilities have reading targeted as an area of need and have IEP goals related to reading more than any other academic area (Torgesen & Davis, 1993). Third, longitudinal research indicated that if students with Autism and students with learning and behavior problems do not learn to read by the end of third
grade, their chances of having reading difficulties throughout their schooling and into adulthood are about 50 percent higher (Lyon, 1998). Therefore, it is critical that students learn to read and accomplish this task early in their schooling.

Reading requires students to be able to distinguish the individual sounds that make up words and understand that letters represent sounds in language. Reading entails using the attention, perceptual, memory, and retrieval processes necessary to automatically identify or decode words (Ashbaker & Swanson, 1996). As emergent readers encounter print in their environment, they ask questions and learn about how language is represented in its written form. They engage in naming many letters and telling you words that begin with the common initial sound (Allington, 1994; Cunningham and Elster, 1994; Sulzby and Teale, 1991). Phonemic awareness is the most complex part of a phonological awareness continuum that includes knowing the sounds of the letters, rhyming and segmenting words and sentences. Phonemic awareness is the ability to recognize the smallest sound units of spoken language and how these units of sound, or phonemes, can be separated (pulled apart or segmented), blended (put back together) and manipulated (added, deleted, and substituted). The phoneme is the smallest sound in spoken language that makes a difference in words. For instructional purposes related to reading, a phoneme is a single sound that maps to print—sometimes to one letter and sometimes to more than one letter (Foorman, Fletcher, Francis, and Schatschneider, 1998). The primary focus of phonemic awareness with children initially learning to read, including children with disabilities, is not rhyming; rather, the focus should be on increasing their awareness of the
individual sounds in language and how each of these sounds can be represented by a letter or combination of letters (Cavanaugh, Kim, Wanzek, & Vaughn, 2004).

Interventions that accelerate reading development routinely devote at least two-thirds of their time to reading and rereading rather than isolated or contrived skill practice (Allington, 2011).

**Culture and Disabilities**

All forms of cultural experience, including learning and schooling that generate diversity in our student populations, need to be recognized (Vygotsky, 1981). For example, children who are challenged by a physical and/or intellectual disability are exposed to cultural conditions different from those experienced by children who are not living with such challenges. In his research on child development, Cole (1995) concluded that teachers can be very important in organizing a child’s environment so as to enhance the types of social experiences that lead to optimal development. He suggested that “it is the foundation upon which, in an ideal world, the education of children would be organized” (Cole, 1995, p.109). August and Hakuta (2009) comprehensively reviewed schools and classrooms in which linguistically and culturally diverse students have achieved high academic performance. Through their analysis of some 33 case studies, they identified the following factors as contributing to the students’ success: use of native language and culture in instruction, a balanced curriculum that includes both basic and higher-order skills, explicit skills instruction, opportunities for student-directed instruction, use of
instructional strategies that enhance understanding, opportunities for practice, systematic student assessment, and home and parent involvement.

We look first not at their deficits, at what they do not know, but at what they need to know. Far from having deficits, they are rich in assets. As teachers, we enter their world in order to aid them and to build bridges between two cultures (Sarason, 1990). Instruction will be more effective if it identifies nonstandard varieties of English as different rather than inferior. All children, including children with disabilities, should be taught English in a way that respects their home language (Gersten & Geva, 2003). Phonemic awareness is the bridge between spoken and written language. Some children will construct this bridge for themselves in the absence of explicit instruction, but many children at-risk for reading problems, including children with disabilities such as Autism will not (Snider, 1995). In addition, it has been estimated that nine percent of all ELL students in U.S. public schools have disabilities (National Symposium on Learning Disabilities in English Language Learners, 2003), thus putting them at further risk for reading difficulty.
CHAPTER II

LITERATURE REVIEW

The No Child Left Behind Act of 2001 (NCLB) and the Individuals with Disabilities Education Act of 2004 (IDEA) mandated that all children, including children with ASD (Autism Spectrum Disorder), be taught to read in ways that are consistent with reading research. More specifically, findings from the National Reading Panel (2000) were cited in NCLB language, requiring that all students be provided explicit and systematic reading instruction in phonemic awareness, phonics, oral reading fluency, vocabulary, and comprehension strategies. Phonemic awareness is an area of difficulty for many students with Autism Spectrum Disorders (ASD) but it is critical to learning to read and write an alphabetic script. This review focused on research aimed at teaching children awareness of how the sounds in words work, to provide the framework of the current study’s goal to accelerate reading and writing achievement for students with Autism.

Phonemic Awareness Deficits

Learning and understanding the sound structure of spoken words allows children to make sense of the alphabetic system and to learn sounds for letters (Baker, 2007; Berg & Stegelman, 2003; National Institute of Child Health and Human Development, 2000). This will help children to use the letter/sound correspondence to begin reading and understanding the text. Most children with difficulties in reading have deficits in phonemic awareness skills (Phillips, 2008). Children with
developmental delays often score far below their peers without these risk factors on early literacy skills. They often have difficulty distinguishing sounds in spoken language (Edwards, 2004). Lack of phonemic awareness skills acquisition has been found to be a predictor of risk for later reading failure (National Early Literacy Panel, 2006). Children with phonemic awareness deficits are more likely to demonstrate reading difficulties because children need to have a strong phonemic awareness structure in order to learn to blend phonemes with letters to decode unfamiliar words (Bishop & Freeman, 1995). Children with Autism typically memorize individual words but have difficulty generalizing from one word to another because of deficits in phonemic awareness. For example, knowing how to read the word ‘cat’ does not generalize to knowing how to figure out sounds for ‘c’ in ‘cup’ or ‘a’ in ‘map’ or ‘t’ in ‘nut’ (Snowling, & Olson, 1992).

When students with Autism have phonemic awareness deficits, they do not have a strategy for sounding out and decoding unfamiliar words encountered in print (Lonigan, 2006). In a randomized, quasi-experimental intervention study Allor (2010) demonstrated that students with Autism, seven and eight years old, could successfully combine isolated skills in phonemic awareness and phonics to decode unfamiliar words. Twelve First and Second grade students completed a developmental spelling measure; twenty six words with initial or final blends, three times at six week intervals. Students participated in three assessments each year. Responses were analyzed for logical representation of speech sounds to describe developmental change in segmentation and word recognition across blend types. Students in this
An intervention study for two years significantly outperformed a contrast group of similar students on measures of phonemic awareness, phonics, word recognition, vocabulary, and comprehension. By the end of the study, approximately half of the students were able to identify the most common sounds for all individual letters and read words made up of those letters.

Although it is widely acknowledged that phonemic awareness is important, confusion remains about what phonemic awareness is, the role it plays in reading development, and how it should be addressed in classrooms (Yopp, 2010). Yopp’s qualitative research study was conducted with a group of four and five year olds. The focus activities for the study involved rhyme, with syllable manipulation, with onset-rime manipulation and activities with phoneme manipulation. Student participation and achievement in the sound structure of spoken language and how students were learning to become readers could be seen by the student participation in different types of activities. Qualitative data suggested that the speech stream was made up of a sequence of small units of sounds and the student’s ability to manipulate those small units, phonemic awareness, seemed to be critical for readers of an alphabetic orthography, that is, representation of the sounds of a language by written or printed symbols, because alphabetic orthography maps speech to print at the level of the phoneme.
Phonemic Awareness Instruction

The “awareness” part of phonemic awareness is important because it implies the level of knowledge that children should have in the awareness of the sounds in words (Adams, 1990). Children can have phonemic awareness without knowing the letter name or the label for the sound. Part of phonemic awareness is the understanding that two words may sound the same, or rhyme, or begin with the same letter sound (Scanlon, 1996). Phonemes are the smallest parts of sound in a spoken word that make a difference in the word’s meaning (Lehr, 2003). For example, changing the first phoneme in the word hat from /h/ to /p/ changes the word from hat to pat, and so changes the meaning (Osborn, 2003). A letter between slash marks shows the phoneme, or sound, that the letter represents, and not the name of the letter (Armbuster, 2003). For example, the letter h represents the sound /h/. All children including children with disabilities can show us that they have phonemic awareness in several ways (National Reading Panel, 2000). These ways may include: orally saying the sound of the alphabet letter (/a/, /b/, /c/); recognizing which words in a set of words begin with the same sound (Bell, bike, and boy all have /b/ in the beginning); isolating and saying the first or last sound in a word (The beginning sound of dog is /d/. The ending sound of sit is /t/); combining or blending the separate sounds in a word to say the word (/m/,/a/,/p/-map); breaking or segmenting a word into its separate sounds (up-/u/,/p/) (National Reading Panel, 2000). In a qualitative research design, Yopp (2000) focused on Prekindergarten, Kindergarten and First grade students and shared 14 activities that were representative of the type of instruction
appropriate for these students and students with disabilities. In this study, the teacher had 20 Kindergartners in her classroom. The teacher read the book “Ten Cats have Hats” (Marzollo, 1999). Picture clues allowed each of the students to predict the author’s rhyme. To attend to the sound clues the teacher hid the pictures on the first reading. Students who had not discovered the author’s rhyming pattern heard their peers pointing out the rhyme element. This playful and meaningful activity helped students to focus on the sound structure of their language and also their vocabulary development as they were listening to their peers. In another study by Yopp, on activities with syllable manipulation, children shared their work after representing the number of syllables in their names with pieces of paper and drawing self portraits. Student participation and achievement in the sound structure of spoken language and how students were learning could be seen by the student participation in different types of activities. For example, students were engaged with their teachers in Preschool, Kindergarten, and First grade classrooms in playful activities that focused attention on the sound structure of spoken language. Qualitative data suggested that the speech stream is made up of sequences of small units of sound and the students’ ability to manipulate those small units, phonemic awareness, seemed to be critical for readers of an alphabetic orthography because alphabetic orthography maps speech to print at the level of the phoneme. This study made an effort to advocate for phonemic awareness instruction as conscious component of early literacy programs (Yopp, 2000).
The scientifically based research on phonemic awareness intervention and instruction has provided examples of effective phonemic awareness instruction that teaches children to notice, think about, and work with sounds in spoken language. Osborn and Lehr, (1998) found that there are eight activities through which teachers could build phonemic awareness in children. They determined through their research that the first was phoneme isolation, in which children recognized individual sounds in a word; the second was phoneme identity, in which children recognized the same sounds in different words; the third was phoneme categorization in which children recognized the word in a set of three or four words that has the “odd” sound; and the fourth was phoneme blending in which children listened to a sequence of separately spoken phonemes, and then combine the phonemes to form a word. Then students wrote and read the word. The fifth activity was phoneme segmentation in which children broke a word into its separate sounds, saying each sound as they tapped or counted it, after which they wrote and read the word. The sixth activity was phoneme deletion in which children recognized the word that remained when a phoneme was removed from another word. The seventh activity was phoneme addition when children made a word by adding a phoneme to an existing word. Finally, the eighth was phoneme substitution when children substitute one phoneme for another to make a new word.

To gain a broader understanding of the reading capabilities of children representative of Autism Spectrum Disorder (ASD), Allor, Mathes and Champlin (2010) examined the reading skills of 41 students with ASD ages six to fifteen.
Sixteen students were identified with Autism, 13 with Pervasive Developmental Disorder and 12 with Asperger syndrome. The study included students who had measurable language skills even if their language skills were limited. Students were assessed on single letter-sound recognition in isolation, single word recognition in isolation, pseudo or nonword recognition, text reading accuracy and text comprehension. On average they demonstrated good letter-sound recognition (79%) and word reading ability (72%) but poor comprehension (67%) after intervention.

Letter-sound Phonemic awareness instruction must be adapted and taught explicitly (Browder & Spooner, 2009). These authors’ studies showed that visuals, flash cards, picture cards, picture books and computer assisted instruction, might be necessary to use depending upon the skills and needs of children with Autism. Browder and Spooner emphasized that students with Autism should be given opportunity to receive phonemic awareness instruction in general education classrooms so that they can learn and participate in evidence-based literacy practices (2006). They emphasized that literacy materials and curricula must be adapted, with reading strategies taught individually and explicitly. Depending on the student, different tools for promoting literacy, including communication devices, Braille, computer assisted instruction, or visual strategies such as picture communication systems should be used when needed. Moreover listening to stories and sharing them, capitalizing on students’ interests and choices, and creating an instructional environment rich in language are essential for a literate community. As reported by Browder and Spooner (2006, p.393), the National Reading Panel (NRP, 2000),
“identified” five essential components of reading instruction: (a) phonemic awareness, (b) phonics, (c) fluency, (d) vocabulary, and (e) comprehension” (p. 324).

Pullen and Justice, (2003) did an experimental intervention study with typically developing Second and Third grade students. Students were randomly assigned to one of two groups for either shared reading or print-referencing reading. Shared (picture focus) reading and print-referencing (alphabetic knowledge, words in print, print recognition) reading interventions were implemented four times weekly for 30 minutes each by teachers for a four-week period. The group of students read to with print referencing outperformed control group peers at post-test on letter sounds, word awareness and segmentation. No differences were found between print referencing and the control group for alphabet knowledge.

