Effective Literacy Instructional Strategies
For Use by General Education Teachers
with Students on the Autism Spectrum

By

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CERTIFICATION OF THESIS/PROJECT CAPSTONE WORK

We, the undersigned, certify that this project entitled EFFECTIVE LITERACY INSTRUCTIONAL STRATEGIES FOR USE BY GENERAL EDUCATION TEACHERS WITH STUDENTS ON THE AUTISM SPECTRUM by LINDSEY HAUNGS, Candidate for the Degree of Master of Science in Education, Literacy Birth to Grade 12, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this project.

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ABSTRACT

This thesis project is a Professional Development Project used to complete a review of literature about what are effective literacy strategies for general education teachers to use when teaching students on the Autism Spectrum, literacy instruction. The researcher took a personal interest in this topic based on her own teaching experience of students on the Autism Spectrum. The most appropriate way to address this question was to complete an exhaustive literature review and synthesis. After a synthesis of the research was completed, four significant findings were produced. The first finding is that according to research, five instructional strategies produce effective results on literacy instruction with students with ASD. The second finding is at the middle school and high school level, comprehension is the area of literacy instruction where most instructional strategies are being applied. The third finding is that the instructional strategy of cooperative learning groups are most effective with students with ASD at the elementary level. The fourth finding is that the most effective instructional strategies can be applied across all three grade levels of elementary, middle school and adolescents: direct instruction (DI) and Class Wide Peer Tutoring (CWPT). These findings are pertinent to the professional development of general elementary teachers with students on the Autism spectrum and will be shared with them through a professional development project in the form of a handout.

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Chapter 1: Introduction

Statement of Problem

Autism Spectrum Disorder (ASD) is "any of a group of developmental disorders (as autism and Asperger's syndrome) marked by impairments in the ability to communicate and interact socially and by the presence of repetitive behaviors or restricted interests" (*Autism*, 2015). ASD can affect individual students at different developmental levels and with a range of severity. The number of individuals diagnosed as on the Autism Spectrum is on the rise. In 2006 the number of reported cases of Autism in the United States was 1 in 110 children (or 0.9 %), in 2008 the number increased to 1 in 88 children (or 1.1 %), in 2010 it reached 1 in 68 children (or 1.4 %). This increasing percentage from 0.9 to 1.4 % in just four years shows that Autism is a growing problem among children in the United States and does not appear likely to decrease anytime soon. As one journalist explains it in *USA Today*, "these rates mean every grade in every elementary school has at least one child with Autism" (Weintraub, 2014, March 27), and that means the number of general education classrooms that include students with ASD is also increasing. The general education teachers in these classrooms are being asked to teach a type of special needs student they may not have been formally trained to teach, and especially teach in the area of literacy. Although general education teachers may be supported in their classroom with extra staff such as Special Education teachers and teacher aides, students with ASD are still required to participate in mandated state testing with their general education classmates. These standards and testing provide another reason why general education teachers would likely benefit from professional development in identifying and improving the reading abilities of the ASD students in their general education classrooms. This opportunity for professional development leads a reading specialist to ask the question, "What are effective literacy strategies for use by general education teachers when teaching students on the Autism Spectrum?" The most appropriate way to address this question is to conduct an extensive literature review, analyze and synthesize the findings, and distribute the results to teachers through a meaningful form of professional development.

Background

My own experience working with students on the Autism spectrum has taught me the importance of communication and social interaction with these students especially through the reading and writing of a text. When I graduated from Fredonia in 2005 with my teaching degree, Autism was not prevalent in the general education setting, nor was it as frequently discussed in the "education world". Training and classes on Autism were seldom offered to general education majors. After my own completion of a six hour workshop on Autism, my interest and passion for how these students interact, socialize, and learn began to develop and flourish. After working in a general education classroom for eight years, I had a large adjustment to make in order to teach Special Education, specifically students on the ASD spectrum. My first teaching experience with ASD students was within an inclusive classroom. At first I felt ill prepared in teaching these students effective and successful strategies for learning to read and write. The first part of the school year I felt anxious that my general education training and preparation was not going to be enough for the job. I felt that the mandated six hour Autism overview had not effectively prepared me to teach reading skills to students with ASD. Even now with my Special Education teaching certification and teaching in a first grade classroom where six of the 10 students are on the Autism spectrum, I feel I am still struggling to identify and find literacy instructional strategies that work for each of these students. As a teacher teaching students on the Autism Spectrum, I personally would like to find reliable, research-based and effective strategies to share with other general education teachers who are also teaching Autistic students on the spectrum.

Terminology

Some of the major concepts related to this thesis have legal or medical or specialized definitions. To help the reader better understand these concepts, the key terms are identified and defined below. These definitions are from leading sources in the field and will therefore be accepted "as is" for this thesis.

