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Literacy Instruction for Students with Autism Spectrum Disorder

Sonja Hall
sonjaehall@outlook.com

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Sonja Hall

Concordia University, St. Paul

ED590 Research and Complete Capstone, Cohort 126

Dr. Diane Harr

Second Reader: Dr. Kelly Sadlovsky

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Abstract

This paper reviewed current literature on instructional strategies for providing literacy instruction to students with Autism Spectrum Disorder. Literacy is made up of many strands, literacy was broken into three subsections for the purpose of this review: phonics instruction, reading comprehension, and writing. According to experts, reading comprehension and writing are two main areas in which students who have been diagnosed with Autism Spectrum Disorder (ASD) can be challenged by. The studies in this review revealed that direct, systematic, and explicit instruction in the area of literacy is essential for student success in the targeted areas. Different teaching strategies involved the use of visuals, different apps on educational technology, and graphic organizers. All instructional strategies implemented direct, systematic instruction. Lessons were predictable and followed a logical order. In each study reviewed, all participants made significant gains towards mastery in phonics, reading comprehension, and writing.

Keywords: Autism Spectrum Disorder (ASD), literacy, reading comprehension, phonics instruction, writing, instructional strategies

Chapter One: Introduction

Introduction

The purpose for this review stemmed from interest in the current push for evidence-based literacy instruction to be provided in schools, the writer's own experience with literacy instruction, and interest in current best practices regarding teaching students with Autism Spectrum Disorder (ASD). Literacy can be defined as "the ability to read, write, speak, and listen in a way that lets us communicate effectively and make sense of the world" (National Literacy Trust, n.d.).

When students are in elementary school, many of them are still operating in Jean Piaget's concrete-operational stage of development. According to Piaget, when individuals are in the concrete-operational stage of development, "children have difficulties with abstract thinking" (Mcleod, 2023). Oftentimes, students are required to access abstract thinking when participating in literacy activities, such as writing. Individuals with ASD tend to be concrete thinkers making abstract thinking skills difficult for them to attain. Students with ASD can experience difficulties in the area of literacy, specifically in regards to reading comprehension and written composition (Brasiel et al., 2020). This begs the question what are the most effective practices for providing literacy instruction, in the areas of phonics, reading comprehension, and writing to students with Autism Spectrum Disorder.

Scope of Research

Research for this review was gathered from studies, journals, and other research published within the last ten years. Since there are many strands that make up the subject of literacy, this review focused on three areas of literacy: phonics, reading comprehension, and writing, two of which are main difficulty areas for students with Autism Spectrum Disorder. This

review is organized into three sections, an introduction, the review, and a discussion about the results and application to teaching practice. Participants in each study ranged in age from preschool through grade eight, with a primary focus on the elementary school grades. All studies in the research evaluate the effectiveness of different instructional strategies for students with Autism Spectrum Disorder.

Importance of Topic

State of Minnesota legislators require districts to provide a Local Literacy Plan to "ensure that all students are reading well by no later than the end of third grade. This plan addresses the third-grade reading proficiency objective of districts' World's Best Workforce plans" (Minnesota Department of Education, n.d.). As a state quality literacy instruction is valued and students with ASD also have a right to high-quality literacy instruction. Literacy instruction begins young with letter names and sounds. A strong foundation is important for strong growth. When students are provided with a strong foundation of skills, their growth can be strong especially when provided with appropriate instruction. Due to the challenges in reading comprehension and writing that students diagnosed with ASD can present with, some may not progress in literacy skill development. When teachers of students who have ASD are trained on and implement effective instructional strategies such as direct, systematic, and explicit instruction that implements the use of visuals, students will thrive.

Definition of Terms

Autism Spectrum Disorder (ASD): a neurological and developmental disorder that affects how people interact with others, communicate, learn, and behave (U.S. Department of Health and Human Services, n.d.).

Literacy: the ability to read, write, speak, and listen in a way that lets us communicate effectively and make sense of the world (National Literacy Trust, n.d.).

Reading Comprehension: comprehension is the understanding and interpretation of what is read. To be able to accurately understand written material, children need to (1) decode what they read; (2) make connections between what they read and what they already know; and (3) think deeply about what they have read (Reading Rockets, 2015).

Writing: the process of using symbols (letters of the alphabet, punctuation, and spaces) to communicate thoughts and ideas in a readable form (EnglishClub, n.d.).

Phonics: a method of teaching people to read by correlating sounds with letters or groups of letters in an alphabetic writing system (Simpson, J. A., & C., W. E. S., 1989).

Instructional Strategies: the instructional materials and procedures that enable students to achieve the learning outcomes (Hill et al., n.d.).

Low-Incidence Disabilities: refers to disabilities that occur in low numbers (Sourcewell, n.d.).

High-Incidence Disabilities: refers to disabilities that occur in more frequent numbers.

Conclusion

Special education teachers are specifically trained in working with and providing instruction to students with disabilities. These teachers are required to teach the state standards to students of all abilities, which means providing instruction in a variety of subjects, including literacy. Students with ASD can present with unique learning differences and difficulties. Many struggle with reading comprehension and writing, two aspects of literacy. As stated in the Concordia University Special Education Program Essential question, in light of what is known about special education law and policies, this review examines the current best practices for providing literacy instruction to students with Autism Spectrum Disorder. In the next chapter,

readers will find a review of fifteen research studies divided into three subsections. Research is focused on best practices for providing phonics instruction, developing reading comprehension, and writing instruction for students with ASD from preschool until eighth grade.