Learning to read should be fun for any child, but when it comes to children with Autism, we must reach them on their level and be aware of the skills in need of instruction for phonemic awareness (Evans, 2007). Evans reported the short and long term positive effects on phonemic awareness for children with Autism and preschool children receiving Sound Foundations (a literacy program endorsed by Institute of Education Sciences) in small-group sessions over a 12-week period, for about 30 minutes per week. In this longitudinal analysis, the participation of students with Autism in the curriculum indicated a significant influence from preschool through Kindergarten on phonemic awareness tasks, word recognition and reading comprehension. Each child with Autism is different and will learn at a different pace
and in a different manner. Flores, (2006) researched the effectiveness of using the Corrective Reading Program (SRA/McGraw-Hill) to teach decoding skills such as letter-sound correspondence to students with Autism with severe intellectual disabilities. The students here were involved in the Corrective Reading Decoding Program for eighteen weeks, twenty-five to thirty minutes a week, which consisted of teaching sound identification and pronunciation. All completed the first level of the program and were able to perform specific skills associated with phonemic awareness. Conners, Rosenquist, Atwell, and Kiser (2006) conducted a ten-week intervention program for twenty students with Autism, seven and eight year old. Phonemic awareness skills, including some sounding out activities were taught four days a week for thirty-five minutes. As a result of the intervention, students were better able to sound out consonant-vowel-consonant (CVC) words compared to a control group, although performance was found to be dependent on the initial general language skills of individual participants.

One of the obvious and yet difficult lessons to keep in mind about reading and learning disabilities is that they are heterogeneous. The explicit awareness of phonemes needed to segment, identify, or manipulate phonemes in words typically develops in children at about six years of age (Torgesen, 2001). In a carefully monitored longitudinal study, Torgeson found that separate special education placements for children with Autism with severe reading disabilities produced no gains in phoneme segmentation skills relative to normal readers during a three year period in elementary school. Nine students with Autism, age six, began their
instruction with an average standard score of 62 in phoneme segmentation, and after three years of this instruction, their standard score for phoneme segmentation skills was 80. In another study, Torgesen (2001b) provided extremely intensive instruction using two different phonemically-based remedial strategies in which 67.5 hours of one-to-one instruction on phoneme blending was delivered in two 50 minute sessions each day for about eight weeks. Thirty students, who had been identified with Autism and reading disabilities, age eight years, grade three, were randomly assigned to the two intervention conditions. Although both of the instructional programs provided explicit instruction in phonemic awareness and phonemically based decoding strategies, they differed in the time spent. Students in one condition spent 85% of their time learning and practicing articulatory phonemic awareness and phonemic decoding that did not involve reading meaningful text, 10% in recognizing high-frequency words, and five percent in reading meaningful text. Students in Condition Two spent 20% of their time on phonemic awareness and phonemic decoding activities of single words, 30% in learning sight words and 50% in reading meaningful text with teacher support. The results showed that students in Condition One had developed good phonemic awareness skills, above the 30th percentile, as compared with the students in Condition Two, who scored below 20th percentile in phonemic awareness.
**Effectiveness of Comprehensive Reading Instruction for Individuals with Autism and Intellectual Disabilities**

Structure, consistency, intense amounts of repetition and practice are critical literacy interventions that are needed to produce meaningful gains (Allor, Jones, & Champlin, 2010; Browder, 2008). Recent research (Mathes, Roberts, Jones & 2010) employed a randomized, quasi-experimental intervention study with students with Autism and severe intellectual disability, and demonstrated that students could successfully combine isolated skills in phonemic awareness and phonics to decode unfamiliar words. The students participating in the intervention for one-two years significantly outperformed a contrast group of similar students on measures of phonemic awareness, phonics, word recognition, vocabulary and comprehension. By the end of the study, approximately half of the students were able to identify the most common sound for all individual letters and read words made up of those letters. This study supports the view that students with Autism and intellectual disabilities should be taught to read in a manner similar to other students who learn to read.

A meta-analysis of 48 studies dating back to 1990 was conducted by Browder and Xin (2009). Their review focused on studies that taught systematic phonemic awareness instruction and sight word recognition. The researchers located the experimental studies that administered phonemic awareness instruction to students, that included a control group receiving no special instruction, and that measured the impact of phonemic awareness instruction on reading outcomes. The researchers
found 48 studies that met their criteria. Their studies revealed a strong evidence base for teaching phonemic awareness and sight words systematically in repeated trial formats. In a series of mixed analysis of variances, which looked at the interactions between the experimental conditions, across studies, results indicated that students in the treatment conditions made greater gains than those in the control groups and that these differences were statistically quite significant. In a four year longitudinal study, Allor, Roberts, and Jones (2010) examined the effectiveness of a comprehensive phoneme-based, direct instruction reading program in teaching early reading and language skills to twelve students with intellectual disability, whose intelligence quotient (IQs) ranged from 40 to 79. The students were in grades One to Three. The students were randomly assigned to control and intervention groups. The teachers provided the intervention for 20-25 minutes, four days per week. There were six students in each group and they followed scripted lessons. Teachers routinely monitored student mastery of skills to determine which lessons and activities needed to be repeated. After two-three years of instruction, results indicated that on standardized measures of reading and language, students in the intervention group made meaningful 84% progress in phonemic awareness, 80% in phonemic decoding, and 72% in word attack and nonsense word fluency at a faster rate than the control group. This evidence supported the effectiveness of a reading program that is comprehensive in scope and sequence with instruction that is structured, repetitive and intensive; and teaching that is explicit in nature.
Learning to Read

Children who fail to read in the early grades incur many costs to the education system and society, such as requiring possible Special Education, remediation, grade repetition, as well as experiencing delinquency and then ultimately dropping out of school (National Assessment of Educational Progress, 2011). Very early, children with and without disabilities begin to learn about spoken language when they hear their family members talking, laughing and singing, and when they respond to all of the sounds that fill their world. Research has shown that skills in phonemic awareness can be a determining factor in how easily a child of developmental delays and Autism learns to read (Armbruster et al., 2010). These two researchers assessed the effects of phonemic awareness skills instruction with five Grade Two students with developmental delays and Autism. The children received 50 to 90 lessons, four days a week for twenty-five minutes on phonemic awareness over five months. They were pre-and post-tested using the Kindergarten level Initial Sound Fluency and Phoneme Segmentation Fluency subtests of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS, 2002). Results showed average increases of 16.6 initial sounds per minute and 27 phonemes per minute.

Phonemic awareness is a vital component of reading fluency (Reading & Van Deuren, 2009) enabling children to decode words rapidly, a key aspect of reading comprehension. The acquisition of phonemic awareness is the result of instruction and not age or disability (Berg, Stegelman and Hatcher, 2010). Berg studied 410
Kindergarten to Third grade students, including children who were at risk for reading failure. The control group received a reading program including instruction in concepts of letter sound identification, letter identification, word reading, writing and spelling. There were three experimental groups and each of these groups received the control group’s reading program as well as instruction in phonemes and instruction in rhyme. Results showed that the children who were at risk for reading failure benefited more from reading instruction if it included phonemic awareness training for fifteen minutes every day and children who were not at risk for reading failure made > 80% progress when phonemic awareness training was included with their reading instruction.

Phonemic awareness instruction should be systematic and explicit (Puranik, Ziolkowski & Montgomery, 2009) and involve the teacher modeling and practicing a phonemic awareness skill with the children and having instruction move from easy to difficult. Five students participated in Santi’s study (2008). A single group pre-test/post-test pre-experimental research design was used. These students attended a special education preschool program for two and a half hours, four days a week. Individualized education program goals for all the students focused on increasing academic skills necessary for Kindergarten. Student One was a five year old boy identified as having developmental delays; Student Two was a five year old boy with Autism; Student Three was a five year old boy with communication delays; Student Four was a five year old girl with developmental delays and Student Five was a boy with intellectual disability. The phonemic awareness program was provided three to
four days a week from 1:10pm to 1:25pm during group time. The results showed that each participant gained at least six initial sounds per minute. Overall, the students gained an average of 16.6 initial sounds per minute from the pre-test to post-test. One student was considered to be “at risk” for poor reading outcomes. During the 20-minute whole group reading time, intervention was provided during the reading time for three days a week for three weeks. This student was encouraged to listen and generate rhymes as the teacher read out the words from the story and to tell the beginning sound in the word. After the individual (group) intervention, the student was no longer in the deficit range.

**Alternative Instruction**

The importance of identifying children who might require alternative/additional instruction to attain adequate literacy skills is particularly relevant for Kindergarten to Third grade students. Research has indicated that children with disabilities and language deficits, particularly in the phonemic awareness domain, experience the greatest difficulty in mastering the alphabetic code (National Reading Panel, 2000). Schatschneider’s (2005) study showed how struggling readers and students with disabilities benefited from theoretically different instructional approaches in reading. In his randomized experiment, the participants were two cohorts, groups of three First Grade students. They were identified for intervention at the beginning of first grade. The experimental group of three received an enhanced classroom instruction intervention in which students learned rhyming,
syllable segmentation, identification of initial and mid-word phonemes and made sound-symbol connections. A group of typically developing students was selected at random and received only regular classroom instruction. The interventions were provided daily for 40 minutes, for a total of 117 hours of intervention. Both interventions taught phonemic awareness and alphabetic skills explicitly and emphasized using this knowledge in reading. Teachers in both interventions modeled concepts and strategies, guided students in practicing them, and provided scaffolding and support while students practiced. The results showed that the experimental group progressed more rapidly 0.17 to 0.63 in phonemic awareness and word reading than the typically developing group whose scores went from 0.30 to 0.53 in phonemic awareness and word reading.

Lindamood-Bell (Patricia, 2004) has served many students with learning difficulties and also children who have been diagnosed with Autism Spectrum Disorders, dyslexia, ADHD, and Central Auditory Processing Disorders. The unique Lindamood-Bell approach assesses individual needs, provides research-validated sensory-cognitive instruction and creates an environment that is safe, positive and focused (Patricia, 2004). Its instructional programs such as, The Seeing Stars has been shown to develop symbol imagery and phonemic awareness for reading, spelling, and fluency (Torgesen, 2000). The Lindamood Phoneme Sequencing (LIPS) program has been shown to develop phonemic awareness for reading and results have indicated that individuals become aware of the mouth actions which produce speech sounds, spelling, and speech. In one of their studies, children who exhibited weakness
in decoding received instruction using the Seeing Stars program. Most students (students diagnosed with Dyslexia and Autism Spectrum Disorder) received between four to eight weeks of instruction, and many students (students struggling with expressive language, phonemic awareness and reading comprehension) made a substantial improvement that allowed them to read text with proficiency (Patricia and Charles, 2000). The results of the pre- and post-test percentiles in phonemic awareness increased from 32 to 61; symbol imagery increased from 23 to 63; word attack from 39 to 68 and word recognition from 25 to 47 percentile. Approximately 60% of 2012 Lindamood-bell students (N=3, 191 students) reported having received a diagnosis of Autism Spectrum Disorder (including Asperger’s Syndrome, Pervasive Developmental Disorder, and Autism), ADD, Dyslexia and Specific Learning Disability. The average results for students with Autism in the pre- and posttest percentiles were statistically significant in the areas of vocabulary, word opposites, oral directions and comprehension. In oral directions percentile < .05 increased to 23, vocabulary 16 to 23, word opposites 13 to 23 and comprehension seven to 18.

**Phonemic Awareness Research**

Legislation mandates that all children, including children with Autism Spectrum Disorders (ASD), be taught to read in ways that are consistent with reading research and target the five components of evidence-based reading instruction: phonemic awareness, phonics, reading fluency, vocabulary, and comprehension strategies (National Reading Panel, 2001).
Phonemic awareness, or the ability to consciously and explicitly talk about and manipulate speech sounds, plays a significant role in the development of reading and spelling abilities (Torgesen, Wagner, & Cunningham, 1994). Learners with intellectual and other developmental disabilities have no time to lose. Many enter school with significantly less developed language abilities and fewer literacy experiences than peers who do not have disabilities (Iacono, 2004).

Roth et al. (2002) studied the efficacy of the rhyming training module using a single-subject, multiple-baseline-probe-across-behaviors research design with eight preschool students with speech and language impairments. All students showed improvement in their ability to produce rhymes. Prior to training, none of the students achieved greater than 54% mean accuracy; following training, no child achieved less than 76% mean accuracy. Additionally, in six of eight cases, rhyming production performance improved from an average of less than 10% accuracy to an average of at least 80% accuracy. These findings showed that preschool children with speech and language impairments can benefit from direct, explicit instruction in phonemic awareness.

