EFFECTIVE INSTRUCTIONAL STRATEGIES TO TEACH READING SKILLS TO
STUDENTS WITH AUTISM SPECTRUM DISORDERS IN ELEMENTARY GENERAL
EDUCATION CLASSROOMS
by
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Abstract

The purpose of this review of literature was to identify effective instructional strategies in lower elementary general education classrooms to improve the reading skills of students with Autism Spectrum Disorder (ASD). The literature reviewed included studies focusing on elementary students diagnosed with ASDs and different reading instruction strategies. Results and conclusions from the studies indicated the effectiveness of direct instruction, small group instruction, assistive technology, and peer tutoring with each group of participants. Recommendations for improving the effectiveness of reading skill instructional strategies for students with ASD in elementary general education classrooms include using a balanced approach of the discussed strategies and understanding that there is no single best practice reading instruction strategy that will work for all children with ASD.

Chapter I: Introduction

The population of children with Autism Spectrum Disorder (ASD) is on the rise. ASD is a spectrum disorder, meaning it can impact individuals differently and can range in its severity. Autistic disorder, otherwise known as classic autism, Asperger disorder, and pervasive developmental disorder (PDD) are subtypes within the ASD diagnosis. Once thought of as a rare condition, the number of individuals diagnosed with ASD raised concerns in the mid–1990s. The Center for Disease Control's Autism and Developmental Disabilities Monitoring Network found "a 57 percent increase in ASD prevalence from 2002 to 2006" (Rice et al., 2013, p. 11). Although research and the number of studies on ASD have increased, there is still limited information on potential risk factors contributing to the disorder.

The disorder has been documented in individuals of all ethnic and socioeconomic groups and is present in all age groups. In addition, there is no known cure for the lifelong disorder. In 2008, it was estimated that one in 88 children in the United States has ASD (Autism Spectrum Disorders: Data and Statistics). Children with ASD are likely to have difficulty with auditory processing skills, social interactions, and communication skills. They enjoy predictability and routine, and want to know what is expected and how those expectations are attainable (Vakil, Welton, O'Connor, & Kline, 2009). These characteristics, although common in children with ASD, vary based on the individual and the severity of the disorder.

The No Child Left Behind (NCLB) Act of 2001 and the Individuals with Disabilities Education Act (IDEA) of 2004 have changed the structure of general education classrooms in the United States to include children with ASD. General education teachers are now responsible for the learning of individual students with a wide range of academic and behavioral needs. With the implementation of standardized Common Core State Standards (CCSS) for all students and a

focus on standardized testing, general education teachers are pressured to find new ways to meet the needs of each student in their class so that all students, regardless of ability, show academic growth.

Statement of the Problem

The United States educational system has seen an average increase of 800% in the number of children with ASD since 1992 (Crosland & Dunlap, 2012). Given that the population of children with ASD may continue to rise, general education teachers in lower elementary classrooms need to understand how best to reach these students and work with their strengths to improve their reading skills. Teaching reading to children with ASD is often a difficult task: "poor language skills place children at high risk for literacy failure and since many children with autism have language impairments, difficulty with learning to read is to be expected" (Nation, Clarke, Wright, & Williams, 2006, p. 911). Although they may be given additional supports, children with ASD are required to take state mandated tests with their general education peers. These tests, based off of grade-level state standards, are used to monitor teacher and school effectiveness, regardless of individual disabilities or individualized educational plans. These tests have placed pressure on teachers to find a way to improve the abilities of all students in their classroom. In addition to the importance of testing, reading is a skill students learn in elementary school but use throughout their lives. Like all students, children with ASD need to be given the opportunity to develop and improve their reading skills to become literate members of society.

It is important that in addition to special education teachers, general education teachers learn how to effectively teach children with ASD, as funding for additional special education classes and teacher aides is often limited. With full inclusion of ASD students in general education classes on the rise and teachers being held accountable to the progress of each student

in their class, it is important that all teachers recognize learning abilities of students with ASD

and how to improve their reading skills.

Research Question(s)

What are the characteristics of effective instructional strategies in lower elementary

general education classrooms to improve the reading skills of students with ASD?

Definition of Terms

The following terms have been defined to ensure that the reader understands the major concepts

found throughout the literature review and remainder of the paper.

Autism Spectrum Disorders (ASDs) "are neurodevelopmental conditions characterized by

impairments in social interactions and communication and restricted, repetitive and

stereotyped patterns of behavior that typically emerge in the first few years of life" (Rice

et al., 2013, p. 2).