Chapter Two: Literature Review

Introduction

Educators use a variety of strategies to implement instruction daily in their classrooms. Students with disabilities can present unique learning needs which require creative thinking and creative instructional strategies in order to deliver appropriate instruction to meet the needs of each student. Literacy is arguably one of the most important skills a student can learn in school. Students with ASD present challenges in the area of literacy, such as reading comprehension and writing skills. A review of current research and literature regarding phonics instruction, reading comprehension, and writing skills for students with ASD was done to determine the current most effective practices when it comes to delivering literacy instruction to students with ASD and building a strong foundation for future development. Research for this review focused on determining the current best practices for providing literacy instruction, specifically in regards to teaching students with ASD in the literacy areas of phonics, reading comprehension, and writing.

Phonics Instruction

"The primary focus of phonics instruction is to help beginning readers understand how letters are linked to sounds (phonemes) to form letter-sounds correspondences and spelling patterns and to help them learn how to apply this knowledge in their reading" (National Reading Panel, 2017). Strong phonics instruction leads to strong readers. Students with ASD can present with unique learning styles that need a unique and specialized instructional approach. "Autistic children are able to learn letters and their sounds/symbols, but they often struggle with applying this knowledge" (Bennie, 2020). There are many strategies and opinions regarding phonics instruction available for educators to implement within their own classrooms.

Systematic, explicit phonics instruction is one of the most effective ways to teach students letter-sound correspondence. According to a quantitative study titled *Teaching letter-sound Correspondence to Preschool Students with Developmental and Intellectual Disabilities*, "preschool students with developmental delay and autism spectrum disorder, and communication disorders can learn letter-sound correspondence using systematic explicit direct instruction" (Matthews Wright et al., 2022, p. 214). This study was administered to preschoolers with developmental delays, autism, and other communication disorders set to determine an effective strategy for teaching students with low-incidence disabilities letter-sound correspondence. The participants in this study were all students in an inclusive preschool setting who have been diagnosed with low-incidence disabilities with the educational label of Developmental Delay or Autism Spectrum Disorder.

The one-to-one intervention lasted a total of 11 weeks. Beginning with one sound at a time, the researchers provided direct and structured interventions to teach letter-sound correspondence. For each letter-sound, the researchers followed the same structure so that students were able to predict the structure of each lesson. The first step in each lesson was to introduce the sound. Then the teacher modeled using the targeted sound and how to choose a response. Thirdly, the teacher and the student engaged in guided practice, which in this case means they are working together to identify sounds. Every lesson ended with an independent practice portion. Throughout each step, the teacher would give the students many opportunities to respond and practice the sounds and would gradually wean the student off support.

The results of this study found that before the intervention, students had a limited understanding of letter-sound correspondence, but after the intervention, the students demonstrated 100% accuracy on letter-sounds /m/, /a/, /s/, and /t/ (Matthews Wright et al., 2022,

p. 212). These results suggest that "preschool students with low incidence disabilities can learn letter-sound correspondence. Study participants mastered letter-sound correspondence when taught using explicit instruction. This study legitimizes the need for establishing this intervention as an evidence-based practice for young students with low incidence disabilities" (Matthews Wright et al., 2022, p. 215).

Limitations of this study, and many studies reviewed, is the limited number of students. As mentioned in this study, "because the population of students had low incidence disabilities, the availability of the participants was limited" (Matthews Wright et al., 2022, p. 214). It was also noticed that the study took place during the onset of the COVID-19 pandemic. This means the method of the interventions had to switch halfway through the intervention period. Although the method had to change from in-person learning to online learning, the structure of the intervention remained the same, and students showed growth.

An earlier study done, *Teaching phonics to groups of middle school students with autism, intellectual disabilities, and complex communication needs,* is a quantitative study done by researchers Melissa K. Ainsworth, Anya S. Evmenova, Michael Behrmann, and Marci Jerome, also found that direct phonics instruction is beneficial to the literacy growth of students with disabilities. Similar to the study performed on preschool students, this study was also performed on students with low-incidence disabilities with a similar intervention. All students that participated in this study had disabilities that were considered severe or low-incidence. The Accessible Literacy Learning (ALL) Curriculum, a "packaged curriculum designed as a comprehensive literacy program for students with significant disabilities, including communication disorders (Light and McNaughton, 2009)" (Ainsworth et al., 2016, p. 168), was implemented as the intervention. As with the study done on preschool students with

low-incidence disabilities, structured lessons were implemented in this study done on middle school students in the form of scripted lessons. The researchers also used both visual and tactile materials, creating a multi-sensory learning experience for students. This study aimed to determine if students with low-incidence disabilities and communication disorders were able to acquire letter-sound correspondence skills. As claimed in the study, "the ability to understand letter-sound correspondence (or phonics) is the basic foundational skill readers need in order to process novel words they will encounter" (Ainsworth et al., 2016, p. 169).

The results of the study done by Ainsworth et al. showed that with direct, explicit instruction in the area of phonics, specifically working on letter-sound correspondence, middle school students with low-incidence disabilities increased their understanding of letter-sound correspondences. Much like the previous study performed on preschool students, middle school students performed higher than baseline after the intervention. As stated in the study, "the results of this study indicate that middle school students with severe disabilities and communication disorders can benefit from direct instruction on letter-sound correspondence using direct instruction such as provided in the ALL curriculum and presented in small group settings" (Ainsworth et al., 2016, p. 174).