Researchers Wanzet & Vaughn, (2007) studied reading-related skills of children with Autism Spectrum Disorder (ASD) with and without a history of hyperlexia, a syndrome characterized by an intense fascination with letters or numbers and an advanced reading ability, compared with a control group of typically developing (TD) children matched on age and single word reading on the Sound
Awareness subtest. This subtest includes phonemic awareness tasks of rhyming, sound deletion, sound substitution, and sound reversal within words in their study. Results showed that children with ASD and a positive history of hyperlexia outperformed the children with ASD alone. The children with ASD who had hyperlexia and TD children performed significantly better with an average score than the children with ASD who had no hyperlexia.

Applying evidence-based practices and strategies to target phonemic awareness, phonics, comprehension, vocabulary, and fluency Browder et al., (2008) evaluated a multi-component curriculum using the Early Literacy Skills Builder (ELSB) with a large group of students with severe developmental disabilities and Autism. Phonemic awareness was included in a reading intervention that was conducted for three years. There were a total of 93 students with severe developmental disabilities and Autism in the study. Students were in grades Kindergarten to grade four. Students in the control group spent an average of 7.9 hours per week in general education classrooms. Students in the intervention group spent an average of 1.31 hours per week in general education classrooms. Thirty teachers participated in this study. The intervention took place only in special education classrooms during three academic years. Both the intervention Early Literacy Skills Builder program (ESLB) and comparison Edmark Reading Program were implemented by teachers. The intelligence quotient (IQ) scores of students with severe disabilities and Autism were 55 or below and students also had behavior challenges. The students were randomly assigned into intervention or control groups
per classroom for three years. Each year half of the newly recruited students in each classroom were randomly selected as the intervention group. The remaining students served as the control group. Pretest and posttests were given to both the groups each year. The result showed that the intervention groups had higher posttest reading scores, 49%, than the control group posttest reading scores, 38%, by the end of the year.

Roth, Speece and Cooper, (2002) showed the connection between phonemic awareness and early literacy achievement by demonstrating the efficacy of the rhyming training module using a single-subject, multiple baseline probes design across behaviors. There were eight preschool children with speech and language impairments. They were taught rhymes four days a week for 20 minutes for six months. All children improved in their ability to produce rhymes. The result showed that their scores increased from 54% mean accuracy to 76% mean accuracy. Six children’s rhyming production performance improved from an average of less than 10% accuracy to an average of at least 80% accuracy.

Phonemic awareness skills are strongly related to success in learning to read and students with moderate to severe developmental disabilities can acquire these early literacy skills and then learn to read if they receive intensive instruction (Mayes & Calhoun, 2003; Browder, 2006; Craig, 2006). Emerging evidence indicates that children with Autism Spectrum Disorder (ASD) can benefit from phonemic awareness and reading instruction consistent with National Reading Panel (NRP)
recommendations (Whalon, Al Otaiba, & Delano, 2009). Implementing strategies to enhance phonemic awareness and reading of all students, but in particular those with Autism Spectrum Disorder, will also require collaboration between general and special educators (Hart & Chu, 2003).

To explore this question of providing phonemic awareness instruction within reading instruction in general education for students with ASD, a multiple baseline design across students and skills was selected and approved. However, as data collection procedures did not follow the multiple baseline procedures, a case study design with a descriptive data resulted. This case study was employed to evaluate the intervention with students with Autism in general education classrooms, in collaboration with general education teachers. Grade level meetings were used to look at students’ progress in phonemic skill acquisition. Phonemic awareness instructional activities were looked at across students using specific individualized instructional programs. In addition, general education teachers were surveyed about the activities and instructional routines chosen for implementation and asked which had a positive impact on reading skills across students and grade levels. This last step was based on a study by Elbro and Peterson, (2004).
CHAPTER III

METHODOLOGY

This is a case study. Initially, the research design chosen for this study was a multiple baseline design. The implementation of the multiple baseline design did not follow necessary data collection procedures; therefore the study did not demonstrate experimental control. Thus, this thesis provides descriptive data in a case study format.

Initially, the independent variable was the instruction in phonemic awareness as part of an individualized instructional program for children with Autism within the context of phonemic awareness instruction in general education classes. The dependent variable was the student outcome data from these instructional programs as well as pre and posttest data using DIBELS (Dynamic Indicators of Basic Early Literacy Skills), a standardized predictive tool of early reading success. Although experimental control has not been demonstrated, the study contains rich descriptive data that examines the changes in phonemic awareness, an indicator for early reading success, for the four participants in the intervention, which occurred from the second week of September, 2012 to the first week of June, 2013.

The date for the DIBELS pretest was September, 2012. The date for DIBELS posttest was June, 2013. The date for DIBELS pretest on Phoneme Segmentation Fluency (PSF) was January, 2013. Phoneme Segmentation Fluency is intended to be
taken in Winter / Middle (Good, Kaminski, & Smith 2002). The date for DIBELS posttest on Phoneme Segmentation Fluency was June, 2013.

**Specific Statement of the Problem**

Phonemic Awareness is a crucial factor in predicting how easily young children will acquire reading skills. When children with Autism and those without disabilities receive phonemic awareness intervention when they are learning to read, their reading tends to be more competent and they are able to work with the individual sounds in spoken words (Ehri, Nunes, Willows & Shanahan, 2001). Direct instruction in phonemic awareness processing strategies is particularly beneficial to students with Autism (Armbruster, Lehr, & Osborn, 2003).

**Hypotheses**

The purpose of this study was to demonstrate that phonemic awareness can be developed through instruction in general education class, and, furthermore, that doing so will significantly accelerate students’ subsequent reading and writing achievement. Since many children with Autism Spectrum Disorder (ASD) lack in Phonemic Awareness skills and Phonemic Awareness is critical to learning to read and write an alphabetic script, the importance of making a place for its instruction with students with Autism is clear.
Methodology

This case study on Phonemic Awareness instruction, an intervention study with students with Autism, looked at the effect of Phonemic Awareness instruction on early reading success as measured by DIBEL scores and evaluative testing. The study was reviewed and approved by the California State University East Bay, Institutional Review Board (IRB). The Parents of these four students with Autism granted written informed consent for their children to participate in this research study.

Student Participants

Four students with Autism participated in this research study. Two students were in Grade Two, age seven years old and two students were in Grade Three, age eight years old. All of the four participants were English-only speakers. Two paraprofessionals and the researcher implemented their instructional programs within the general education classroom. The participants’ names were coded as ‘AJ’, ‘BS’, ‘CI’ and ‘DE’. AJ was an eight year and nine months old boy in Third grade; BS was an eight year and seven months old girl in Third Grade; CI was a seven year old boy in Second Grade; and DE was a seven year six month old boy in Second Grade.

To address my research hypothesis, the intervention study was conducted with four students with Autism, three boys and one girl, in Grades Two and Three by comparing activities across students through specific individual instructional programs in a Second and Third Grade combination classroom through a descriptive case study design.
**Student AJ**

Student AJ was an active and energetic boy assigned to a special education class. AJ greeted his peers by saying “Hi” with a smile on his face when he was mainstreamed for Physical Education (P.E), Music, Library, Recess and Lunch (in the Cafeteria with his grade and age appropriate peers). He attended school assemblies and other school-related activities, such as taking part in the school winter concert. He participated in group singing when he was told by his Special Education teacher that he would earn three “green cards”. The green cards were used as rewards for positive behavior in the classroom. After earning three green cards he would go to the school office and get a prize. This made him excited and happy. He appeared to enjoy the company of his peers but he always wanted to do things his way. He would have tantrums, spitting and kicking when asked to change from his preferred activity to another activity. This happened occasionally because the reward system of green cards worked really well with him. He would urinate in the garbage can if he was asked to do something which he did not like. This did not happen in General Education classroom. He demonstrated no interest in reading. He was learning to write his name and upper-case and lower-case letters from a written model. He used a visual schedule to help him transition from one activity to another throughout the school day. He was very regular in his attendance.

As indicated by the research reviewed above, teaching AJ to orally say the sounds of the alphabets, blending them orally into words and identifying upper and
lower-case letters would improve his reading skills. This would then help him in other subject areas such as math, science and social studies. Moreover, developing literacy skills in the general education classrooms with grade and age appropriate peers would definitely build his self-esteem, confidence and love for learning. For this research study, AJ was integrated into a Second and Third grade Dual Language Immersion general education classroom. He went there during English instruction time in Reading for 50 minutes each day, Monday, Tuesday and Thursday with a Paraprofessional. The Researcher went there for 30 minutes in the beginning and then after three weeks, the researcher went to the General Education classroom for 20 to 25 minutes.

Student BS

Student BS always had a smile on her face when she came to school. She needed a lot of verbal and modeling prompts to express her needs and wants. She knew how to talk but somehow needed a lot of motivation to use her words to communicate with peers and adults. She was mainstreamed for P.E, Music, Library, Recess and Lunch in the Cafeteria with her grade and age appropriate peers. BS also went to school assemblies and other school-wide activities such as a fire-truck show, police show and a pet animal show. She used her daily visual schedule to help her with transitions. She listened and followed one-step directions. BS was learning to trace upper and lower-case letters. She appeared to have no interest in reading books or even looking at the pictures.
As indicated by the research reviewed above, teaching BS to orally say the sounds of alphabets, blending them into words, identifying upper and lower-case letters and segmenting the words by sound systematically through instructional programs in a general education environment would improve her reading skills.

Student BS was integrated into a Second and Third Grade Dual Language Immersion general education classroom. She went there during English Instruction time for 50 minutes each day, Monday, Tuesday and Thursday with a Paraprofessional.

**Student CI**

Student CI enjoyed the ‘Big Book’ reading in the SDC classroom. ‘Big Book’ reading is a teacher led group reading session where the teacher reads the book slowly and with expression pointing out the pictures in the book. He liked looking at the colorful pictures and listened to stories which were read aloud with expression and emotion. He had a hard time focusing on a task for more than two minutes. If a book was given to him to read he would rip the pages of the book and throw things around. When CI was distracted and disturbed the other students, the researcher took the Big Book to CI and asked him to touch the pictures in book, which regained his attention. For example, during a book about animals, touching the pictures related to the story, such as pictures of horses or dogs would bring CI’s attention back. I used direct verbal and visual prompts with CI to help CI understand a story. He liked math. He was learning to read and count numbers 1 to 10. Teaching CI through his strengths (enjoyed big book reading) was very motivating to CI.
As indicated by the research reviewed above, teaching CI the sounds of the alphabet, blending them into words and learning with his grade and age appropriate peers would accelerate his reading and writing skills in all areas of learning. CI was mainstreamed with his grade and age appropriate peers in P.E, Music, Library, Recess and Lunch. It was very difficult for CI to go for school assemblies because it was too overwhelming for him. He enjoyed outside recess. Student CI was integrated into a Second and Third grade Dual Language Immersion general education classroom. He went there during English instruction time for 50 minutes each day, Monday, Tuesday and Thursday with a Paraprofessional.

**Student DE**

Student DE was also regular in his attendance. He was absent for a few days in the study. DE liked to draw lines and circles on his white board. He had returned from a Disneyland trip and sang the song ‘Small World’ in his own tune and rhythm continually. When anything was asked, he replied in one or two words after two or three direct verbal prompts. He did not actively participate during reading and writing activities. When he was reminded of something related to Disney World or requested to sing ‘Small World’ song he became alert and responded to other questions asked during learning activities. He would point to pictures in the book or tell the name of the character in the book, when prompted to answer. As indicated by the research reviewed above, teaching DE the sounds of alphabet, blending them orally into words, identifying upper and lower case letters of the alphabet and orally segmenting
sounds in an orally presented word would build his knowledge of letter sounds and later on improve his reading skills.

For all of the students, having these students integrated into the general education classroom and learning phonemic awareness with their peers in a grade and age appropriate classroom might also benefit his general education peers as well as the teachers, both general and special education, because the strategies employed for his teaching might be very useful for other general education students as well.

Setting

The four students were integrated for 50 minutes each time, three days a week for Reading within a Second-Third Grade General Education combination classroom. All four students went to the same classroom and were taught by the same teacher. There was another teacher in the classroom for four weeks. She also took turns in teaching. After four weeks she went to a different school. This was a Dual Language Immersion classroom, comprised of English-speaking and Chinese-speaking students. This general education classroom had a 50/50 instruction model. Instruction in English was given 50% of the time and 50% in Mandarin. The four students went to the general education classroom during English instruction time. The content and instruction that was going on the first day when my students went into the general education classroom included teacher-directed whole group reading for fifteen minutes using a Second Grade reading book from the Macmillan/McGraw-Hill curriculum. The topic was “Friends and Family”. The overall theme was ‘Personal
Experiences’ for Unit 1 of the Reading curriculum. The teacher used Letter-Sound cards with all of the students. The students were integrated in the same class and taught by the same teacher throughout the school year except for the first four weeks in September 2012. During the first four weeks of September 2012, there was another general education teacher in the classroom along with the other teacher.