Comprehension "is a complex cognitive process and the ability to understand text" (Randi,

Newman, & Grigorenko, 2010, p. 892)

Decoding is the process in which "readers blend or combine sounds" to read words (Tompkins,

2006, p. 127).

Fluency "is the ability to read effectively, and it involves three components: reading speed, word

recognition, and prosody" (Tompkins, 2006, p. 173).

Full inclusion "is a method of delivering services which include developmentally appropriate

practices that are age, individually, and culturally suitable for the child and effective

special education support services" (Vakil et al., 2009, p. 324).

Summary

The prevalence of ASD in schools has increased at a tremendous rate over the years, and with NCLB and IDEA, general education teachers now have the responsibility of teaching all students in full inclusion classrooms, including those with ASD, to meet specified state standards. It is no longer the responsibility of just special education teachers to meet the needs of students with IEPs. The growing number of students with ASD in elementary schools leads to a great need for all general education teachers to be educated on how to practice effective intervention strategies to teach reading skills to students with ASD. The literature review will explore research focusing on reading skill instruction that can be used by general education teachers such as direct instruction, assistive technology, and peer tutoring. Full inclusion classrooms and the five components of reading will also be explored.

Chapter II: Review of Literature

The following chapter explores effective strategies to use in the general education classroom to improve reading skills of students with ASD. It is important that through the use of research studies, effective strategies that teach reading skills to students with ASD that can be used by general education teachers in classrooms, with or without paraprofessional help, are identified. Throughout this chapter, research studies centering on students with ASD regarding classroom environment, different components of reading, direct instruction, assistive technology, and peer tutoring are discussed.

Classroom Environment

The presence of special education students, including those with ASD, in the general education classroom has increased since the implementation of NCLB and IDEA. Full inclusion focuses on having all students in the same classroom where interaction with peers takes place, all students participate, everyone is accepted, and all students show academic growth (Humphrey, 2008). In the past, students with ASD have traveled between the general education classroom and special education classroom for various parts of the school day, leaving them to miss out on social and academic opportunities. Full inclusion allows for general education and special education practices to become one, accommodating and modifying in a natural setting to allow for individuals to interact and learn with typically developing peers (Vakil et al., 2009). When students with ASD are included in the general education classroom with their peers, they are present during classroom instruction and discussions, which allows for incidental learning from the general education teacher, as well as learning from their peers. Many ASD students are required to take state-mandated tests based on grade level standards. Full inclusion allows these students to be present and participate alongside their typically developing peers as they learn and

prepare for such tests. In a full inclusion setting, students with ASD are at a greater chance for "generalization and transfer of learning" (Vakil et al., 2009, p. 323), ultimately leading toward more academic achievement.

The heterogeneous nature of ASDs requires varying degrees of accommodations in a full inclusion setting, depending on the individual's level of functioning and abilities. In a review of empirical research that addressed strategies for including children with autism in general education classrooms, Harrower and Dunlap (2001) reviewed research on inclusion as an independent variable, as well as the relationship between inclusion and social and academic growth. In their review, Harrower and Dunlap identified antecedent procedures to be effective. Antecedent procedures are proactive alterations of some part of the environment that a student may struggle with (Harrower & Dunlap, 2001), including priming and prompt delivery. Priming allows a student to preview information or activities before they take place or before the student engages in the activity. Priming is found to be successful for students with ASD as "it links individual instruction to larger classroom group activities" (Crosland & Dunlap, 2012, p. 255). Priming can be used in a multitude of academic areas as well as socially. To aide in reading comprehension, a child with ASD might read and discuss a story one-on-one before doing so with the whole class. This method can be used to varying degrees based on an individual's specific needs. In addition to priming, prompt delivery is another method that has been found to be successful in the inclusion setting to assist students with ASD. Teacher and peer provided prompts are often helpful to "elicit an appropriate response in a targeted academic or behavioral activity" (Harrower & Dunlap, 2001, p. 766). Children with ASD may not respond to instructions given to typically developing peers, whereas prompt delivery acts as a "supplement [to] the general instructional routine" (Harrower & Dunlap, 2001, p.766). As with priming,

prompt delivery can be used in a variety of academic and social situations. Full inclusion in the elementary classroom has many social and academic benefits and is important to consider when working to improve the reading skills of students with ASD.

Components of Reading

The National Reading Panel has identified five components of reading, which are phonemic awareness, phonics, fluency, vocabulary and comprehension (NICHD, 2000). These components are equally important and when mastered, lead to successful independent reading skills.