Autism: "A developmental disorder marked by severe impairment of intellectual, social, and emotional functioning. The essential features of the condition typically appear prior to 30 months of age and consist of disturbances of developmental rates or sequences, responses to sensory stimuli, speech language and cognitive capacities and capacities to relate to people, events and objects" (Ritvo & Freeman, 1978, p.565)

Autism Spectrum Disorder (ASD): "Includes the diagnosis of Autism, Asperger's syndrome and atypical autism. ASD is a neurological and developmental disorder that begins early in life and affects how a person acts and interacts with others, communicates, and learns" (Merriam-Webster, 2014)

Assistive Technology (**AT**): "any item, piece of equipment, modified or customized, that is used to increase, maintain or improve the functional capabilities of children with disabilities" (Tuedor, 2006, p.294)

Instructional Strategy: "Instructional strategies are techniques that are used to help students become independent learners. The strategies become learning strategies when the student selects an appropriate one, and uses it effectively to accomplish a task or meet a goal." (*Instructional Strategies* [pdf], (2002). Alberta: Alberta Learning)

Direct Instruction (DI): "Direct Instruction is an approach to teaching. It is skills-oriented, and the teaching practices it implies are teacher-directed. It emphases the use of small-group, face to face instruction by teachers and aides using carefully articulated lessons in which cognitive skills are broken down into small unit, sequenced deliberate, and taught explicitly. (Carnie, 2017, p. 5-6)

These major concepts and definitions will be used throughout this thesis to help explain a student on the Autism spectrum's learning abilities and diagnosis, along with some instructional strategies used within an inclusive classroom of students on the Autism spectrum. The terms ASD and Autism will be used interchangeably in this thesis. Students on the Autism spectrum can be diagnosed with Autism, along with other forms of Autism such as Asperger's syndrome

and atypical autism, all of which can benefit from effective instructional strategies in literacy instruction.

Theoretical Framework

The theoretical framework for this thesis rests on the theory of literacy as a social practice (Gee, 1991). By its very definition, ASD is "marked by impairments in the ability to communicate and interact socially" (*Autism*, 2015). Gee (1991) proposes that community and social interaction are key to an individual's ability to make meaning. It is this meaning, that depends on the language and literacy of the community or social group that a person is in at any given moment. The theory of literacy as a social practice also connects to Vygotsky's theory of social development (Kadervaek, J.N & Rabidoux, P, 2004). Vygotsky believes that through interaction within the socio-cultural environment, an individual develops more effective mental processes and strategies; thus learning occurs through social interaction, especially with a parent or a teacher. ASD students generally lack the abilities of attention, sensation, memory and perception that are part of social interaction (p. 239), therefore leading to the struggle and difficulty ASD students have in learning, including learning to read and comprehend a text. As part of their disorder, ASD students often struggle to maintain focus on a parent or teacher, therefore making it difficult for them to mimic or copy an adult -- especially in learning how to read.

Rationale

The federal regulations of the No Child Left Behind (NCLB) Act of 2001 and the Individuals with Disabilities Education Improvement (IDEIA) Act of 2004 have changed the job of general education teachers and the composition of the general education classrooms across America. General education classroom teachers now face the task of meeting the needs of both general education students and students on the Autism Spectrum. Yell, Drasgow and Lowery (2005) report that the NCLB Act requires educators to use "scientifically based strategies and methods that will allow schools to make meaningful changes in the academic achievement of their students" (p. 130). It is now the responsibility of the general education teacher to recognize, comprehend and meet the academic literacy needs of all students in their classrooms, including

those on the Autism Spectrum. According to Rayner, Foorman, Perfetti, Pesetky and Seidenberg (2001), "learning to read builds on cognitive, linguistic and social skills that have developed from the earliest age" (p. 34). Students on the Autism Spectrum have, by definition, a deficit in linguistics (language development) and social skills -- in turn making reading and learning to read extremely difficult. The Autism Spectrum Disorder is a disorder affecting students of all genders, socioeconomic and ethnic groups. With the number of students diagnosed with ASD continuing to rise, and with no known cure, it seems likely that all general education teachers will eventually be faced with ASD students in their classrooms. Therefore this research into appropriate literacy instructional strategies for use by general education teachers is a worthwhile study.

Chapter 2: Literature Review

One way to address the question of effective teaching strategies for general education teachers to use when teaching students on the Autism Spectrum to read and comprehend a text is to conduct an extensive literature review and synthesis. The leading education databases including ERIC, EbscoHost, and Academic Search Complete have been searched using terms related to this research question   and the keywords of *Autism, Autism Spectrum Disorder, literacy instruction, instructional strategies.* This review also searched for studies looking specifically at the role of the general education classroom teacher and ASD students. A total of 18 studies were found that examined literacy instruction strategies for students on the Autism Spectrum. These studies are grouped below by the grade levels of the participants: students at the elementary school level (grades K-4), at the middle school level (grades 5-8), and at the high school level (grades 9-12).