This was the only time the four students were integrated in this general education class, and was the first time they were being mainstreamed for any academic subject. As noted above, they were integrated for P.E, Music, Library, Recess and Lunch with their grade and age appropriate peers including their peers from the same Second and Third Grade class where they were being mainstreamed. Moreover, when they went for Library, there were a lot of directions that they had to follow, such as waiting in line, taking turns to choose a book of their choice, following two to three step direction as how to use the computer and the like. A decision was made to integrate them gradually with more and more time in the general education classrooms. Two paraprofessionals accompanied the four students, two students with each paraprofessional. The researcher also went to the general education classroom. The researcher went to the general education classroom on Tuesday, Thursday and Friday for 20 to 25 minutes, about half the period that the students were present. In the beginning for two weeks, the researcher went for approximately 30 minutes. The researcher stayed a little longer in the beginning to demonstrate to the Para-Professionals how to help other students in the classroom. Seeing me working with both the special education students and the general education
students in the same classroom also provided guidance to the Para-Professionals about being supportive of all the learners in the classroom even when their own students did not need their assistance. The general education teacher expressed her appreciation for their efforts.

Paraprofessional Training

The two Paraprofessionals who implemented the specific instructional programs were given training by the researcher for two hours each for two consecutive Wednesdays, August 29th and September 5th, 2012 before the implementation of the instructional programs. They were given a total of four hours of training. All the prompt levels, Direct Verbal (DV), Indirect Verbal (IDV) and Gestural (G) prompts were explained to them in detail. They were also taught how to take Baseline (BL) and Probes (P) data. On the first day (Wednesday afternoon), the first half hour, the researcher gave them in writing the explanation of different prompts. The researcher read each prompt aloud while they were listening and simultaneously following along with the handout that the researcher gave them, which contained a detailed explanation of each prompt level. In the next half hour, for 15 minutes they were told to read the description of each prompt on their own. The next 15 minutes were devoted to a question and answer session in which questions were asked by the Paraprofessionals and the researcher answered their questions. For example, one of the Paraprofessionals asked the researcher, “What is a prompt?” The researcher told them that any extra information which is given for assistance and then
faded away is called a prompt. For the next half hour, the researcher modeled each prompt for them although they reported that they knew how to deliver prompts. The last half hour of the first day, I had written each prompt (DV, IDV, G, P) on a small piece of paper and folded it. They had to pick up one of the pieces of paper, open it and read aloud which prompt was written and then explain or model that prompt. The two Paraprofessionals had two turns each. They demonstrated the prompts correctly.

The next Wednesday, day two, the researcher had Letter/Sound cards from Macmillan/McGraw-Hill curriculum set up on the table in the researcher’s classroom. The researcher also had blank data sheets for the instructional programs (letters A to J). For 90 minutes, the two paraprofessionals and the researcher role played as student and a Paraprofessional. The selection was done voluntarily because all three of us had to be in each of the roles. The third person noted down in points any questions she had in mind while observing how the paraprofessional was taking the baseline data and marking on the data sheet for the response given by the student. The next half hour was devoted to feedback on the training that they had received on the two Wednesdays.

These paraprofessionals had been trained by the researcher during the previous year on implementing systematic instructional programs and taking data on specific programs for students, as doing so is a part of their daily job description. During the training they were instructed to be regular and consistent in implementing the instructional programs.
**Teacher Survey**

The Teacher Survey was given to the two general education teachers of the combination class who were teaching during in the third week of September, 2012. They took approximately two weeks to fill out the survey. One teacher was the general education teacher who taught the four students throughout school year. The second teacher was a general education teacher in the same class who was there for four weeks. Since she was there while my students went for mainstreaming the researcher also gave her the survey.

**Goal of the Survey**

The goal of the survey was to find out what they viewed as effective phonemic awareness activities and instructional routines that might help every instructor teach reading in the most effective manner possible. This information may assist teachers of students with Autism to identify the skills and strategies they need to teach their students to become successful readers. This survey was given one time at the start.

**General Educators Survey**

The survey examined their views on effective phonemic awareness activities and instructional routines that might help every instructor teach reading in the most effective manner. The general education teachers were asked to rate each item in Question Number 1 from a score of one to five. A score of one was rated as “not
important,” two as “may be important,” three as “somewhat important”, four as “very important” and five as “essential”. In Question Number 2, they were asked to rate each item from a score of one to three, with three as “most effective”. In Question Number 3, they were asked to rate each item from a score of one to five, with one as “strongly agree”, two as “disagree”, three as ‘neutral”, four as “agree” and five as “strongly agree”. In Question Number 4, they were asked to each item in minutes, “10-15 minutes”, “15-30 minutes”, “30-45 minutes” and “45 minutes-1 hour”. In Question Number five, they were asked to rate each item from a score of one to five, with one as “very dissatisfied”, two as “dissatisfied”, three as “neutral”, four as “satisfied” and five as “very satisfied”. In Question Number 6, they were asked to rate each item from a score of one to five, with one as “very dissatisfied”, two as “dissatisfied”, three as “neutral”, four as “satisfied” and five as “very satisfied”. In Question Number 7, they were asked to share additional effective phonemic awareness strategies that they had utilized.

**DIBELS Administration**

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) (Good, Simmons, & Smith, 1998; Kaminski & Good, 2002) is designed to measure performance on early literacy skills before children begin to read and during early instruction. DIBELS serves two functions: (a) to identify children who are not acquiring early literacy skills and (b) to monitor progress during reading interventions (Kaminski & Smith, 2002). In September, 2012, the Pretest of DIBELS Initial Sound
Fluency and Letter Naming Fluency were conducted with the four student participants. In June, 2013, the Posttest of DIBELS Initial Sound Fluency and Letter Naming were conducted with the four participants.

**DIBELS Initial Sound Fluency (ISF)**

DIBELS Initial Sound Fluency (ISF) is a standardized, individually administered measure of phonemic awareness that assesses a child’s ability to recognize and produce the initial sound in an orally presented word (Kaminski & Good, 1998; Liamon, 1994). The researcher presented four pictures to the child, named each picture, and then asked the child to identify (that is, point to or say) the picture that begins with the sound produced orally by the researcher. For example, the examiner said, “This is a sink, cat, gloves, and hat. Which picture begins with /s/?” and the student is expected to point to the correct picture (Good, Kaminski, & Smith, 2002).

**DIBELS Letter Naming Fluency (LNF)**

DIBELS Letter Naming Fluency (LNF) is a standardized, individually administered test. Students were presented with a page of upper and lower-case letters arranged in random order and were asked to name as many letters as they could. LNF is based on research by Marston and Magnusson (1985). Students were told if they did not know a letter they would be told the letter. The student was allowed one minute to produce as many letter names as he/she could, and the score was the number of letters named correctly in one minute.
**DIBELS Phoneme Segmentation Fluency (PSF)**

In January, 2013, the Pretest of DIBELS Phoneme Segmentation Fluency was conducted with four participants. In June, 2013, Posttest of DIBELS Phoneme Segmentation Fluency was conducted with the four participants (Phoneme Segmentation Fluency is intended to be taken in Winter/Middle, Good, Kaminski, & Smith, 2002). This test was started after four months of intervention. The intervention started in the second week of September, 2012.

DIBELS Phoneme Segmentation Fluency (PSF) is a standardized, individually administered test of phonemic awareness (Good & Kaminski, 2001). The PSF measure assesses a student’s ability to segment three-and four-phoneme words into their individual phonemes fluently. The PSF measure has been found to be a good predictor of later reading achievement (Kaminski & Good, 1996). The PSF task was administered by the researcher orally presenting words of three to four phonemes. It requires the student to produce verbally the individual phonemes for each word. The researcher said, “sat,” and the student said, “/s/ /a/ /t/” to receive three possible points for the word. After the student responded, the researcher presented the next word, and the number of correct phonemes produced in one minute determines the final score.
Systematic Instructional Program Intervention

The first major activity on phonemic awareness was to orally say the sounds of alphabet. The General Education teacher showed the letter card ‘A’ which also had the picture of an ‘Apple’. The letter card was big and colorful. It was visible to all the students in the classroom. The teacher also moved around the classroom with the card. The students did not have individual cards. She said, “The letter a stands for the /a/ sound, as in apple. Let’s pretend to open our mouths wide, so we can bite into a juicy, sweet apple. Say /a/ /a/ apple. (munch) we bite into our apple.” These colorful letter/sound cards on phonemic awareness were from the Language Arts curriculum (Macmillan/McGraw-Hill, 2007). The script that the teacher read was written at the back of the card. The first baseline was taken on sounds of the alphabet form /a/ to /j/ for two consecutive days on all of the four students on the specific individual instruction program by the Para-Professionals and the researcher in the second week of September, 2012. The student’s first instructional program consisted of orally saying the Sounds of Alphabet /a/ to /j/. The second instructional program was orally saying the Sounds of Alphabet /k/ to /t/. The third instructional program was orally saying the Sounds of Alphabet /u/ to /z/. The fourth instructional program was blending the sounds orally into words.

Intervention data were taken three days a week, on Monday, Tuesday and Thursday. The prompts that were used for all the four students were Direct Verbal (DV), Indirect Verbal (IDV), Gesture (G), Independent (I). All the four students had
the same prompt levels because when the first baseline was taken of letters /a/ to /j/ student AJ knew only the sound of /a/, student BS could not orally say any of the sounds, student CI could not orally say any of the sounds and student DE also could not orally say any of the sounds /a/ to /j/. During the baseline sessions of rest of the alphabets the baseline score for all the students was zero. Therefore, all four students’ programs needed to start from Direct Verbal prompts to Indirect Verbal prompts and went to Gestural prompts and finally to Independent prompts. The criterion for movement was 100% correct on two out of three trials. The same procedure was followed for sounds of the alphabet from /k/ to /t/ and /u/ to /z/. The next objective was to orally blend the sounds into words. Specific individual instructional programs were made for this objective also for all the four participants. Baseline data were taken for two days at the introduction of each individualized program (Orally say the Sounds of Alphabet A to J; Orally say the Sounds of Alphabet K to T; Orally say the Sounds of Alphabet U to Z and Blend the sounds orally into words) for each of the four participants. After the baseline data, intervention data was taken for different prompt levels (DV, IDV, Probe 1, Gestural, Probe 2, I) for all three days in a week for full 15 sessions.
CHAPTER IV

RESULTS

Interobserver Reliability

Interobserver reliability data were collected for all four students in each of the four individualized instructional programs intervention. A second, trained rater (there were two Paraprofessionals working with the researcher) collected data with the researcher (Special Education Teacher) in the general education classroom throughout the course of the study. Target students participated in the study for a total of 52-60 sessions depending upon their personal attendance within the time frame of the project. For AJ (Student One), a second rater collected data with the observer for 100% of the baseline sessions (8/8) and for 77% (45/52) of the sessions during the intervention; for BS (Student Two), interobserver reliability data were collected for 100% (8/8) of the baseline sessions and for 77% (45/52) of the intervention sessions. CI (Student Three) had a second rater for 100% (8/8) of the baseline opportunities and for 100% (52/52) of the intervention opportunities, while for DE (Student Four), this took place for 100% (8/8) of his baseline sessions and 100% (52/52) of his intervention sessions. For all of the students in all of the intervention sessions the interobserver reliability was found to be 100% (calculated by taking the total number of instances of agreement by the two observers and dividing it by the total number of agreements and disagreements of the observers x 100).
Dynamic Indicators of Basic Early Literacy Skills

Initial Sound Fluency Pretest and Posttest Results

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Initial Sound Fluency (ISF) was individually administered with student AJ, student BS, student CI and student DE. It took three minutes to administer. This test assessed each student’s ability to recognize and produce the initial sound in an orally presented word. The examiner showed the student the probe pictures, pointed to each picture and said the name following the standardized directions. There were a total of sixteen probe pictures. For example, the examiner placed four pictures in front of the student. The examiner said, this is tomato, cub, plate, doughnut (pointed to pictures) and asked, which picture begins with /d/?, which picture begins with /t/?, which picture begins with /k/?, which picture begins with /p/? The examiner presented the next questions as written on the score sheet. After the examiner finished asking the question, the examiner started her stopwatch. I stopped the stopwatch as soon as the student responded. If the student did not respond after five seconds, the examiner scored the question as zero and presented the next question. Each question had a score of zero and one. The examiner also noted in how many seconds the student responded. In the end, the result for ISF was calculated by the following formula: sixty multiplied by total correct and then divided by seconds (Kaminski & Good, 1998).
Student 1: AJ

Pretest of DIBELS Initial Sound Fluency (ISF) was administered with student AJ in September, 2012. AJ was able to recognize and produce the initial sound of /t/ in four seconds and /s/ in three seconds. Student AJ was not able to recognize and produce the initial sound of rest of the fourteen orally presented words. His score was 17 Correct Initial Sounds per minute.