Direct, explicit, systematic instruction seems to be the most effective way of teaching phonics skills to students with disabilities. Like in the previous studies, another study aimed to determine the effectiveness of systematic instruction with the implementation of an Augmentative and Alternative Communication (AAC) device. The study titled, *Effects of Systematic Instruction and an Augmentative Communication Device on Phonics Skills Acquisition for Students with Moderate Intellectual Disability Who Are Nonverbal*, used interventions to target phonics skills in students with significant or low-incidence disabilities.

Interventions in this study were performed by the students' own teachers. The teachers used the GoTalk Phonics curriculum to target phonics skills such as phoneme identification, blending sounds to identify words, and blending words to identify pictures. Teachers would provide direct instruction in all areas, and students would respond to direct instruction using their AAC device. Students were given a field of four to choose the correct answer from. Students were also given adequate wait time and a second prompt, if needed, to accurately answer the question. The teacher would orally produce the sound or word that was being targeted, and the student would choose the correct response on their AAC device.

Results of this study showed that with direct instruction that was modified to the learning and communication needs of the students, their scores increased significantly. "One eligibility requirement of this study was completion of an early literacy curriculum in which letter-sounds were previously taught. Despite their previous knowledge, all participants demonstrated a stable, increasing trend in intervention for this skill" (Ahlgrim-Delzell et al., 2014, p. 528). This study focused on skills that are needed for beginning reading (blending). The researchers mentioned that "other researchers have considered the challenge of teaching phonics to students who are nonverbal. Light et al. (2008) developed the ALL curriculum for teaching students with significant speech or motor disabilities critical literacy skills… In contrast, this study provided intensive practice on phonics skills that bridged into beginning reading" (Ahlgrim-Delzell et al., 2014, p. 528). Much like the ALL curriculum, the GoTalk Phonics Curriculum was designed for students with disabilities. When these curriculums were paired with direct, individualized instruction, students made incredible gains in their skill level.

The same researchers conducted another study on the effectiveness of systematic phonics instruction using an iPad for students who use AAC, *Systematic Instruction of Phonics Skills*

Using an iPad for Students With Developmental Disabilities Who Are AAC Users. This study took place after the initial 2014 study and was done using a larger sample of students and teachers. All students participating in this study were diagnosed with a disability, many diagnosed with ASD. All students also had communication needs, and many used AAC devices to communicate.

Using an intervention named the *Early Reading Skills Builder (ERSB)*, which is a curriculum that "blended iPad-based technological speech supports using GoTalk Now (GTN; The Attainment Company, n.d.) and systematic instruction using time delta and shaping/fading of model prompts" (Ahlgrim-Delzell et al., 2016, p. 89). The skills taught using this intervention were beginning reading skills such as phoneme identification in isolation and in words, segmenting sounds, blending sounds, decoding words, identifying sight words, reading connected text, and answering comprehension questions. Teachers administered the intervention to their students in a one-to-one setting, as with the ALL curriculum and the GoTalk phonics curriculum. When asked to respond to a prompt, students indicated their response on their iPad from an answer field.

The results of this study demonstrated "that systematic and explicit instruction and iPad technology that provided accessible receptive and expressive response modes that promoted students ability to manipulate phonemes to learn to decode words to read connected text and answer comprehension questions" (Ahlgrim-Delzell et al., 2016, p. 94). All students who participated in the study showed an increase in skill ability after the intervention. The researchers claimed that "systematic instruction of phoneme identification was essential" (Ahlgrim-Delzell et al., 2016, p. 94). All research has shown that when students are provided direct, systematic instruction, they will make gains towards mastery of phonics skills. There are curriculums

designed for students with disabilities, such as the ALL Curriculum, GoTalk Curriculum, and the ERSB Curriculum. These studies have shown that students benefit from the systematic and structured nature of these programs, and the direct instruction provided in a small setting, oftentimes one-on-one, contributed to the success of the student's increase in skill acquisition.

Knowing letter names and sounds is not the only aspect of phonics instruction that students need to learn, "phonological awareness (PA) is 'the ability to detect, manipulate, or analyze, the auditory aspects of spoken language (including the ability to distinguish or segment words, syllables, or phonemes), independent of meaning' (Lonigan & Shanahan, 2009, p. 3)" (Dynia et al., 2019, p. 2). This skill starts when a child is very young and develops over time. Beginning instruction young is integral to the overall development of phonological awareness in children. As the previous studies mentioned, direct and systematic instruction is one of the most effective ways to teach phonics skills to students with significant disabilities and autism. According to Maureen Bennie at the Autism Awareness center; "individuals on the Autism Spectrum have specific challenges around reading… this difficulty may have a genetic origin found on the irregularities of chromosome one, six, seven, and fifteen" (Bennie, 2020). Chromosome one is responsible for phonics, chromosome six is responsible for phonemic awareness, chromosome seven is responsible for oromotor skills, and chromosome fifteen is responsible for single-word segmentation. Although this is just a theory, studies have shown that there is a correlation between students with ASD and phonological awareness acquisition (Dynia et al., 2019, p. 11).