To better understand the reading abilities in children with ASD, Nation et al. (2006) studied 41 children with ASD to assess phonics and comprehension abilities. The children were recruited from a health clinic, and inclusion criteria included children between ages six and 15 and with measurable language skills. All participants were diagnosed by clinicians using research diagnostic criteria (Nation et al., 2006). Diagnoses included 16 children identified with autism, 13 identified with atypical autism, otherwise known as pervasive developmental disorder – not otherwise specified (PDD-NOS), and 12 identified with Asperger's syndrome. Four assessments were given by means of standardized testing, three tests focusing on reading accuracy and one test on reading comprehension. Phonics abilities were assessed using a non-word reading test, a single word in isolation reading test, and a text reading test. Comprehension abilities were assessed using reading passages and relevant literal and inferential questions to monitor children's understanding. Participants' vocabulary and oral language comprehension was also assessed.

Only 32 of the original 41 participants were used in analysis, due to nine participants being unable to read. Results showed that participants' reading accuracy was highest when in

isolation (mean 96.56%) or in-text (mean 95.53%). Participants seemed to have more difficulty reading non-words (mean 90.83%), indicating they may rely on rote memorization when reading words rather than phonics strategies. This pattern of reading may be encouraged during literacy instruction focusing on repetition of words and materials rather than phonics-based strategies. Participants' reading comprehension (mean 82.34%) was very poor in relation to their word reading ability, indicating that components of the comprehension process are difficult for children with autism, regardless of their decoding skills. Half of the 20 children who scored in the normal range for word reading skills exhibited poor comprehension skills, leading researchers to consider the relationship between hyperlexia, a reading comprehension disorder, and autism. Results support the need for further research focusing on the discrepancy between reading accuracy and reading comprehension. There was a correlation ($p < .01$) between participants' oral language comprehension and their reading comprehension, indicating that oral language skills impact reading comprehension. As many students with ASD have language impairments, it is likely that they will struggle with reading comprehension. Nation et al. (2006) discussed the importance of future research focusing on which specific areas of the comprehension process cause the greatest difficulty for individuals with ASD.

Nation et al. (2006) noted large individual differences between participants, as some children scored at their age-range, while others were unable to complete the test. In addition, individuals showed differences from test-to-test, which demonstrates the diverse reading abilities of children with ASD. Results indicate the importance of specific phonics, whole-word and comprehension instruction for students with ASD to improve reading skills.

Effective Instructional Strategies for Improving Reading Skills

The instructional strategies used to teach reading skills vary by classroom and skill. It is important that the delivery of reading skill instruction uses research-based strategies to ensure maximum learning is taking place. The following section reviews research on direct instruction, small group instruction, assistive technology, and peer tutoring to improve the reading skills of students with ASD.

Direct instruction.

Direct Instruction (DI) is an organized and explicit method of instruction used in schools with a variety of ages, abilities, and subject areas. DI begins by identifying what is to be taught and breaking it into component parts that are sequentially taught to mastery. This sequence allows children to gain mastery of one skill before moving on to learn a new skill (Harp & Brewer, 2005). DI generally follows specific teacher behaviors and procedures, including modeling, leading, and testing that allows students to "acquire, maintain, and generalize skills, ideas, and concepts in an efficient and effective manner" (Ganz & Flores, 2009, p. 76). DI is a reading approach that provides language impaired students with ASD intensive, explicit instruction.

Flores and Ganz (2007) found DI to be an effective approach to teaching reading comprehension skills to students with ASD. The purpose of this study was to evaluate the effectiveness of a DI program when teaching comprehension skills to children with ASD or DD. Four children from a private school for individuals with ASD and intellectual impairments, ages 10 to 14, participated in the study. Two of the four children were diagnosed with autism by a doctor using the *Autism Diagnostic Observation Schedule*. Two alternating researchers provided 20 minutes of instruction five days a week using the DI program, *Corrective Reading Thinking Basics: Comprehension Level A*. They followed a scripted teacher book and taught three of the

program's successive strands: statement inference, use of facts, and analogies. Students

participated in baseline testing in all three skills prior to instruction.

Flores and Ganz (2007) followed and implemented instructional procedures and

instructor behaviors recommended in the program, including modeling the skill for students,

guiding students as they tried the skill, and asking students to demonstrate the skill

independently. Instruction also followed the directed script and students were directed how and

when to respond using verbal and visual cues. Instruction of each strand continued until all

students reached the goal of 100% accuracy three consecutive times. After the goal for all

students was met, instruction of that strand decreased, and instruction of the next skill began. A

multiple-probe-across-behaviors design was used and results showed that all four children,

including those with ASD, responded to the instruction by showing improvement in the targeted

comprehension skills. Both children with ASD showed the most growth in use of facts, scoring a

0% at baseline testing and scoring a mean of 83% and 94% during instruction. Even more

noteworthy is that both students maintained their performance in all three strands when the

frequency of instruction decreased as well as after one month of no instruction. Although a

functional relationship between DI and reading comprehension was clearly demonstrated, the

study was not compared to a different type of instruction and there were no typically developing

peers involved for comparison. In addition, there were a small number of children with ASD

involved in the study, limiting the effectiveness with children with higher or lower functionality.