Posttest of DIBELS Initial Sound Fluency (ISF) was administered with student AJ in June, 2013. AJ had made good progress. AJ was able to recognize and produce the initial sound of /d/ in two seconds, /t/ in two seconds, /k/ in one second, /r/ in two seconds, /b/ in two seconds, /i/ in three seconds, /r/ in two seconds, /f/ in two seconds, /s/ in two seconds, /m/ in two seconds, /b/ in two seconds, /p/ in three seconds and /d/ in two seconds. His score was 29 Correct Initial Sounds per minute.

Student 2: BS

Pretest of DIBELS Initial Sound Fluency (ISF) was administered with student BS in September, 2012. BS was able to recognize and produce the initial sound of /b/ in four seconds. Student BS was not able to recognize and produce the initial sound of rest of the fifteen orally presented words. Her score was 15 correct Initial Sounds per minute.

Posttest of DIBELS Initial Sound Fluency (ISF) was administered with student BS in June, 2013. BS made substantial progress. BS was able to recognize
and produce the initial sound of /d/ in two seconds, /t/ in one second, /k/ in two seconds, /p/ in four seconds, /r/ in three seconds, /b/ in two seconds, /t/ in three seconds, /s/ in two seconds, /b/ in two seconds, /d/ in four seconds and /qu/ in two seconds (Sounds of /t/, /b/ and /d/ had been repeated because they had different pictures the second time). Her score was twenty-four Correct Initial Sounds per Minute.

**Student 3: CI**

*Pretest of DIBELS Initial Sound Fluency (ISF)* was administered with student CI in September, 2012. CI was not able to recognize and produce the initial sound of the sixteen orally presented words. His score was zero correct Initial Sounds per minute.

*Posttest of DIBELS Initial sound Fluency (ISF)* was administered with student CI in June, 2013. CI made very good progress. CI could recognize and produce the initial sound of /d/ in two seconds, /t/ in two seconds, /k/ in three seconds, /t/ in two seconds, /b/ in two seconds, /i/ in one second, /r/ in three seconds, /s/ in three seconds, /b/ in two seconds, /d/ in two seconds and /qu/ in two seconds. His score was twenty-seven Correct Initial Sounds per Minute.

**Student 4: DE**

*Pretest of DIBELS Initial Sound Fluency (ISF)* was administered with student DE in September, 2012. DE was able to recognize and produce the initial sound of /b/
in four seconds. Student DE was not able to recognize and produce the initial sound of rest of the fifteen orally presented words. His score was 15 correct Initial Sounds per minute.

Posttest of DIBELS Initial Sound Fluency (ISF) was administered with student DE in June, 2013. DE made progress. DE could recognize and produce the initial sound of /d/ in two seconds, /t/ in three seconds, /k/ in three seconds, /p/ in four seconds, /k/ in four seconds, /r/ in two seconds, /b/ in two seconds, /r/ in three seconds, /s/ in one second, /b/ in three seconds, /d/ in two seconds and /qu/ in four seconds. His score was 22 Correct Initial sounds per Minute.

Letter Naming Fluency Pretest and Posttest Results

The Dynamic Indicators of Basic Early Literacy Skills, Letter Naming Fluency (LNF) Pretest was individually administered to students AJ, BS, CI and DE. It took one minute to administer this test for each student. The examiner placed a student copy of the probe in front of the student. The examiner told the student to point to each letter and tell the name of that letter. The score was calculated by the number of letters named correctly in one minute (Kaminski & Good, 2002).

Student 1: AJ

Pretest of Letter Naming Fluency (LNF) was administered with student AJ in September, 2012. In one minute AJ could name the letter ‘N’ out of 24 letters. The letter ‘N’ occurred two times. He scored two in LNF.
Posttest of Letter Naming Fluency (LNF) was administered with AJ in June, 2013. AJ showed great improvement. In one minute AJ was able to name sixty letters. He scored 60 in LNF.

Student 2: BS

Pretest of Letter Naming Fluency (LNF) was administered with student BS in September, 2012. In one minute BS could not name the ten letters pointed to. She scored zero in LNF.

Posttest of Letter Naming Fluency (LNF) was administered with student BS in June, 2013. BS showed progression. In one minute BS was able to name 35 letters. She scored 35 in LNF.

Student 3: CI

Pretest of Letter Naming Fluency (LNF) was administered with student CI in September, 2012. CI was not able to name of each of the ten letters pointed to. He scored zero in LNF.

Posttest of Letter Naming Fluency (LNF) was administered with student CI in June, 2013. CI did very well in the posttest. In one minute CI could name of 43 letters pointed to. He scored 43 in LNF.
Student 4: DE

Pretest of Letter Naming Fluency (LNF) was administered with student DE in September, 2012. DE named ‘E’ and ‘R’ in one minute. He scored two in LNF.

Posttest of Letter Naming Fluency (LNF) was administered with student DE in June, 2013. DE did well in posttest. He named of 43 letters, scoring 43 in LNF.

Phoneme Segmentation Fluency Pretest and Posttest Results

The Dynamic Indicators of Basic Early Literacy Skills, Phoneme Segmentation Fluency (PSF) test was individually administered to student AJ, BS, CI and DE. This test was administered four months after the intervention. Phoneme Segmentation Fluency is intended for children from winter (Good & Kaminski, 2002). This test takes one minute to administer. The examiner orally presented words of three to four phonemes. The student is required to produce verbally the individual phonemes for each word. For example, the examiner said, ‘sat’, the student has to say ‘/s/ /a/ /t/’ to receive three possible points for the word. The maximum time for each sound segment was three seconds. If the student did not provide the next sound segment within three seconds, the examiner gave the student the next word (Good & Kaminiski, 2002). The number of correct phonemes produced in one minute determined the final score.
Student 1: AJ

Pretest of Phoneme Segmentation Fluency (PSF) was administered with student AJ in January, 2013. AJ could produce verbally the individual sound of the first letter of the word. For example, when the examiner orally presented the word ‘duck’, AJ was able to verbally produce the individual phoneme /d/. He could not verbally produce the individual phonemes /u/ and /k/. The total number of sound segments produced correctly at the end of one minute was 22.

Posttest of Phoneme Segmentation Fluency (PSF) was administered with student AJ in June, 2013. AJ showed good progress as he was able to produce verbally all the individual phonemes for words like, duck, rush, shop, pine, hall, row, tip, etc. He was not able to say the sound segment for words like, cheese and too. The total number of sound segments produced correctly by AJ was 49.

Student 2: BS

Pretest of Phoneme Segmentation Fluency (PSF) was administered with student BS in January, 2013. BS was able to say the sound segment of first letter of the word orally presented to her by the examiner like in duck, /d/ and not /u/ and /k/, in word bat, /b/, in word gone, /g/, in word more, /m/, etc. Only in word shop she could say the sound segment /p/. The total number of sound segments produced correctly at the end of one minute was 17.
Posttest of Phoneme Segmentation Fluency (PSF) was administered with student BS in June 2013. BS showed progression in saying the sound segment of the words orally presented to her by the examiner. She was able to say the sound segment of not only the first letter of the word but also of the middle and last letter of the word. For example, for the word tip, she could say the sound segment of /t/ and /p/. For the word gone, she could say the sound segment of /g/, /o/, /n/. For the word seen, she could say /s/ and /n/ and was not able to say the sound segment /ea/. The total number of sound segments produced correctly at the end of one minute was 34.

Student 3: CI

Pretest of Phoneme Segmentation Fluency (PSF) was administered with student CI in January, 2013. CI could tell some of the beginning sound in the word. He could tell the ending sounds of six words. For example of word too, he could tell /oo/, of word hall, he could tell /l/, of word gone, he could tell /n/, of word hoot, he could tell /t/, of word thank, he could tell /k/ and of word cheese, he could tell /z/. The total number of sound segments produced correctly at the end of one minute was 19.

Posttest of Phoneme Segmentation Fluency (PSF) was administered with student CI in June, 2013. CI made substantial progress in saying the sound segment of words which were orally presented to him by the examiner. CI was able to tell the sounds in the words which were the beginning sounds, some ending sounds and very few middle sounds. For example, he could tell the beginning and ending sound /d/ and /k/ in the word duck, beginning sound /t/ in the word too, beginning /r/ and
middle /u/ in the word rush, beginning sound /y/ in the word your and ending sound /d/ in the word should and similarly in other words which were orally presented to him by the examiner. The total number of sound segments produced correctly at the end of one minute was 38.

Student 4: DE

Pretest of Phoneme Segmentation Fluency (PSF) was administered with student DE in January, 2013. DE was able to say the sound segments of the beginning words and the ending sounds of six words and the middle sound of one word. For example, he could say the beginning sound /d/ and ending sound /k/ in the word duck but could not tell the /u/ sound. In the word shop, he could segment only the /o/ and /p/ sound. The total number of sound segments produced correctly at the end of one minute was 24.

Posttest of Phoneme Segmentation Fluency (PSF) was administered with student DE in June, 2013. DE did well in the posttest. DE was able to tell the sounds in the word. For example, in the word bat, he could tell /b/ /a/ /t/. In the word knock, he told /o/ /k/ together but not separately, in the word more, he told /m/, in the word ranch, he told only /r/ sound. The total number of sound segments produced correctly at the end of one minute was 38.
Summary of DIBELS Individual Results

The Pretest on Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Initial Sound Fluency (ISF) showed that three students, coded as AJ, BS and DE scored ISF scores of 17, 15 and 15 respectively. These three students were at Low Risk. One student coded as CI had an ISF score < 4. This student was At Risk as can be seen in Graph 1. The Posttest on ISF score showed huge gains on all the four students. AJ’s ISF score was 29, a gain of 12 points. BS’ ISF was 24, a gain of 9 points. DE’s ISF score was 22, a gain of 7 points. CI’s ISF score was 27, a gain of 27 points, as reported in Graph 2.

The Pretest on Letter Naming Fluency (LNF) showed that all the four students scored in the range of 0 to 2. LNF pretest score of student AJ was 2. Student BJ LNF score was 0. Student CI LNF score was 0. Student DE LNF score was 2 as seen in Table 3. The Posttest on LNF score showed that all the four students made significant gains. LNF posttest score of student AJ was 60, that is, a gain of 58 points. LNF score of student BS was 35, that is, a gain of 35 points. LNF score of student CI was 43, that is, a gain of 43 points. LNF score of student DE was 43, that is, a gain of 41 points as reported in Table 4.

The Pretest on Phoneme Segmentation Fluency (PSF) showed that all the four students scored in the range of 17 to 24. PSF pretest score of student AJ was 22. PSF score of student BS was 17. PSF score of student CI was 19. PSF score of student DE was 24 as reported in Table 5. The Posttest on PSF score showed significant gains by
all the four students. PSF posttest score of AJ was 49, that is, a gain of 27 points. PSF score of student BS was 34, that is, a gain of 17 points. PSF score of student CI was 38, that is, a gain of 19 points. PSF score of student DE was 38, that is, a gain of 14 points.
Findings on DIBELS

Graph 1

![Graph 1](image1.png)

Graph 2

![Graph 2](image2.png)

Graph 3

![Graph 3](image3.png)
Findings on Systematic Individualized Instructional Programs Intervention

Student 1: AJ

Student AJ learned to say the sounds of alphabet /a/ to /z/ and blended the sounds orally into words in the General Education classroom. The general education teacher used large colorful letter/sound cards on phonemic awareness from the Language Arts curriculum (Macmillan/McGraw-Hill).