Phonological awareness emergence in preschool children with autism spectrum disorder was a quantitative study done on preschool students diagnosed with ASD to determine if there is a correlation between students with ASD and their phonological awareness skills. As previously

stated, students with ASD can have genetic markers that make phonological awareness a difficult skill to acquire. The intervention tested in this study was done through a shared read-aloud at school, while caregivers also committed to reading twice a week with their child at home. Researchers provided storybooks for teachers and caregivers to read with their students. Teachers and caregivers either read the books with a print-focused style ("Print-focused style includes adult references to letters and words during book reading" (Dynia et al., 2019, p. 5)) or a regular reading style.

This study took place over one preschool academic year, and the results showed that students with ASD began the year behind their typically developing peers in the area of phonological awareness but made similar gains. This means that "because children with ASD started with a delay and made similar gains as their peers, they will not close the gap in [phonological awareness] skills without a specific intervention targeting [these] skills" (Dynia et al., 2019, p. 11). Due to the results of this study, it can be concluded that it is important that "early childhood educators provide children with ASD with a more intensive intervention to close this gap" (Dynia et al., 2019, p. 11). Phonological awareness is a building block to later decoding and becoming a fluent reader. If students are set up with a strong foundation, meaning implementing appropriate interventions, students will be more successful as their skills develop.

The research is clear that direct, systematic instruction is integral to the success of students with ASD and phonics acquisition. In multiple studies, this was tested against specific curriculums designed for students with disabilities. The curriculums, or methods, developed for students with disabilities include the ALL Curriculum, GoTalk Curriculum, and ERSB Curriculum. In addition to the different curriculums, structured exposure to literature was tested through shared read alouds at preschool and at-home reading done by caregivers. It can be

determined by the research that educators should implement systematic phonics instruction in their classrooms to support the literacy development of students with ASD. It is repeatedly claimed that literacy is one of the most important skills one can attain. In order to have strong literacy skills, students need to have a strong foundation of instruction, catered to their learning needs. Direct, systematic instruction is one way to meet the need of providing phonics instruction to students with ASD.

Reading Comprehension

Reading comprehension has previously been mentioned as one of the areas in which students with ASD present challenges. Rigid and structured thinking can cause challenges with comprehension. A child may be able to decode and read a word, but knowing what it means is different. Stringing a set of words together and creating meaning can be challenging for students with ASD. There are several reasons for these comprehension difficulties as suggested by researchers: Theory of Mind, "which refers to the ability to understand others' viewpoints and emotions" (Sartini et al., 2020, p. 1); Weak Central Coherence, "which results in difficulty understand larger context and synthesizing detail" (Sartini et al., 2020, p. 1); and executive functioning challenges, "which leads to difficulties regulating a variety of self-monitoring behaviors" (Sartini et al., 2020, p. 1). All students are entitled to appropriate reading instruction, including reading comprehension. "Given the complex nature and characteristics of ASD, it is helpful for teachers struggling with teaching students to comprehend reading texts by using the ready-to-use evidence- based strategies or steps described" (Nghia Nguyen et al., 2015, p. 75).

According to a qualitative journal article titled *Reading Comprehension and Autism in the Primary General Education Classroom*, written by Neal Nghia Nguyen, Patrick Leytham, Peggy Schaefer Whitby, and Jeffrey I. Gelfer, there are effective steps and strategies that an educator

can use to teach reading comprehension to primary students diagnosed with ASD. Using the cognitive deficits that students with ASD can present with (Theory of Mind, Weak Central Coherence, and Executive Functioning challenges), the researchers put together five steps, or strategies, that educators can implement in their classrooms to support the comprehension development of students with ASD. The first step being to, "access and build background knowledge" (Nghia Nguyen et al., 2015, p. 73). Educators can do this by using visuals about topics presented in the text and pre teaching topics covered in the text. The second step being to "create mental images" (Nghia Nguyen et al., 2015, p. 73), meaning using a picture walk to engage background knowledge and create a mental image of the story that will be read to them. The third step is to "make connections" (Nghia Nguyen et al., 2015, p. 74), by utilizing graphic organizers to help students connect to the text. For example, a venn diagram may be used to help students visualize what is unique to them, a character in the book, and what is the same between them and the character. The fourth step the researchers suggested is to "engage in consistent discussions" (Nghia Nguyen et al., 2015, p. 74), meaning as the teacher reads the story, discussions about the elements take place (characters, setting, events, problem, solution). This may look like the teacher implementing a Story Grammar intervention as they read the story by facilitating a discussion about story elements as the story is being read. The fifth step is to "summarize understanding" (Nghia Nguyen et al., 2015, p. 75), meaning students are asked to retell events in the story. Overall, a structured approach to teaching reading comprehension is recommended by experts and researchers.

A quantitative study was done on elementary students who had an educational diagnosis of ASD and received special education services in a self-contained classroom for students with moderate to severe disabilities. Researchers set out to determine the *effects of systematic*

instruction and self-directed video prompting on text comprehension of elementary students with autism spectrum disorder. The students special education teacher administered the interventions and used graphic organizers, video prompts from the My Pictures Talk application, and ReadWorks passages with adaptations as materials for the intervention. Through direct, systematic instruction, the teacher provided modeling, prompting, and guidance to teach the students and wean off support so that students were becoming more independent when answering questions, prompted by a video.