The DI program used in this study was implemented as directed and at the prescribed pace. The

only accommodation made for students was the use of visual cues during the instruction of use of

facts. The successful implementation of this program suggests a connection between DI and

reading comprehension skill instruction for students with ASD.

Small group instruction.

In general education classrooms, teachers are confronted with individual student needs and deficits. One way to meet those individual needs is by providing small group instruction to students with similar needs and abilities. As more children with ASD are placed in general education classrooms, teachers need to find ways to meet their individual needs in addition to typically developing peers. In a multiple probe study to evaluate small group instruction, Ledford, Gast, Luscre, and Ayres (2008) focused on incidental and observational information acquired by children with ASD during small group sight word instruction. Six students diagnosed with autism, ages five to eight, participated in the study that took place in a self-contained classroom for students with autism. Prior to the study, participants participated in screening sessions in which they were assessed on their ability to read aloud 40 sight words from the Edmark Functional Words list. The six participants were then placed into three groups based on their skill level and participated in instructional sessions within a group and one-on-one probe sessions. Twelve target words and phrases were selected by parents, teacher, and researchers from the Edmark Functional Words list. Words read aloud by students during the screening session were eliminated from consideration. Each participant was assigned six target words and six observational words, which were the target words of their group member. For example, Brian and Andrew were in the same instructional group. Brian's target words (food, danger, first aid, down, women, fire alarm) were Andrew's observational words. Andrew's target words (boys, poison, restroom, exit, caution, keep out) were Brian's observational words. The same 12 words were used for each group. Throughout the study, students participated in one-on-one word probe sessions and small group instruction. During both conditions, word cards were presented with the cue "Look. Tell me the letters. What word?" (Ledford et al., 2008). Probe sessions were

conducted prior to each small group instructional session and lasted for 15 minutes. All twelve target words were included in each probe session two times. Small group instructional sessions included two students and the teacher. During each small group session, each student focused on two of his/her six target words, so that four words were presented to the students during each session. There were 10 trials for each student during each small group session, with each word being presented five times. Incorrect responses or no response was modeled correctly. The trial continued once participants provided a correct answer. In the small group sessions, Ledford et al. used a constant time delay procedure. During the initial session for each word pair, the word was presented with a zero second delay, in which the teacher would present the word card, say "What word?" and immediately provide the verbal model of the word name. Once the student correctly repeated the word, verbal praise was given. Once 100% of student responses were correct, they moved on from the zero second delay. Successive sessions used a three second delay, in which the teacher would present the word card, say "What word?" and wait three seconds for a student response before providing a verbal model. Correct student responses provided before the three seconds were praised and reinforced. If no response or an incorrect response was given, the teacher verbally modeled the correct response, and did not give any praise. Small group instructional sessions continued until both students within a group attained 90% unprompted correct responses over three consecutive days on his/her target words (Ledford et al., 2008).

Prior to any instruction, all six participants read 0% correct target words, and they maintained 0% correct during initial probe sessions. During the study, all participants reached criterion (100% in zero second delay and 90% in three second delay) on his/her target words. During post-test sessions, all participants identified at least 83% of their target words (mean 94%) and 67% of observational information (mean 94%). Results indicate that students with

ASD can learn to read words through observational and incidental learning situations, such as small group instruction. Ledford et al. (2008)noted that although the results indicate a relationship between small group instruction and observational learning, there are limitations to the study including the small number of participants. In addition, small groups in classrooms generally have more than two students and further research is necessary to see if similar results would be found in a study with groups of 5 or 6 students. These results and the relationship between small group instruction and observational learning show that a small group instructional setting is an effective instructional strategy for teaching reading skills to students with ASD.

Assistive technology.

Assistive technology and computer-based instruction are common intervention strategies in the classroom for children with ASD. Assistive technology is "any technology that enables an individual with a learning disability to compensate for specific problems/deficient" (Tuedor, 2006, p. 294). There is a wide variety of assistive technology available to students and educators, each varying in how it assists the student. Assistive technology is interesting and engaging to students, promoting learning in non-traditional ways (Moore & Calvert, 2000). Assistive technology allows teachers to manipulate learning conditions such as auditory and visual components, how much information is given at a time, and number of cues, based on individual student needs. Specifically, it allows for text, sound, and images to be presented simultaneously to learners whose focus is reading (Bosseler & Massaro, 2003). Due to the need for one-on-one instruction with many ASD students, computer-based instruction has become more prevalent in classrooms as it provides the one-on-one setting for students, is consistent and predictable (Williams, Wright, Callaghan, & Coughlan, 2002).