AJ: Letters A to J

Baseline Data for orally saying the sounds of the alphabet /a/ to /j/ were taken for two consecutive days in the second week of September, 2012 in the general education classroom with student AJ. During the baseline phase, AJ knew only the sound /a/. During the intervention phase, with first Direct Verbal (DV) prompt, AJ could say the sound /a/, /b/, /d/, /f/, /h/ and /j/. In the second and third DV prompt, AJ could say all the sounds /a/ to /j/. In the first Indirect Verbal Prompt (IDV), AJ could say the sound /a/, /b/, /d/, /f/, /g/, /h/, /i/ and /j/. A probe was conducted after a week and AJ repeated his correct performance for sounds /a/ to /j/. In the third IDV prompt, AJ was again successful in saying the sounds. Next, Gestural (G) prompts showed that AJ could say sounds /a/ to /j/. Two Independent (I) levels showed that AJ had mastered the sound /a/ to /j/. In the third Independent level, baseline after intervention, no letter/sound cards were used and AJ could orally say the sounds of alphabet /a/ to /j/ when letters were written on paper by hand by the examiner.
BL = Baseline; DV = Direct Verbal; IDV 1 = Indirect Verbal 1; P1 = Probe 1;
IDV 2 = Indirect Verbal 2; G = Gestural; P2 = Probe 2; I = Independent

AJ: Letters K to T

Baseline Data for orally saying the sounds of alphabet /k/ to /t/ were taken for two consecutive days in the second week of November, 2012 in the general education classroom with student AJ. During the baseline phase, AJ knew the sound /p/. He did
not know the rest of the sounds. During the intervention phase, with first Direct
Verbal (DV) prompt, AJ could say the sound /k/, /m/, /n/, /o/, /p/, /r/, /s/ and /t/. The
teacher showed large lip movement cards which were colorful. These cards helped AJ
to sound /l/ and /q/. In the second and third DV prompt, AJ could say all the sounds
/k/ to /t/. In the first Indirect Verbal Prompt (IDV), AJ could say the sound /k/, /l/,
/m/, /n/, /o/, /p/, /q/, /r/, /s/ and /t/. A probe was conducted after a week and AJ
repeated his correct performance for sounds from /k/ to /t/. In the third IDV prompt,
AJ said the sound /k/ to /t/. Gestural (G) prompts showed that AJ was able to say the
sound /k/ to /t/. Two Independent (I) levels showed that AJ had mastered the sounds
/k/ to /t/. In the third Independent level, baseline after intervention, no letter/sound
cards and lip movement cards were used. AJ could orally say the sounds of alphabet
/k/ to /t/ as the examiner wrote the alphabet on paper.
BL= Baseline; DV= Direct Verbal; IDV 1= Indirect Verbal 1; P1= Probe 1;
IDV 2= Indirect Verbal 2; G= Gestural; P2= Probe 2; I=Independent
AJ: Letters U to Z

Baseline Data for orally saying the sounds of alphabet /u/ to /z/ were taken for two consecutive days in the second week of February, 2013 in the general education classroom with student AJ. During the baseline phase, AJ did not know any of the sounds from /u/ to /z/. During the intervention phase, with first Direct Verbal (DV) prompt, AJ could orally say the sounds /v/, /w/, /x/, /y/ and /z/. In the second and third DV prompt, AJ could say all the sounds from /u/ to /z/. In the first Indirect Verbal Prompt (IDV), AJ could say the sound /u/ to /z/. A probe was conducted after a week and AJ repeated his correct performance for sounds /u/ to /z/. In the third IDV prompt, AJ performed correctly for all sounds from /u/ to /z/. Two Independent (I) levels showed that AJ had mastered the sound /u/ to /z/. In the third Independent level, baseline after intervention, no letter/sound cards were used. AJ could orally say the sounds of alphabet /u/ to /z/ as the examiner wrote the alphabet on paper.
BL = Baseline; DV = Direct Verbal; IDV 1 = Indirect Verbal 1; P1 = Probe 1;
IDV 2 = Indirect Verbal 2; G = Gestural; P2 = Probe 2; I = Independent
Baseline Data for blending the sounds orally into words cat, bat, sat, rat, fat, hat, mat, pat, bad and man were taken in the second week of April, 2013 with student AJ. During the baseline phase, AJ could blend the sounds of words cat, bat, rat, hat, mat and bad. During the intervention phase, AJ had mastered blending the sounds orally into words cat, bat, sat, rat, fat, hat, mat, pat, bad and man. Another probe was conducted after the intervention, in which AJ was successful in blending the sounds orally into words of all the 10 words.
BL = Baseline; DV = Direct Verbal; IDV 1 = Indirect Verbal 1; P1 = Probe 1;
IDV 2 = Indirect Verbal 2; G = Gestural; P2 = Probe 2; I = Independent
Student 2: BS

Like AJ, student BS benefited from this intervention, demonstrating mastery in orally saying the sounds of the alphabet /a/ to /z/ and also blending the sounds orally into words of ten words which were presented to her during the intervention phase. It was interesting to note that although she did not know the sounds of alphabet during the baseline phase, after intervention she almost progressed the same way as AJ.

BS: Letters A to J

Baseline Data for orally saying the sounds of alphabet were taken in the second week of September, 2012 in the general education classroom. BS did not know the sounds of the alphabet /a/ to /j/. During the intervention phase, in the first Direct Verbal (DV) prompt, BS could orally say the sounds of alphabet /a/, /b/, /c/, /e/, /h/ and /i/. In the second and third DV prompt, BS could say the sounds /a/, /b/, /c/, /d/, /e/, /f/, /g/, /h/, /i/ and /j/. In the first Indirect Verbal (IDV) prompt, BS could not say the sound of /f/ and /i/. In the second IDV, BS could say all the sounds /a/ to /j/. A probe was conducted after a week and BS repeated her correct performance for sounds /a/ to /j/. Two gestural prompts and the second probe showed that BS could say the sound /a/ to /j/. The two Independent (I) levels showed that BS had mastered to orally say the sounds of alphabet from /a/ to /j/. Another probe was conducted after the intervention in which the alphabets were written on a piece of paper by the
examiner and no letter/sound cards were shown. BS orally said sounds of the alphabet /a/ to /j/.

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BL= Baseline; DV= Direct Verbal; IDV 1= Indirect Verbal 1; P1= Probe 1; IDV 2= Indirect Verbal 2; G= Gestural; P2= Probe 2; I=Independent
BS: Letters K to T

Baseline data for orally saying the sounds of alphabet letters /k/ to /t/ were collected with student BS in the second week of November, 2012 in the general education classroom. Baseline showed that BS knew the sound of /s/. The intervention started with the Direct Verbal (DV) and BS could not say the sound /k/ and /r/. The teacher showed large lip movement cards to all the students. These large lip movement cards helped BS to orally say the sound /k/, /l/, /m/, /n/, /o/, /p/, /q/, /r/, /s/ and /t/ in the second and third DV prompts. In the Indirect Verbal (IDV) prompts, BS was able to say all the sounds from /k/ to /t/ both times. A probe was conducted after a week and BS repeated her correct performance for sounds /k/ to /t/. Gestural (G) prompts and the second probe showed that BS orally said the sound /k/, /l/, /m/, /n/, /o/, /p/, /q/, /r/, /s/ and /t/. The two independent levels showed that BS had mastered the sound /k/ to /j/. Another probe was conducted after the intervention and no sound/letter cards were showed. BS correctly verbalized the sounds of the alphabet letters which were written on paper by the examiner.
BL= Baseline; DV= Direct Verbal; IDV 1= Indirect Verbal 1; P1= Probe 1;
IDV 2= Indirect Verbal 2; G= Gestural; P2= Probe 2; I=Independent
BS: Letters U to Z

Baseline data for orally saying the sounds of alphabet /u/ to /z/ were collected with student BS in the second week of February, 2013 in the general education classroom. Baseline was taken for two consecutive days. Baseline results showed that BS did not know the sound /u/ to /z/. During the intervention phase, in the first Direct Verbal (DV) prompt, BS could not say the sound /u/ and /x/. In the second and third DV prompt, BS orally said the sound /u/ to /z/. The next Indirect Verbal (IDV) prompt showed that BS orally said the sound /u/, /v/, /w/, /x/, /y/ and /z/. A probe was conducted after a week and BS could orally say the sound of alphabet /u/ to /z/. The second probe and the Independent (I) level showed that BS had mastered the sounds. Another probe was conducted after the intervention without the letter/sound cards. The alphabets were written on paper by the examiner. BS was successful in orally saying the sounds of alphabet letters from /u/ to /z/. 
Graph 10: Student BS
Letters U to Z

BL = Baseline; DV = Direct Verbal; IDV 1 = Indirect Verbal 1; P1 = Probe 1;
IDV 2 = Indirect Verbal 2; G = Gestural; P2 = Probe 2; I = Independent
**BS: Words:**

Baseline Data for blending the sounds orally into words were administered with student BS for two consecutive days in the second week of April, 2013. In the baseline it was seen that BS could not blend the sounds of cat, bat, sat, rat, fat, pat and bad orally into words. During the intervention phase, in the first Direct Verbal (DV) prompt, BS could orally blend the sounds of cat, bat, sat, fat, hat, mat, pat, bad and man into words. In the second and third DV prompt, BS was able to blend the sound of cat, bat, sat, rat, fat, hat, mat, pat, bad and man. The Indirect Verbal (IDV) prompt and the two probes showed that BS could blend the sounds orally into words of all the ten words that were presented to her. The next two Independent (I) levels showed that BS had mastered blending the sounds orally into words. A probe that was conducted after the intervention showed that BS successfully blended the sounds orally of all the 10 words.
Graph 11: Student BS Words

BL= Baseline; DV= Direct Verbal; IDV 1= Indirect Verbal 1; P1= Probe 1;
IDV 2= Indirect Verbal 2; G= Gestural; P2= Probe 2; I=Independent
Student 3: CI

Student CI benefited from this intervention. By the end of this intervention CI had mastered the sounds of the alphabet /a/ to /z/ as he could orally say the sounds of alphabet when shown the letter/sound card by the general education teacher and also without the letter/sound card. The teacher also showed the large lip movement card to help CI say the sound /k/, /p/ and /q/. CI had also mastered to blend the sounds orally into words like, cat, bat, sat, rat, fat, hat, mat, pat, bad and man. It was interesting to see how CI progressed with each prompt level successfully.

CI: Letters A to J

Baseline data for orally saying the sounds of the letters /a/ to /j/ was collected with CI in the general education classroom in the second week of September, 2012. During baseline phase, CI did not know the sounds of the letters /a/ to /j/. The first DV prompt showed that CI could orally say the sound /b/, /c/, /d/, /g/, /h/ and /j/. In the second and third Direct Verbal (DV) prompt, CI orally said the sound /a/ to /j/. The Indirect Verbal (IDV) prompt showed that CI could say the sound /a/, /b/, /c/, /d/, /e/, /h/, /i/ and /j/. He was not able to say the sound /f/ and /g/. The teacher showed the large lip movement cards. The next IDV prompt and probe showed that CI was successful in saying the sound /a/ to /j/. During the gestural prompt CI could not say the sound /g/. The probe and the two Independent (I) levels showed that CI had mastered the sound /a/ to /j/. Another probe was conducted after the intervention which showed that CI orally said the sounds of alphabet letters /a/ to /j/ by just
looking at the letters written on the paper by the examiner. No letter/sound cards were shown. This showed his mastery in orally saying the sounds of the letters /a/ to /j/.

BL= Baseline; DV= Direct Verbal; IDV 1= Indirect Verbal 1; P1= Probe 1; 
IDV 2= Indirect Verbal 2; G= Gestural; P2= Probe 2; I=Independent
CI: Letters K to T

Baseline data for orally saying the sounds of alphabet /k/ to /t/ were collected with student CI in the second week of November, 2012 in the general education classroom. During the baseline phase, CI orally said the sound /m/ but not the rest. During the intervention phase, the first Direct Verbal (DV) prompt showed that CI orally said the sound /l/, /m/, /n/, /o/, /r/, /s/ and /t/. The second and third DV prompt showed that CI could say the sound /k/ to /t/. The next Indirect Verbal (IDV), probe and Gestural (G) prompts showed that CI could orally say the sounds of letters /k/ to /t/. The two independent (I) levels were highly successful as CI had now mastered the sounds /k/ to /t/ without any prompts. Another probe was conducted after the intervention to see whether CI could orally say the sound /k/ to /t/ without the letter/sound cards which were constantly shown throughout the intervention phase. During this probe the letters were written on paper by the examiner and CI was successful in orally saying the sound /k/ to /t/.
BL= Baseline; DV= Direct Verbal; IDV 1= Indirect Verbal 1; P1= Probe 1;
IDV 2= Indirect Verbal 2; G= Gestural; P2= Probe 2; I=Independent
CI: Letters U to Z

Baseline Data for orally saying the sounds of alphabet /u/ to /z/ was administered with student CI in the general education classroom in the second week of February, 2013. During baseline CI did not know the sound /u/ to /z/. The first Direct Verbal (DV) showed that CI could say the sound /u/, /v/, /y/ and /z/. The next two DV prompts showed that CI could orally say the sounds /u/ to /z/. The Indirect Verbal (IDV), probe, Gestural (G) prompts showed progression as CI orally said the sounds /u/ to /z/. The Independent (I) levels showed that CI had mastered the sound /u/ to /z/. Another probe conducted after the intervention showed that CI orally said the sound /u/ to /z/.
BL= Baseline; DV= Direct Verbal; IDV 1= Indirect Verbal 1; P1= Probe 1; IDV 2= Indirect Verbal 2; G= Gestural; P2= Probe 2; I=Independent
Baseline Data for blending the sounds orally into words were administered with student CI in the second week of April, 2013 in the general education classroom. Baseline showed that CI could blend the sounds of cat, bat, sat, rat, hat, pat and man into words. He could not blend the sounds of fat, mat and bad into words. CI showed successful progression from the Direct Verbal (DV) prompt to the indirect Verbal (IDV) prompt as CI could blend the sounds of cat, bat, sat, rat, fat, hat, mat, pat, bad and man. The probe and the Gestural (G) prompts showed that CI was able to blend the sounds of ten words orally into words. The next two Independent (I) prompts showed that CI had mastered blending the sounds orally into words. Another probe conducted after the intervention showed that CI was successful in blending the sounds orally of all the 10 words.
BL = Baseline; DV = Direct Verbal; IDV 1 = Indirect Verbal 1; P1 = Probe 1;
IDV 2 = Indirect Verbal 2; G = Gestural; P2 = Probe 2; I = Independent
Student 4: DE

Student DE did well in the intervention. He progressed gradually to the Independent (I) level and could orally say the sounds of alphabet /a/ to /z/. DE benefited from the intervention because he mastered to blend the sounds of 10 words orally into word. Student struggled with orally saying the sounds of /e/ and /g/. The teacher showed DE three-dimensional articulation sound cards in a small group setting with other general education students. This helped DE to progress from one prompt level to another.