The results of this study showed that when students were given systematic instruction, that included the use of visuals, they improved their comprehension skills. All students demonstrated an increase in their comprehension skills as well as their level of independence. The classroom teachers claimed "that answering 'wh' questions was an important skill for the student or students. In addition, all agreed or strongly agreed that the intervention was effective" (Sartini et al., 2020, p. 9). The researchers mentioned that not only did the students increase their comprehension skills but "generalization data suggest that their self-directed video prompting may be beneficial for helping students transfer skills across exemplars, stories, settings, and people" (Sartini et al., 2020, p. 9). The results of this study support the research showing that systematic instruction is essential and effective in teaching students with ASD. Different strategies such as the "MLT strategy, modeling of examples and non-examples, and visual supports (i.e. [graphic organizers]; e.g., Knight & Sartini, 2015)" (Sartini et al., 2020, p. 11) have been researched and can be confidently implemented in classrooms to improve student comprehension.

Another study examined the *Effects of Direct Instruction on Reading Comprehension for*

Individuals with Autism or Developmental Disabilities. As claimed by the researchers, "reading is a complex metacognitive process that contains numerous components that must be mastered in order to succeed. Of these components, the ultimate goal is for individuals to be able to derive meaning from the text, otherwise known as reading comprehension" (Head et al., 2018, p. 176). Researchers conducted a study on middle school students with ASD and the effects of direct instruction on specific reading comprehension skills and the generalization of the instruction. Taking a structured approach to reading comprehension instruction has been both suggested and proven by the previous two journal articles. In this study, middle school students with ASD received one-on-one instruction either in place of one of their electives or after school. Using the *Corrective Reading Comprehension: B1* curriculum, the researcher implemented a series of lessons over the course of six weeks. A series of AIMSWeb subtests was administered at the end of the six weeks to gauge student generalization of learned skills.

The results of this study showed that "each student mastered each skill presented and maintained performance once instruction had ended. In addition, all three participants generalized these skills to a norm referenced test of reading achievement and an additional measure of reading comprehension commonly found in general education classrooms" (Head et al., 2018, p. 186). This study affirmed previous research and review on the effectiveness of direct instruction. The researchers claimed that direct instruction is an effective intervention for a variety of students and student needs, not just students diagnosed with autism, but students from different backgrounds or with cognitive deficits.

As previously stated, students with ASD have reading comprehension challenges. The journal article, *Reading Comprehension and Autism in the Primary General Education Classroom,* suggests following a structured approach to reading comprehension, including the

implementation of the five steps. Step four suggests that when engaging in discussions about the story being read aloud, different story elements will emerge (characters, setting, events, problem, solution). The Story Grammar intervention is an intervention created to explicitly teach characters, setting, events, problem, and solution. The participants involved in this study titled, *effects of an adapted story grammar intervention on the listening comprehension of children with autism*, had to be in the primary grades (kindergarten, first, or second grade), be diagnosed with ASD, and be able to verbally answer questions. For this intervention, a researcher read a book aloud and asked scripted questions, targeting all the story grammar elements (characters, setting, events, problem, and solution). Researchers provided a significantly structured intervention, following the same procedure daily with different books. When asking the scripted questions, researchers changed how they presented the answers. They would have students answer in an open-ended fashion and in later points by presenting answer choices for students to choose from.

The results of this study showed that when students are given structured intervention, they will increase in their ability to answer comprehension questions. “All participants demonstrated a gradual increase with their greatest gains in the final intervention phase. By the 3rd intervention phase combined spontaneous correct responding and correct responding with visuals stabilized for 4 of the 5 participants with scores ranging between 80 and 100% on the comprehension test” (Whalon et al., 2019, p. 10). This shows that the Story Grammar intervention was effective in increasing comprehension abilities in young students with ASD. Some students even made “immediate improvements” (Whalon et al., 2019, p. 10) in their ability to comprehend a story that was read to them.

According to multiple studies, visually-based instructional strategies is a proven intervention for increasing comprehension in students with ASD. The use of the Story Grammar

intervention, structured instructional steps, and implementation of visuals help to increase the comprehension skills of students with ASD. Another strategy was evaluated in a research study titled *Technology-Aided Instruction and Intervention in Teaching Students With Autism to Make Inferences.* Researchers set up a study to determine if a technology intervention aided in the comprehension development of students with ASD.

There were two students who participated in this study, both in middle school, and both who spend the majority of their day in the general education setting. The intervention included the implementation of TinyTap, an app that walks students through an interactive reading lesson, videos, and graphic organizers. All three interventions were compared to each other. Students showed improved comprehension after the implementation of all three interventions, however students showed the most improvement after the TinyTap intervention, both also stating that they preferred that intervention over the other two because they "could work independently and indicated that TinyTap was easier for them to comprehend" (Kouo & Visco, 2021, p. 153).

An important note to consider is that many of the identified studies had relatively small sample sizes and may require further research in order to determine the effectiveness of the interventions. As proven by the current studies, a structured intervention is the most effective strategy in increasing student reading comprehension. In addition to a structured intervention such as Story Grammar or following the suggested five-step process to increasing reading comprehension, using visually-based strategies is also recommended by the research to aid in increasing the comprehension of students with ASD.