Students with ASD not only have a range of academic skills, but social and behavioral skills as well. As with all students, finding ways to hold the attention of and motivate individuals with ASD to learn can be difficult. Moore and Calvert (2000) assessed the attention and motivation of students while learning by comparing teacher and computer instruction. Fourteen children, 12 boys and two girls, were randomly assigned to receive vocabulary instruction from a teacher or computer. Participants, aged 3 to 6, were engaged in activities to learn six targeted nouns.

Instructional time within both conditions was videotaped to observe the attention of participants. Two observers scored students during their instructional time looking for "on" and "off" behaviors. Researchers identified students as being attentive when their attention was directed at the teacher, learning materials, or computer. Students were identified as being inattentive when their attention was directed away from the teacher, learning materials, or computer. Children were attentive 97% of the time in the computer condition and only 62% of the time in the teacher condition. Children's motivations with teacher instruction and computer instruction were also compared. Following treatment, children were asked if they wanted to keep working or play. To ensure student understanding, teachers prompted responses by pointing at drill materials or the computer and play items. When participants chose to continue working, researchers noted that the condition was motivating to them. When they chose to go play, it was noted that the condition was less motivating to them. None of the children were motivated to continue working with the teacher, while 57% of the children were motivated to continue working in the computer condition. Although researchers had a small sample size and there was no control group, results indicate that using computers as an instructional supplement is motivating and engaging to students with ASD. When working to improve the reading skills of

students with ASD, computers are possible instructional tools that hold the attention of students to keep them engaged on the learning material.

Bosseler and Massaro, (2003) conducted a single-subject multiple-baseline study to evaluate vocabulary acquisition and retention in eight children with autism, ages seven to 12, using a computer-animated tutor. Children were selected from two school programs and exhibited delays in all academic areas, especially in all areas of language; one child was incapable of speech. Children worked with the computer-animated tutor, known as Baldi, for 10 to 40 minutes a few times each week over six months' time. Baldi was developed to mimic face-to-face communication in which visible speech and natural mouth and tongue movements can be observed by the learner. On the computer screen, students saw a talking head, vocabulary items, and stickers generated for correct or incorrect responses. Before the study began, students participated in training sessions to get acquainted with Baldi and the lessons to rule out any potential program errors. Once the study began, each session included five exercises: pretest, presentation, recognition, production, and posttest. The pretest was used to determine preexisting knowledge of the focus vocabulary before the lesson. The presentation exercise is when Baldi would name each vocabulary item and highlight it on the screen one at a time. Baldi then checked the students' understanding by having the student select the vocabulary item that was named. During the recognition exercise, students learned to recognize all of the vocabulary items for the session by clicking on the item as it was named. Feedback was given by use of stickers for correct and incorrect responses. Incorrectly identified items were presented at least twice, and recognition trials continued until all items were identified correctly. During the production exercise, Baldi highlighted a specific vocabulary item and directed the student to say the word aloud. Students' speech was recorded, played back from them, and saved for later evaluation.

The posttest followed the same procedure as the pretest and students were given feedback in the form of stickers. The pretest and posttest were designed to determine the number of vocabulary items students learned. Results showed that students were able to learn vocabulary from the computer program in all lessons as they identified more words during the posttests (mean 84%) than during the pretests (mean 67%). In addition, all students were reassessed thirty days after mastery of all vocabulary items and showed continued mastery (mean 91%), indicating that they retained the knowledge after instruction. Results indicated that learning does occur from computer programs as all children made progress during lessons and maintained their performance afterwards. It was also noted that the majority of students enjoyed working with Baldi and were engaged during instruction. This study, similar to that of Moore & Calvert (2000), shows that students with ASD enjoy working with computers and are capable of learning skills through computer programs, making computers a useful instructional tool when teaching reading skills to students with ASD.