Baseline Data for orally saying the sounds of the letters /a/ to /j/ were administered with student DE in the second week of September, 2012 in the general education classroom. During baseline DE did not know the sounds of the letters /a/ to /j/. The first Direct Verbal (DV) prompt showed that DE could orally say the sounds of the letters /a/, /b/, /d/ and /h/. The next two DV prompts showed that student DE was able to orally say the sound /a/, /b/, /d/, /f/, /h/, /i/ and /j/. Student DE struggled with sound /e/ and /g/. The teacher showed three-dimensional articulation sound cards which showed the position of the tongue and mouth along with the script which the teacher read to him. The next two Indirect Verbal (IDV) prompts showed that DE could say the sound /e/ but not /g/. The teacher again showed the three-dimensional articulation sound cards and also the letter/sound card. Finally, DE could orally say the /g/ sound in the next IDV prompt. The probes and the Gestural (G) prompt showed that DE was able to say the sound /a/ to /j/. The two independent levels
showed that DE had mastered the sound /a/ to /j/. Another probe conducted after the intervention showed that DE could orally say the sounds of the letters /a/ to /j/ by looking at the letters written on papers.

Graph 16: Student DE
Letters A to J

BL = Baseline; DV = Direct Verbal; IDV 1 = Indirect Verbal 1; P1 = Probe 1;
IDV 2 = Indirect Verbal 2; G = Gestural; P2 = Probe 2; I = Independent
DE: Letters K to T

Baseline Data for orally saying the sounds of alphabet /k/ to /t/ were administered with student DE in the second week of November, 2012 in the general education classroom. During baseline, DE did not know the sounds of the letters /k/ to /t/. The first Direct Verbal (DV) prompt showed that DE could say the sound /m/, /n/, /o/, /p/, /q/, /r/ and /t/. The next two DV prompts and the Indirect Verbal (IDV) prompts showed that student DE was able to orally say the sounds /k/, /l/, /m/, /n/, /o/, /p/, /q/, /r/, /s/ and /t/. The two probes and the Gestural (G) prompt showed that DE said the sounds /k/ to /t/. The two Independent (I) levels showed that DE had mastered the sounds /k/ to /t/. Probe conducted after the intervention showed that DE said the sounds orally by looking at the alphabets /k/ to /t/ written on paper without the use of letter/sound cards.
Graph 17: Student DE
Letters K to T

BL= Baseline; DV= Direct Verbal; IDV 1= Indirect Verbal 1; P1= Probe 1;
IDV 2= Indirect Verbal 2; G= Gestural; P2= Probe 2; I=Independent
DE: Letters U to Z

Baseline Data for orally saying the sounds of the letters /u/ to /z/ were administered with student DE in the second week of February, 2013 in the general education classroom. Baseline Data showed that DE did not know the sounds of the letters from /u/ to /z/. The first Direct Verbal (DV) prompt showed that DE could not orally say the sounds /y/ and /z/. The next DV and Indirect Verbal (IDV) prompt showed that DE could orally say the sounds /u/, /v/, /w/, /x/, /y/ and /z/. The probe and Gestural (G) prompt showed that DE was able to say the sounds /u/ to /z/. The next two Independent (I) levels showed that DE had mastered the sounds /u/ to /z/.

Another probe conducted after the intervention showed that DE said the sound /u/ to /z/ by looking at the letters written on paper without the use of letter/sound cards.
Graph 18: Student DE
Letters U to Z

BL = Baseline; DV = Direct Verbal; IDV 1 = Indirect Verbal 1; P1 = Probe 1;
IDV 2 = Indirect Verbal 2; G = Gestural; P2 = Probe 2; I = Independent
DE: Words:

Baseline Data for blending the sounds orally into words was taken in the second week of April, 2013 with student DE in the general education classroom. Baseline Data showed that DE could blend the sounds of bat, mat and man orally into words. The first Direct Verbal (DV) prompt showed that student DE could blend the sounds of cat, bat, sat, fat, hat, mat, pat and man. He could not blend the sounds of rat and bad. The next DV and Indirect Verbal (IDV) prompts showed that student DE was able to blend the sounds of cat, bat, sat, rat, fat, hat, mat, pat, bad and man orally into words. The probe and Gestural (G) prompt showed that DE was successful in blending the sounds of all the ten words. The next two Independent (I) levels showed that DE was able to blend the sounds of cat, bat, sat, rat, fat, hat, mat, pat, bad and man orally into words. Another probe conducted after the intervention showed that DE had mastered to blend the sounds of all the 10 words orally into words.
Graph 19: Student DE
WORDS

BL= Baseline; DV= Direct Verbal; IDV 1= Indirect Verbal 1; P1= Probe 1;
IDV 2= Indirect Verbal 2; G= Gestural; P2= Probe 2; I=Independent
Teacher Survey Results

Table 1
Importance of Phonemic Awareness in Early Reading Skills (5 is most important)

<table>
<thead>
<tr>
<th>Query</th>
<th>Teacher 1</th>
<th>Teacher 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of Phonemic Awareness in Early Reading Skills</td>
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<td>4</td>
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Table 2
Effectiveness in Building Phonemic Awareness (3 is most effective)

<table>
<thead>
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<th>Activity</th>
<th>Teacher 1 (1-3)</th>
<th>Teacher 2 (1-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Rhyming</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Oral Categorization (Separating “pat” from “pot”)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Oral Blending ( /p/o/t/ blends as “pot”)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Phoneme Isolation (isolating /d/ in “bad”)</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Phoneme Identification (/l/ in “roll” or “poll” or “hole”)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Phoneme Addition ( “am” add /r/ for ram and /h/ for “ham”)</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Phoneme Deletion (“cart” without /t/ is “car”)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Phoneme Substitution ( changing “log” to “dog” or “hog”)</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 3

*Effectiveness of Teaching Phonemic Awareness by focusing on a few types of phoneme manipulation*

<table>
<thead>
<tr>
<th>Query</th>
<th>Teacher 1</th>
<th>Teacher 2</th>
</tr>
</thead>
<tbody>
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<td>Phonemic awareness is taught most effectively through by focusing only on one or two types of phoneme manipulation rather than several types.</td>
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<td>Agree</td>
</tr>
</tbody>
</table>

Table 4

*Time Spent on Teaching Phonemic Awareness and Satisfaction with allotted time.*

<table>
<thead>
<tr>
<th>Activity</th>
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<th>Teacher 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with Allotted Time</td>
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<td>Neutral</td>
</tr>
</tbody>
</table>

Table 5

*Satisfaction with DIBELS as Early Predictor of Reading Skills*

<table>
<thead>
<tr>
<th>Query</th>
<th>Teacher 1</th>
<th>Teacher 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with DIBELS as early predictor of reading skill</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
</tbody>
</table>
The results of the survey showed that the importance of phonemic awareness instruction in early reading skills was rated as very important to these two teachers. Rhyming, Oral Blending, Categorization, Phoneme Isolation, Phoneme Addition and Phoneme Segmentation were rated as most effective in building phonemic awareness skills in students. Phoneme Deletion and Phoneme Substitution were not highly ranked by both teachers. Survey results also showed that the teachers agreed that phonemic awareness could be taught most effectively when it focuses on only one or two types of phoneme manipulation rather than several types. The time they had to spend in teaching phonemic awareness skills each day was ten to fifteen minutes. They both had a neutral response about their satisfaction with the time allotted to phoneme awareness skills. Their satisfaction with DIBELS as an early predictor of reading skills was neutral. There was no response on additional effective phonemic awareness strategies that they had utilized and would like to share.

The survey given to the two general education teachers who were involved in the instruction of phonemic awareness skills to the four students with Autism showed that they agreed that phonemic awareness plays a vital role in the development of early reading skills with all students including students with Autism. The survey also brought into focus that when teaching phonemic awareness to students the teacher should focus on one or two skills rather than several types. Both the general education teachers emphasized Phoneme Identity as an effective oral activity in building phonemic awareness skills. It was interesting to see that their views on DIBELS as an early predictor of reading skills were neutral. The researcher did not have a follow-up
discussion on the question of why both the general education teachers rated their satisfaction on DIBELS as an early predictor of reading skills neutral. DIBELS measure was used in the whole school.
CHAPTER V

DISCUSSION

This section examines the outcomes of the intervention and its specific results for each of the individual students. The limitations of the study and implications for further research are reviewed.

Interpretation of Results

Findings from the inclusive reading intervention case study on phonemic awareness with students with Autism suggest that this intervention study was highly effective for teaching phonemic awareness skills. The data showed that phonemic awareness can be developed through instruction in the general education classroom. All the four students in Second and Third Grade responded to intervention, suggesting the benefits of intervention through specific individual instructional programs in grade and age appropriate general education classrooms. Collaborating with the general education teacher during grade level meetings helped in analyzing each student’s progress in skills acquisition in phonemic awareness. When the researcher expressed her concern to the General Education teacher for student AJ that the baseline data showed that AJ knew only the sounds of alphabet /a/ and /p/ and whether whole group discussion would be beneficial to AJ in orally saying the sounds of the alphabet, the General Education teacher was very supportive and said that some of her Chinese students also needed a lot of practice in learning the sounds of the alphabet. She stated that she would consistently be using ‘Letter-Sound Cards’ from
the English Language Arts, Macmillan/McGraw-Hill Curriculum. The researcher supported this teaching strategy for the benefit of all the students. The consistent use of these ‘Letter-Sound Cards’ helped student AJ learn the sounds of the alphabet. When student BS was struggling in orally saying the sound of alphabet /d/, /f/, /g/ and /j/, the researcher discussed with the General Education teacher that the students with Autism would benefit if they visually saw the movement of the lips when orally learning to say the sounds of the alphabet. The General Education teacher said that she already had large, colorful lip movement cards as she intended to use them with her students who had trouble saying the sounds. This discussion helped because she started showing these large ‘Lip Movement Cards’ in both whole and small group setting with students who needed that extra visual support. The researcher’s observations indicated that this benefitted student CI and DE and some of the general education students as well. The use of ‘Three-Dimensional’ articulation cards was also discussed when collaborating with the general education teacher about each student’s progress. Student DE benefitted greatly from the three-dimensional articulation sound cards which were used in a small group setting of six students in the general education classroom. He was able to orally say the sounds of the alphabet with the correct articulation. Large colored lip movement cards were used with the whole class. Student AJ and student CI were able to blend the sounds orally of six words out of 10 words when the baseline data were taken for blending the sounds orally into words. This suggests their mastery on the individual sounds of the alphabets and reading achievement. Findings from this study are consistent with the
previous research indicating that direct instruction in phonemic awareness processing strategies is particularly beneficial to students with Autism (Armbruster, et al. & Osborn, 2003).

**Effects on Reading Skills**

By the end of Spring 2013, student AJ and student CI were able to read a few words from the Decodable Reader books. These Decodable books were part of the school’s intervention curriculum for all students. Student BS and student DE flipped the pages of the decodable readers. This suggested that they were interested in the book because both of them were looking at the pictures and words, which they had not demonstrated any interest in prior to intervention. During grade level meetings we discussed how large lip movement cards helped the students with Autism and general education students to orally say the sounds of the letters as they could see and model the lip movement for each individual sound.