Writing

Writing has been another area identified by experts in which students with ASD have challenges. Due to their lack of abstract thinking skills and tendency to engage in rigid thinking,

students with ASD can struggle with writing. Different instructional strategies have been heavily researched and interventions have been studied to determine their effectiveness. One strategy in particular has been researched and its effectiveness has been studied numerous times and that is Self-Regulation Strategy Development (SRSD) Training. The SRSD Training intervention "is an instructional approach designed to improve a writer's strategic behavior, knowledge, and motivation" (Asaro-Saddler & Saddler, 2010, p. 108). This strategy focuses on three main goal areas; "through direct instruction and guided and independent practice, students learn to carry out typical composing processes such as planning" (Asaro-Saddler & Saddler, 2010, p. 108), "students develop the knowledge and self-regulatory procedures (e.g. goal setting, self-monitoring, self-instruction, and self-reinforcement) they need to utilize the writing strategies while composing" (Asaro-Saddler & Saddler, 2010, p. 108), and by targeting "specific motivational aspects such as self-efficacy and effort" (Asaro-Saddler & Saddler, 2010, p. 108). The effectiveness of this intervention has been evaluated and highly rated by researchers who have implemented this intervention with students who have ASD.

In one study titled *Planning Instruction and Self-Regulation Training: Effects on Writers With Autism Spectrum Disorders*, researchers set out to determine the effectiveness of this intervention on elementary students with ASD. All students who participated in this study had a diagnosis of ASD and also had difficulties with written expression. Using the SRSD model to plan and write a fictional story, elementary students with ASD were evaluated on their written expression improvement. One of the researchers listed on the study was the one to implement this intervention. Through explicit instruction, students were taught how to plan their writing by using graphic organizers and mnemonic devices (i.e. "**P**ick my ideas, **O**rganize my notes, **W**rite and say more [POW]" (Asaro-Saddler & Saddler, 2010, p. 114)).

The results of this study showed that all students increased their ability to produce writing. After the intervention, all students showed that they were able to add more details and elements in their written stories. Students showed a sporadic use of the self-regulatory strategies ("self-statements, goal setting, self-reinforcement" (Asaro-Saddler & Saddler, 2010, p. 120)) they were directly taught throughout the course of the study. Further research done on this intervention in 2012 also showed that this approach, SRSD, is an incredibly effective approach in teaching students with ASD written expression skills. The same researcher, Kristie Asaro-Saddler, partnered with another researcher, Nicole Bak, to determine the effectiveness of the SRSD approach in *Teaching Children with High-Functioning Autism Spectrum Disorder to Write Persuasive Essays.* Again the intervention was implemented on elementary students with ASD and difficulties in written expression. Through direct instruction, background knowledge was built and the different writing stages were taught. Much like the previous study, through the implementation of mnemonic devices and graphic organizers (POW, and "**T**opic sentence, **R**easons, **E**xplain, and **E**nding [TREE]" (Asaro-Saddler & Bak, 2012, p. 369)) and the SRSD approach implemented by the researcher, students showed improvements in their written expression skills.

The results of this study showed that "teaching the POW + TREE strategy using the SRSD approach improved the persuasive essay writing of the children with ASD" (Asaro-Saddler & Bak, 2012, p. 373). Instructional strategies for teaching phonics and reading comprehension also include direct and structured instruction. This has proven to be effective in skill development across three areas of literacy. Both researchers, Kristie Asaro-Saddler and Nicole Bak, continued further research in the effectiveness of the SRSD approach. This approach has been proven effective in their previous studies in tandem with using graphic organizers and

mnemonic devices to teach the planning stage of writing. According to the researchers, "SRSD is one of the most well-researched writing interventions conducted for students with and without disabilities" (Asaro-Saddler & Bak, 2014, p. 93). The combination of direct instruction on how to plan and produce writing and the self-regulation strategies such as self-monitoring, goal setting, and self-reinforcement has a positive correlation with student written expression.

In their 2014 study titled *Persuasive Writing and Self-Regulation Training for Writers With Autism Spectrum Disorders*, the researchers set out to determine the effectiveness of this same intervention on students who received instruction in a self-contained setting or in the general education setting. All students had to be diagnosed with ASD and show written expression difficulties. The results of this study were consistent with the findings of the previous studies in that all students showed improvements in their written expression skills. It was also noted that student confidence increased significantly and they made comments such as "I knew I could do it!" (Asaro-Saddler & Bak, 2014, p. 102).

Written expression difficulties are common for students with ASD. In order to become successful writers, systematic, direct instruction is required. Writing is a scaffolded subject that begins in early childhood with pre-writing skills. Researchers set out to determine what instructional strategies educators were implementing in the classrooms of students with ASD, and their effectiveness. In the study, *Instructional Practice for Students With Autism Spectrum and Related Disorders: Exploring the Teaching of Writing in Two Self-Contained Classrooms*, researchers observed experienced educators and noted the instructional strategies that were implemented in the classroom in regards to writing. Teachers in both classrooms implemented the use of visuals to help support the concrete understanding of students with ASD. The researchers observed that "practices such as direct modeling and verbal scaffolding particularly

support the interactional nature of writing instruction" (Asaro-Saddler et al., 2017, p. 180). It was also noted that technology was used in one classroom, which had a positive effect on the students. These strategies are not only effective for students with disabilities, but also students without disabilities. There are some implications of this study, such as "many of the instructional practices that are appropriate for all writers may be effectively applied with children with ASD" (Asaro-Saddler et al., 2017, p. 182).