In a different study focused on students' reading skills, Williams et al. (2002) evaluated the effectiveness of computer-assisted instruction and traditional book-centered instructional methods. The study included eight children with autism, age three to five, recruited from a local autism specialist unit. All participants were diagnosed using research diagnostic criteria. Participants were randomly assigned to receive personal teacher instruction (PI) or computer-assisted instruction (CAI) for the first 10 weeks, and then switched for another 10 weeks. The book-based PI consisted of each child receiving their own reading book and receiving scripted instruction. Books were designed to be as interesting as possible with sounds and appealing illustrations. The computer-assisted instruction had the same book scanned into the computer with the same sounds as the book version. Students had the ability to turn the pages of the book

on the computer screen, had the option to listen to the book auto-narrated, and could click to hear highlighted words read aloud. There were four assessment measures performed: baseline, experimental, crossover, and final.

All participants spent more time on task in the computer condition (mean 9.9 minutes) than in the book condition (mean 2.8 minutes) (Williams et al., 2002). Students also interacted more in the computer condition than in the book condition. Researchers not only considered the students' time on-task and engagement, but also looked at their use of words from the baseline testing to the final assessment. Six out of the eight children showed significant growth from baseline scores to the final assessment. Two children spoke zero words throughout the entire study. Williams et al. (2002) also looked specifically at reading skills and noted that children read twice as many word cards correctly after computer instruction than the traditional book instruction indicating students with ASD are more likely to be engaged and learn reading skills from computer-based instruction than traditional book methods. Williams et al. (2002) found that children with ASD spent more time, were more engaged, and learned more words in reading lessons with the computer program than with typical book-based instruction. Researchers also noted that students rarely refused to work on the computer compared with frequent refusals to learn with a book. Although results show the usefulness of computer-based instruction to improve the reading skills of students with ASD, implications of the student include the small sample size and the generalization of reading rather than a focus on specific reading skills.

These studies show the positive relationship between computer technologies and student attention, motivation, and acquired skills. Assistive technology is an efficient and effective instructional strategy for improving the reading skills of students with ASD.

Peer tutoring.

Classwide peer tutoring (CWPT) is another effective strategy to use with children with ASD and has been found to show "gains in reading fluency, reading comprehension, and social interactions between students with autism and their peers" (Crosland & Dunlap, 2012, p. 257). CWPT is the pairing of two or more students together to work on an instructional strategy, where one student provides instruction and positive support to another student in an inclusive classroom setting (Kamps, Barbetta, Leonard, & Delquadri, 1994). In a multiple baseline study examining CWPT, Kamps et al. (1994) measured its effectiveness with reading skills and social interactions of individuals with ASD. Kamps et al. examined the rate of words read correctly and reading errors, responses to reading comprehension questions, and social interaction. Three male students considered to be high-functioning, ages eight and nine, were selected for the study. The study took place inside students' general education classroom with researchers serving as peer tutoring monitors, measuring academic and social performances of the participants. The CWPT took place three to four days a week for 25 to 30 minutes each day as a supplement to baseline reading instruction. During the CWPT, the learner read for eight to 10 minutes from the same material used in baseline, while the tutor provided feedback and scored correctly read sentences. After reading, the tutor asked comprehension questions about the reading passage. Immediately following the CWPT reading and discussion, the teacher arranged for unstructured free time in the classroom, during which researchers observed social interactions between the participants and their typically-developing peers. All students showed an increase in number of words read correctly per minute with CWPT. Prior to CWPT, students read 106, 96, and 117 words correctly, but during CWPT, read 125, 127, and 129 words correctly, suggesting the effectiveness of CWPT with reading fluency. The reading comprehension component results also suggest the effectiveness of CWPT in the general education classroom. Prior to CWPT, students

scored 47%, 24%, and 67% on reading comprehension questions, but during CWPT, scored 85%, 85%, and 100%, suggesting the effectiveness of CWPT with reading comprehension. Although the study included only a small number of participants who were all male and high-functioning, results strongly suggest the effectiveness of CWPT in the general education classroom with reading fluency and reading comprehension in individuals with ASD.

Summary

The research explored in this literature review identifies strategies that can be used by general education teachers in full inclusion classrooms to meet the needs of students with ASD. Full inclusion is a strategy that has been found to be beneficial to children with ASD. The inclusion of students with ASD in general education classrooms is suggested to improve both social and academic growth. Published research suggests that educators should use a balanced approach of research-based strategies such as direct instruction, assistive technology, and peer tutoring to find what works best for each individual student. Although many strategies have been shown to be effective with students with ASD, the complexity of the disorder and each individual diagnosis makes it difficult to identify one specific strategy that will be the best practice for every child with ASD.

Chapter III – Results and Analysis Relative to Problem

The focus of this literature review is guided by the question exploring what specific strategies are effective in improving the reading skills of individuals with ASD. Although the sample size in each study was less than 50 due to the small number of possible participants, researchers have identified various strategies, such as full inclusion classrooms, DI, small group instruction, assistive technology, and CWPT that improve the reading skills of students with ASD. Although ASD is a broad spectrum disorder with each child having different needs and abilities, researchers have found commonalities in the characteristics of students with ASD to allow for a better understanding of the learning needs.