The baseline data taken before the intervention started showed that students BS, CI and DE did not know the sound of any letters /a/to /j/. Student AJ knew only the sound of letter /a/. It was interesting to see that after the first Direct Verbal prompt, the student’s AJ, BS, CI and DE had perfect scores. The general education teacher showed three-dimensional articulation cards to student DE when he was struggling to articulate the sound of /e/ and /g/ in a small group setting (five to six students) with other general education students. In the first Indirect Verbal prompt all the four students scored on an average 70% to 80%. During Probe 1 and Probe 2
when the second and third baseline was taken again all the four students got perfect scores. At the Independent level all the four students had mastered the sounds /a/ to /j/. All four students seemed excited going to the general education grade and age appropriate classroom and learning the sounds of the letters in whole and small group setting, an idea supported by the works of Adams (1990). The four target students scored an average of zero to 10% during the baseline session of letters K to T taken before the intervention started. The teacher had used large lip movement cards which had the name of the letter, a colorful picture related to the letter and lip showing the position of the movement of the lip. This might have helped student AJ, BS, CI and DE to get perfect scores after the first Direct Verbal prompt. Moats (2005) found that phonemic awareness (ability to sound out letters) facilitated by colorful visuals, facilitates phonemic awareness of letter sounds and later, word reading. Baseline Data taken before the intervention for letters /u/ to /z/ demonstrated that the four target students were unable to sound out letters. When the intervention began with the first Direct Verbal prompt the students scored on an average from 80% to 90%. This shows that the students AJ, BS, CI and DE benefited from the Letter-Sound cards and they needed to hear the sound of the letters for them to finally master those sounds in a direct explicit method of teaching. These results support the findings of Adams, Foorman, Lundberg, and Beeler, (1998), and other researchers who found that direct systematic instruction in letter-sound associations provides effective boosts to both early letter-sound identification and early reading. Results for blending the sounds orally into words demonstrated that student AJ could successfully blend the sounds of
six words during the baseline session before the intervention and with the intervention he had perfect scores. He also showed interest and confidence when blending the sounds of ten words with the prompts and then independently. Student BS needed the Direct Verbal prompts to get perfect scores from the second Direct Verbal prompts onwards. She seemed happy learning along with her peers because she was rarely absent and always had a smile on her face when going to the general education classroom. Student CI articulated the sounds orally into words by trying to imitate the movement of the large lip movement cards which were shown earlier to all the students in whole group and small group setting. He had perfect scores starting from the first Direct Verbal prompt. This clearly shows that CI had mastered the sounds of letter /a/ to /j/. Student DE did not show from his face that he was paying attention but when his turn came to blend the sounds orally into words, the Direct Verbal prompts boosted him to get perfect scores.

Student One: AJ

During the baseline sessions for the letters A to Z, student AJ could orally say the sounds of /a/ and /p/. The researcher was concerned whether AJ would benefit from the whole group in the general education Second and Third Grade combination classroom. The researcher had expressed this concern during grade level meetings with the general education teacher. Since some Chinese students who spoke Mandarin needed practice in identifying the sounds of the alphabet, the general education teacher used the letter-sound cards very consistently. Moreover these letter-sound
cards were big enough to be visible to the whole class. These letter-sound cards were also very colorful which helped student AJ to master the sounds /a/ to /z/. The prompt levels helped AJ to confidently progress from one prompt to another as success was clearly noticeable to the researcher. Baseline Data for blending the sounds orally into words made it clear that student AJ had mastered the sounds of the alphabet because AJ could blend the sounds of six words out of ten words. Student AJ was very regular in his attendance which helped in implementing the instructional programs very consistently. By the end of Spring 2013, AJ could read two and three letter words from the intervention Decodable Reader.

Student Two: BS

Looking at the baseline sessions of letters A to Z in which student BS had to orally say the sounds of alphabet, it could be seen that BS could orally say the sound of letter /s/ only. Student BS struggled in orally saying the sound of letter /f/ during the first Direct Verbal and Indirect Verbal prompts. The large and colorful lip movement cards which the general education teacher showed to all the students, moving around the classroom helped BS to orally say the sound of letter /f/. Student BS progressed from one prompt to another successfully. Probe one and Probe two showed that BS had mastered the sounds /a/ to /z/. During the baseline phase of blending the sounds orally into words, student BS could blend the sounds of four words out of ten words. After the second Direct Verbal, BS had perfect scores as she progressed successfully from one prompt to another. At the Independent level, BS
could blend the sounds orally into words of all the ten words. The researcher found it interesting to note that the different prompt levels in the instructional program supported student BS to successfully master the sounds of the alphabet and blend them orally into words in a systematic way. This increased the self-esteem and confidence of student BS because she could now blend the sounds orally into words. By the end of Spring 2013, BS started to look at the pictures and words as she flipped pages of the intervention Decodable Reader.

**Student Three: CI**

Baseline session before the intervention started showed that student CI could orally say the sound of alphabet /m/ only. Student CI benefitted from the instructional program on phonemic awareness which was implemented in the grade and age appropriate general education classroom. This is evident because after the first Direct Verbal prompt, CI progressed successfully from one prompt level to another. He struggled with orally saying the sounds of alphabet /f/ and /g/. The large lip movement cards helped him to orally say the sounds of /f/ and /g/. As a researcher I could see the benefits of the instructional program and how student CI became successful with each prompt level. The independent level and baseline after the intervention showed that CI had mastered the sounds /a/ to /z/. Moreover the baseline for blending the sounds orally into words showed that CI could blend the sounds of seven words out of ten words. Then after the first Direct Verbal prompt CI had perfect scores as he progressed from one prompt level to another. By the end of
Spring 2013, CI could read two and three letter words from the intervention Decodable Reader.

Student 4: DE

Student DE progressed gradually from one prompt level to another. Baseline sessions before the intervention showed that DE was not able to orally say the sounds of alphabet /a/ to /z/. The general education teacher showed large lip movement cards to help student DE orally say the sound of letter /c/, /e/ and /g/. As student DE was still struggling in orally saying the sound of alphabet /g/, the general education teacher used three-dimensional articulation cards with student DE in a small group setting with five general education students. These three-dimensional cards showed the position of the tongue very clearly which helped DE to orally say the sound of alphabet /g/. The researcher and the general education teacher could see how student DE was successful in mastering the sounds of the alphabet /a/ to /z/. Baseline before the intervention for blending the sounds orally into words showed that student DE was able to blend the sounds of four words out of ten words. After the second Direct Verbal prompt DE progressed with success from each prompt level and had finally mastered blending the sounds of ten words. By the end of Spring 2013, DE flipped the pages of the intervention Decodable Reader and seemed interested looking at the pictures and the words in the reader.
DIBELS

When the researcher compared the Pretest and Posttest results of Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Initial Sound Fluency (ISF) it could be seen that the Posttest score of student AJ was 29, a gain of 12 points from Pretest. In ISF, AJ had to recognize and produce the initial sound in an orally presented word. The Posttest results for ISF showed that AJ had knowledge of the sounds of the alphabet. The ISF measure took about three minutes to administer. The Posttest score for Letter Naming Fluency (LNF) for AJ was 60, a gain of 58 points from the Pretest. In LNF, AJ had to name upper-and lower-case letters. The result of the Posttest of LNF showed that AJ could now name the upper-and lower-case letters. The researcher attributed this success to the large Letter-Sound cards which were shown in the general education class to teach sounds had both upper and lower case letters printed in front. The LNF measure took one minute to administer. The result of the Posttest of Phoneme Segmentation Fluency (PSF) revealed that AJ had a gain of 27 points from the Pretest. In PSF, AJ had to produce verbally the individual phonemes for each word that was presented. This gain showed that AJ had knowledge of the sounds of alphabet. The PSF measure took about two minutes to administer.

Student BS’ Posttest score for the ISF was 24, a gain of nine points from the Pretest. This demonstrated that BS could recognize and produce the initial sound in an orally presented word. BS’ Posttest score for LNF was 35, a gain of 35 points as BS had a Pretest LNF score of zero. Student BS did well in LNF. It could be that BS
also benefitted from the Letter-Sound cards which were used during the intervention phase. The Posttest score of PSF of student BS was 34, a gain of 17 points from the Pretest.

Student CI’s Posttest score for the ISF was 27, a gain of 27 points from the Pretest which was a significant increase from a score of zero. This suggests that CI showed competence in recognizing and producing the initial sound in an orally presented word. The Posttest score of LNF was 43, a gain of 43 points from the Pretest. CI showed a significant gain in LNF score from zero to 43. Student CI scored 38 in the PSF Posttest, a gain of 19 points from the Pretest.

Student DE’s Posttest score for the ISF was 22, a gain of seven points from the Pretest. Student DE did not make a significant gain in Initial Sound Fluency (ISF). It can be said that he did benefit from the intervention even though it was a small gain in score. DE’s Posttest score for Letter Naming Fluency (LNF) was 43, a gain of 41 points. DE did very well in LNF as is evident from his Posttest score. DE scored 38 in PSF, a gain of 14 points from the Pretest score in Phoneme Segmentation Fluency.

**Teacher Survey**

Both teachers responded that phonemic awareness was “very important” in early reading skills. Curiously, however, both teachers also responded that they spent 10-15 minutes on phonemic awareness each day – quite a low amount. Furthermore, they rated their satisfaction with the time allotted for phonemic awareness education as “neutral.” This suggests that though the teachers themselves value the importance
of phonemic education, the adopted curriculum devotes only 10-15 minutes for phonemic awareness education.

The teachers rated activities that are easily taught and explained, such as “rhyming” and “blending,” as much more effective than activities like “phoneme substitution” and “phoneme deletion” activities that require a stronger conceptual understanding. They might view it as ineffective because the minimal time spent on the activities does not produce a strong grasp required for these practice centered activities. It’s easier to rhyme “hot” with “cot” than to change “hot” to “hut” or “hit” by identifying the middle phoneme, deleting it and substituting another. Additionally, while general education teachers are generally aware of traditional activities like rhyming and how to effectively teach such activities, teachers may not be as familiar with the more technical activities like “phoneme substitution” The survey made clear that more phonemic education research would be welcomed by teachers so that they are more certain about how much time to allocate or how to effectively teach some of the more technical phonemic awareness activities.

This case study suggested that there is a link between children’s (students with Autism) early abilities in phonemic awareness and their later reading skills. Knowledge of how to orally say the sounds of alphabet and then blend these sounds orally into words helps students with Autism to be successful readers. All four participants with Autism benefitted from this inclusive reading intervention which is evident from the results of this case study.
Conclusions

This case study suggested that phonemic awareness can be taught successfully with students with Autism with the implementation of specific systematic individualized instructional programs in conjunction with special education and general education teacher discussion and collaboration. There is evidence to suggest that phonemic awareness supports reading acquisition, and this was seen here in the outcome data of students’ instructional programs, where the major activity was to blend the sounds orally into words. This information may assist teachers with the information, tools, and strategies they would need to provide systematic instruction and engagement with orally saying the sounds of the alphabet and blending the sounds orally into words. It might help both Special Education and General Education teachers to engage in direct, explicit and meaningful phonemic awareness instruction with both students with Autism and typically developing students in order to offer the best possible instruction and support for students with Autism.

Limitations of the Study

The students with Autism who participated in this research study were integrated into general education classes only three days a week for 50 minutes for each of these days. They were present for English Language Arts in the Second and Third Grade combination General Education classroom. It is essential that students with Autism are included in their general education class throughout their school day, which would not only provide them with more opportunities to practice phonemic
awareness skills in different learning environments throughout school day, but might also lead to similar progress in Math, other academic subjects and in social and communication skills.

Another limitation of this research study relates to the design issues. The researcher misunderstood the implementation of a multiple baseline design, thus this study did not demonstrate experimental control, by establishing a stable baseline before moving to the intervention, and then continuing baseline data collection with the second student for that same skill in phonemic awareness, until a learning trend was indicated in intervention for the first student. In this manner, the second student would have served as the first student’s control, enabling the researcher to move from each student onward in same way, to demonstrate that the intervention is responsible for the effects. Then, after the first student’s learning trend was demonstrated, the researcher should have proceeded with the intervention with the second student on that skill and in that manner the researcher should have thereby proceeded with student three and student four. Due to the lack of control in this case study the results cannot be attributed directly to the intervention and therefore also cannot be generalized to other students with Autism.
Recommendations for Further Research

Research studies are needed to further analyze the role of phonemic awareness intervention and its importance in improving the reading skills of students with Autism in general education contexts. Phonemic awareness among pre-readers is a powerful predictor of future success in reading and spelling (Liberman, Shankweiler, Fischer, & Carter, 2001). Explicit training of phonemic tasks improves reading achievement (Ball & Blachman, 1991). Most important is the question of whether this intervention is likely to improve reading and writing achievement for students with Autism.

A future investigator setting up a study similar to this one should consider implementing an experimental design so that the results could be attributed to the intervention, and show possible generalization of the intervention to other students with Autism.

The researcher has seen through this study that the most effective environment for instruction of phonemic awareness skills and to develop literacy skills is in the general education classrooms with same-age peers. For students with Autism, whole-class read-alouds and teaching of phonemic awareness skills can be powerful because they model fluent oral reading and proper articulation of the sounds of the alphabet and blending the sounds orally into words and other phonemic awareness skills. The presence of students with Autism in general education classrooms gives an
opportunity to special education and general education teachers to regularly reflect on and adjust classroom structures of teaching for the benefit of all learners.
References