"Learning to write is a complex process" (Price et al., 2017, p. 450). Writing begins in the early childhood years when students are learning to write their name and continues through adulthood. According to researchers Johanna R. Price, Emily A. Lacey, Virginia L. Weaver, and Billy T. Ogletree in their study *An Intervention Strategy for Teaching a Student with ASD to Write Sentences in Response to Prompts*, commonly used evidence-based practices for writing instruction are "modeling, prompting, and teaching self-management (or self-regulation)" (Price et al., 2017, p. 452). The purpose of their study was to determine the effectiveness of writing interventions on a student with ASD. A writing strategy called *Draw, Sentence, Detail, Check* or *DSDC* was developed to structure writing. Overtime, the researchers differentiated the prompts given to the student. The student was given a prompt to respond about the past, present, or future. The student would then go through the DSDC process to produce a written response.

The results of this study show that DSDC is "a promising instructional technique for teaching students with [High Functioning ASD]" (Price et al., 2017, p. 459). The student showed a significant improvement in his ability to produce a written response to a prompt. He was able to add more details and use punctuation to end his sentence, things he was missing prior to the intervention. Students with ASD often require the use of visuals in response to their concrete

thinking tendencies. The researchers in this intervention created a visual chart for the student to reference throughout the course of the intervention.

Teaching students self-regulatory strategies is a proven way to increase student's written expression abilities. Students not only increased the quality of their work, but they also increased their confidence. In tandem with teaching self-regulatory strategies such as goal setting, self-monitoring, and self-reinforcement, interventions included the use of graphic organizers, which helped to make the abstract concrete for students with ASD. Explicit instruction in these areas helped to increase students' written expression skills. Students increased in the quality of their work, as well as the amount of writing they produced. Writing is a challenging skill for students with ASD, but not impossible. Students are able to be successful, confident writers when given the support and direct instruction they require.

Conclusion

There are many strategies that educators can implement in their classrooms to support the literacy development of students with ASD. All of the instructional strategies for phonics instruction, reading comprehension, and writing require teachers to provide direct, systematic instruction, as proven effective in numerous studies reviewed. Through the use of multi-sensory supports and different curriculums created for students with ASD, students made significant progress and gains towards mastery of phonemic awareness and phonics skills. Through direct and structured instruction regarding reading comprehension, students also made significant gains. The use of visuals and educational apps helped to increase student success when answering comprehension questions. Writing is a particularly challenging area of literacy for students with ASD. Their rigid thinking and lack of abstract thinking can lead to frustration that is caused by a written expression task. Although there is not a lot of research in regards to

writing instruction for students with ASD, many of the evidence-based methods for general education students also work for ASD students but on a different time frame, ASD students can take longer to master writing standards. One thoroughly researched writing intervention is teaching students with ASD self-regulatory behaviors such as self-monitoring, positive self-talk, and setting goals. Through this, student's ability to produce quality written work increased alongside their confidence in their ability to produce written work. In the next chapter, the research findings will be discussed, suggestions for future research will be discussed, and an application to the classroom will be discussed.

Chapter Three: Discussion, Application, and Future Studies

Introduction

Literacy instruction is provided daily in nearly every elementary and special education classroom. The purpose of this literature review was to determine what the current research says about teaching literacy to students with Autism Spectrum Disorder (ASD). Literacy is made of many strands so for the purpose of this review, literacy was broken into three strands: phonics instruction, reading comprehension, and writing. Research shows that when students are provided with direct, structured instruction in the areas of phonics, reading comprehension, and writing, students make significant gains towards mastery of the skills or have increased in their skills significantly. In this chapter the findings will be discussed, both insights gained and limitations, as well as, an application to the classroom, and suggestions for future studies.

Discussion

The studies reviewed in this paper revealed some powerful insights about how students with ASD learn literacy skills. Multiple studies revealed that direct, systematic instruction is the most effective way to provide phonics instruction, reading comprehension, and writing instruction. Studies in the area of phonics instruction focused on beginning phonics skills such as letter-sound correspondence. Four studies focused on letter-sound correspondence and students with low-incidence disabilities and complex communication needs. The results of these studies showed that when students are provided with direct, structured instruction, they make great progress in their skills. Studies on phonics instruction collected for this review focused on students in preschool through middle school. Throughout all grade levels, one type of instructional practice was proven effective for all students and that was direct, systematic instruction.

Reading comprehension is a challenging area for students with ASD. Researchers are unsure exactly why but theorize that it is due to Theory of Mind, Weak Central Coherence, or an executive functioning deficit. When educators used a comprehensive approach to teaching comprehension skills, students made progress. Experts recommend that as a teacher reads aloud they access background knowledge, use a picture walk, use a graphic organizer, discuss story elements, and summarize when the story is finished. Through this, students build a greater understanding of the text, leading to greater comprehension. In addition to following these steps, researchers suggest that educators implement visually-based instruction to support the comprehension of students with ASD. Using different apps, structured curriculum, and graphic organizers have helped students with ASD increase their reading comprehension skills.

In the area of writing, research focused on self-regulation training and how it impacts the writing abilities of students with ASD. Self-regulation is often thought of as a way to regulate big emotions. Students with significant behaviors are often coached in self-regulation strategies, however, self-regulation can also mean students are setting their own goals, reinforcing their own work, using positive self-talk, and managing their time. Dr. Kristie Asaro-Saddler and a team of researchers studied this strategy over a period of time in multiple studies. Her research, in addition to the additional research gathered for this review, showed that when students with ASD are taught self-regulation strategies, the quality, length, and confidence of their work increases. Implementing these strategies in addition to using graphic organizers and structure, student writing increased.