A common theme woven throughout the literature review and throughout the research studies is that individuals with ASD develop reading skills in different sequences and at different times from one another and their typically developing peers (Ganz & Flores, 2008; Nation et al., 2006), requiring teachers to focus on how learning material is presented so that students are motivated and find enjoyment in their learning activities (Bosseler & Massaro, 2003; Kamps et al., 1994; Williams et al., 2002). All of the instructional strategies expanded upon in this literature review (DI, small group instruction, assistive technology, and CWPT) provide clear instruction to provide students with ASD learning opportunities while remaining in the general education classroom. While some of these strategies provide instruction at the individual students' level it is important to recognize that exposing students with ASD to the same information as their typically developing peers allows for incidental and observational learning, as well. In addition to providing differentiated instruction, these strategies use explicit and organized instruction keeping students with ASD focused. As resources and funding in schools

are limited, it is also important to note that all of these strategies are able to be implemented in the general education classroom with or without paraprofessional help.

Keeping students with ASD motivated and engaged is also discussed throughout the studies within the literature review. In many of the studies, (Bosseler & Massaro, 2003; Kamps et al., 1994; Williams et al., 2002) there were times when participants refused to participate in learning activities or were unable to control their behavior, mirroring common behavior struggles in general education classrooms. When students are misbehaving or refusing to participate, there is no learning taking place. Finding ways for students with ASD to enjoy learning activities is an important first step for general education teachers to take in order to improve reading skills.

Just as students with ASD have different reading skills, they also have various learning styles, forcing teachers to find what works best for each individual student. Due to the heterogeneous nature of ASD, there is not one specific program or strategy that will work for all children with ASD. All of the strategies expanded upon in this literature review enable general education teachers to provide clear and explicit differentiated instruction at small-group or one-on-one settings to students with ASD in a manner that is enjoyable and engaging to them.

Chapter IV - Recommendations and Conclusion

Autism Spectrum Disorders are being diagnosed more often than ever before, and it is no longer a rare condition. Educators today must become educated through research to understand the complex disorder in order to provide effective reading instruction to students with ASD. The final chapter will reflect upon the research discussed to identify recommendations and areas for further research.

Recommendation

One of the most important recommendations suggested from the research studies included in this literature review is for general education teachers to understand the diversity of students with ASD and how that impacts their learning and social skills in the general education classroom. General education teachers need to educate themselves with facts regarding ASD including common strengths and weaknesses. In addition, teachers need to get to know students with ASD on a personal level to identify the individual child's needs and interests. Just as every child is different, every individual with ASD is different and teachers must communicate with parents and the student to understand traits specific to the child. Students with ASD learn skills different from one another and their typically developing peers, causing reading to be a difficult task. Many students with ASD act out and refuse to participate in learning activities so it is important that general education teachers find ways to motivate, engage, and reward students with ASD as they work to become readers.

Just as teachers differentiate for all general education learners, they must attempt teaching reading skills to children with ASD using a balanced approach of the strategies suggested, including DI, small group instruction assistive technology, and CWPT to see what is most effective and engaging for the individual student. When teaching reading skills through DI

or small group instruction, general education teachers need to bring students with ASD into discussions when possible to create more opportunities for learning. In addition, general education teachers need to provide praise to students with ASD during small group and DI lessons to encourage the behavior in the future.

Many teachers already use DI in their classroom every day during small and whole group instruction; however, assistive technology and CWPT are instructional strategies that require the general education teacher to seek information and implementation ideas. Assistive technology and CWPT are instructional strategies that take place in addition to teacher instruction that takes place during the day, allowing the student to receive information in a variety of ways. General education teachers should utilize school and district resources and find research online to become familiar with assistive technology and CWPT in the general education classroom when teaching a student with ASD. There are varying degrees of assistive technology, and general education teachers can begin by using websites and applications for audiobooks or reading skill development, and if needed get information regarding more advanced assistive technology. Websites to improve reading skills such as ABCya (www.abcya.com), Starfall (www.starfall.com), and PBS Kids (http://pbskids.org) have sound, colors, and movement to engage students while they develop reading skills. In addition, applications for tablets, such as Storia, Bookster, Bob Books #1, and Interactive Alphabet are engaging and created for students to use independently. Although new technology may not be available for teachers, simple websites or even audiobooks (on tape or CD) are engaging and beneficial to students with ASD.