The instructional strategies found through the studies in this review have been proven to be effective. Although all the strategies studied and reviewed are effective, there are some limitations to the research. By nature, students with low-incidence disabilities have been

diagnosed with disabilities that occur in low-numbers. Many studies included in this review were conducted on students with low-incidence disabilities meaning that the sample size was small and it can be difficult to determine the effectiveness of each intervention with such small sample sizes. Many studies had less than 10 participants from one school. In order to determine overall effectiveness of each intervention strategy, sample sizes would need to increase.

In addition to the small sample size, all of the studies occurred within the last 10 years, some of which occurred in the last four years, meaning the COVID-19 pandemic may have impacted the results of the study. In one particular study, *Teaching letter-sound Correspondence to Preschool Students with Developmental and Intellectual Disabilities*, research took place during the onset of the COVID-19 pandemic meaning that interventions had to take place virtually. It is important to keep in mind that this could have impacted the results of the intervention.

There was only one study in this review that tracked student progress throughout the entire academic year. It is difficult to determine whether students have been able to generalize the skills they have learned if instruction is not provided and data is not tracked over time. Many of the studies in this review lasted a total of six to 11 weeks. Although all students made progress over the duration of the study, it can be difficult to determine the effectiveness of each intervention over time unless the intervention is tracked over a period of time.

While there are a few limitations that need to be kept in mind when reading these studies, there are many insights that can be gained and applied to the classroom. Direct and systematic phonics instruction provided in a small-group setting is an effective way to increase students' understanding of various phonics concepts. Providing a comprehensive approach to reading comprehension and implementing the use of visuals and graphic organizers, students will

increase in their comprehension abilities. Writing is a complex subject and proves to be difficult for many students, not just students with ASD. Students should be taught to plan their writing through learning self-regulation strategies and implementing the use of a graphic organizer to help them stay organized. When these strategies are implemented, students will make progress not only academically but in the quality of their work and in their confidence.

Application

Using the insights gained from the current research, while also keeping in mind some of the limitations, many of the instructional practices can be implemented in the classroom. At the beginning of the year, many teachers take time to develop routines, procedures, and schedules. As teachers develop routines for teaching academic skills, research-based practices should be considered. In the research collected for this review, many of the methods for providing direct, systematic instruction took place in a small-group or one-on-one setting. As routines and schedules are developed, special education teachers working with students with ASD or other complex disabilities should consider providing instruction in small-group centers, or in one-on-one rotations. Through setting up a center or station routine, teachers are able to provide differentiated, direct instruction in the area of literacy.

As teachers and students move throughout the year, anchor charts and visuals are created to help students anchor their learning. Instructional strategies suggest that graphic organizers and mnemonic devices are implemented, specifically in the area of writing. As educators create anchor charts and set up their classrooms at the beginning of the year, they should be intentional about posting or creating supports that will enhance the direct instruction students are benefitting from throughout the day. The structure, or organization, of the different instructional strategies

can be indirectly reinforced through providing students with anchor charts or visuals posted in an instructional area.

Future Studies

Limitations discussed in this chapter include the sample size of each study, duration of each study, and timing of some studies. Suggestions for future research and studies go along with the limitations of the research in each study. Given the small sample size of many of the studies, one suggestion would be to increase the number of participants included in the study. Although some of the studies were done on students with low-incidence disabilities, researchers could broaden the area in which they request participants. A larger sample size can provide researchers and educators with stronger evidence supporting each instructional strategy or intervention.

In addition to small sample sizes, another limitation is the duration of much of the research. It is difficult to determine whether or not students retain what they have learned from each intervention or if they have generalized the information they have learned from each intervention. One intervention included in this review was tracked throughout the duration of one academic year. A second suggestion for further research would be to increase the duration of each study to determine if students are retaining the information taught to them. Although it can be difficult for researchers to keep track of a study for the duration of one academic year, the results could provide valuable insights in literacy instruction for students with ASD.

Similar to the duration of each study, none of the studies collected for this review returned to the students after a period of time to determine whether or not the students retained and continued building the skills they were taught. A third suggestion for further research involves researchers returning to the participants after a set period of time to determine if students retained what they learned and/or built upon those skills. Through returning to collect

data on participant progress, further effectiveness of each intervention could be determined. In all suggestions, stronger data on the effectiveness of the intervention or instructional strategy would be targeted.

Conclusion

"Literacy is an important life skill for many reasons. Literacy opens up a whole world of possibilities and greater independence" (Bennie, 2020). Students with Autism Spectrum Disorder (ASD) can present with challenges in phonics, reading comprehension, and writing due to the cognitive deficits they have. Due to these challenges, some students never learn to read, never learn to comprehend, and never learn to write. As a literate society, it is integral that students are provided with strong literacy instruction that is evidence based and effective. There are various instructional strategies that can be implemented but it all comes down to structured, systematic, and direct instruction. Students make incredible gains when provided with this approach and not only do their literacy skills increase, but their confidence as well. Educators have the power to provide students with a strong foundation of skills that will assist them in becoming confident, independent members of our society.

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