To implement CWPT to assist students with ASD, general education teachers should utilize a CWPT system that works for the specific child and the classroom environment to improve academic and social skills. Programs such as Grand Valley State University's Peer-to-

Peer Support Program for elementary schools to high schools can be implemented in a school-wide setting or just within one single classroom and can be modified to meet specific goals for specific students.

There are a variety of strategies and implementations to use in the general education classroom to improve the reading skills of students with ASD. Some strategies are easier than others to implement, and many are free while others cost a great deal of money. Prior to implementing instructional strategies, it is crucial for general education teachers to understand the needs, interests, and strengths of his/her specific ASD student and plan what will work specifically for him/her. General education teachers need to recognize the diverse spectrum of ASD and implement the strategies that work with the individual learner.

Areas for Further Research

Reading is a complex skill that involves decoding and then making sense of words. Although the research studies discussed in the literature review identify effective strategies for teaching reading skills to children with ASD, it is important to identify specific strategies that are most effective for specific reading skills, such as decoding and comprehension. Because ASD is a disorder with a vast spectrum of abilities and impairments, more research in the field of reading is needed, especially research studies that focus solely on decoding or solely on comprehension skills. In addition to focusing on specific strategies and specific reading skills, future research needs to include larger numbers of participants from public schools across the United States, where students with ASD are in general education classrooms and special education classrooms, rather than facilities specifically for children with ASD. When focusing research on individuals with ASD, there are a small number of potential participants, making it important for researchers to expand their testing population to gain a greater understanding of the ASD population.

A possible area for future research would be a quantitative study focusing on which effective strategies, DI and assistive technology, work best with the instruction of specific reading skills. During the study, each of the strategies would be used to teach decoding skills and comprehension skills, giving researchers an idea of best practices to present material.

The subjects tested would include students diagnosed with ASD who are reading at a kindergarten-, first-, or second-grade level randomly selected from public schools across the United States. The study would need to include at least 30 students. Research-based programs would be used for the baseline testing, crossover and posttest for each part of the study. For phonics, a basic letter-sound inventory as well as the Dynamic Indicators of Basic Early Literacy Skills (DIBELS®) Nonsense Word Fluency assessment would be used to identify students' phonics skills which are used for decoding. The two-part study would take place over twelve weeks and would begin with the study of phonics. All students would be given the DIBELS® Nonsense Word Fluency (NWF) assessment to identify the number of sounds and words they are able to decode in one minute. Participants would then be split into two groups: one group to receive DI using BOB Books for three weeks and the other to receive phonics instruction through the BOB Books application for three weeks. For both groups, instruction would take place for 30 minutes each day. At the end of three weeks' time, students would be given the DIBELS® NWF assessment again to see their progress at the crossover. Groups would then switch instructional strategies for three weeks. Posttests would be given at the conclusion of the second three weeks for posttest data. The second six weeks of the study would focus on comprehension skills following a similar method to the phonics study. Students would begin by participating in a baseline assessment, receive either computer-based instruction or DI focusing

on comprehension skills for three weeks, participate in a crossover assessment, receive the other

form of instruction for three weeks, and then finally participate in a posttest assessment.

The results of the two-part study would provide a great deal of information for general

education and special education teachers on how to focus on improving phonics and

comprehension skills in students with ASD.

Summary and Conclusion

With the NCLB Act of 2001 and IDEA of 2004, the population within general education

classrooms has changed to include children with disabilities, including those with ASD. Along

with this change, teachers are now, more than ever, required to meet the needs of and show

growth in all learners, including students with ASD. It is crucial that general education teachers

identify, understand, and meet the needs of students with ASD so they, too, may develop reading

skills to become literate members of society. General education teachers, in addition to special

education teachers, need to understand and implement effective strategies to teach reading skills

to students with ASD. Full inclusion in general education classrooms improves both social and

academic growth in students with ASD and researchers have found many effective strategies to

teach reading skills to students with ASD (DI, small group instruction, assistive technology, and

CWPT) that can be implemented within general education classrooms. It is difficult, however, to

identify or develop a single program or plan to teach individuals with ASD to read due to the

complex nature of the disorder. In addition, it is important that general education teachers use

instructional strategies in which a student with ASD will be cooperative, motivated, and

engaged, as behavior can be an inhibiting factor to learning necessary reading skills. Although

there is a great deal of research that has been done in regards to educating students with ASD,

there is much more research that needs to be done in order for teachers to better reach these

students. Much of the time in elementary school is spent teaching the lifelong skill of reading.

All children, including those with ASD, deserve the opportunity to be literate members of our

society and it is up to general education teachers and special education teachers to continue to

learn about ASD to make that possible.

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