Literacy Instructional Strategies for Elementary Level ASD Students

The studies reviewed in this section have participants in the elementary grade range and the age range of six to 12 years old. Only one study was found that had just one participant. Whitcomb, Bass, and Luiselli (2011) conducted a study with a nine year old male who attended a private school designed for students with disabilities. The researchers examined the effects of using the instructional strategy of using a computer-based reading program. Whitcomb, Bass, and Luiselli studied an early reading program called "Headsprout." The study covered 23 lessons of the Headsprout reading program. Lessons 1-5 were repeated but after that, each subsequent lesson was only given once. Both the teacher and the student were given training in using the program before the study began. The teacher received a 60 minute training on the Headsprout program itself while the student was given three sessions on how to use the computer mouse to point, click, and drag pictures. The purpose of the study was to determine the impact of the software program on the student's ability to read Word Sets and connected text from Headsprout Readers. The study looked for improved reading accuracy across word sets and stories: "data also suggested generalization of word set reading skills" (p. 491). After studying the findings, the researchers concluded that "the study highlighted some promising results in using systematic computer-assisted reading instruction for a student with autism" (p. 497). One the promising

results was an increase in "expressive accuracy" (p. 197) when reading three word sets. Although the study was done at a private school where only one student had autism, the researchers felt the results of Headsprout were "promising": "replication of this study with additional students and teachers, in a variety of school settings and using alternative forms of instruction (e.g., Curriculum-Based Measurement, DIBELS) could potentially provide a powerful approach to effectively teaching students with ASD to read" (p. 498). Therefore the results from this study appear to indicate that computer-based literacy instruction does produce positive results with elementary grade level autistic male students.

Williams, Wright, Callaghan, and Coughlan (2002) also evaluated and studied a computer based program with elementary students on the Autism spectrum. The participants in this study were 8 children on the Autism spectrum, ranging in age from three to five years old. The students were selected from a local Autism specialist. The students in the study were selected at random to either receive reading instruction from a teacher, or from computer instruction. The students who received teacher instruction received their own copy of a book and scripted verbal instruction. The books included sounds and "appealing illustrations" (Williams et. al, 2002, p.). The students who were selected to receive the computer based instruction were given a scanned version of the same book. Those students were able to turn the pages of the book on the screen, could listen to the book being narrated and could click on vocabulary words to hear them read aloud. This study was conducted through three steps: a baseline, experiment, and posttest. The study began by giving all participants a baseline, followed by 10 weeks of instruction. The results from this study showed that 6 out of 8 students showed growth from their baseline to their final assessment. Williams et al. (2002) noted that students read twice as many words correctly after computer instruction than those students with regular teacher instruction. Williams et al. (2002) found students on the Autism spectrum to have been more engaged, refused to work less, and learned more words in reading lessons on a computer that a book based instruction. This study shows that the use of a computer can be an instructional strategy for improving reading skills of students on the Autism spectrum.

Bosseler and Massaro, (2003) conducted another computer based intervention with students on the Autism spectrum. This study was conducted with eight students, ages 7 to 12. The students were selected from an after school program and showed severe delays within all academic areas, especially that of literacy, with one student being classified as non-verbal. The

computer program Baldi was selected for this study. Baldi is a computer created program meant to copy and mimic face to face communication where mouth and tongue movements can be learned. The program shows the students a visual of a talking head, vocabulary words and generated stickers based on their correct responses. Before the researchers started the study, the students were all taught how to use Baldi correctly and researchers were able to identify possible program errors that may occur. The participants started the study by completing a pretest to test their prior knowledge of vocabulary words. Once the pretest was given to each student, they were given 4 remaining components of the research study: presentation, recognition, production and a post-test. During the presentation phase, the program looked at how the students understood vocabulary words by selecting a given word. During the recognition phase the students were looked at for how they recognized given vocabulary words. The students were then given stickers as a form of feedback. The recognition phase continued with the students until all vocabulary words were understood. During the production phase, the program would require the student to orally say the given vocabulary word, which was recorded and saved for future evaluations. At the conclusion of the program, the students were given a post-test to determine how many vocabulary words they had learned. The results from this study showed that the Baldi computer program helped students increase the number of vocabulary words learned. The students showed growth from 67% on the pretest, to 84%. All eight students were tested again using the Baldi program, 30 days after the original post-test, and results showed a continued mastery of the program and words learned. Results showed that increased learning took place through the use of this intervention with students on the Autism spectrum, and students maintained this learning.

Bailey, B., Arciuli, J., & Stancliffe, R. J. (2017) also conducted a study using a computer based intervention called ABRACADABRA. This program is a free computer based literacy program that was being used to assess the reading accuracy and comprehension skills of children diagnosed with ASD (p.257). For this intervention, 20 participants were selected across the metropolitan city of Sydney Australia. 18 of them being male, and 2 of them female. The participants ranged in age from 5-11 years old and all had a clinical diagnosis of ASD. All of the participants were assigned to one of two experimental groups: a wait list group and an instruction group. The Participants who were selected for the instruction group, were given one on one ABRA instruction for 26 sessions, over a 13-week time period in the participant's home. Each

intervention session was an hour long, with independent computer activities which were presented to the participant on a laptop. During the 60-minute instruction, the participants completed a 15-minute computer task which targeted word identification. The next 20 minutes the participants completed an activity that focused on reading comprehension. After the completion of this task, the participants completed a 15-minute extension exercise with the instructor which focused on shared reading or spelling activities. At the conclusion of the session, the students were given 10 minutes of choice time (p.261). After the intervention was completed, a post assessment was done to measure reading accuracy, comprehension, and reading level accuracy. The participants from the wait list group were not given any other instruction, other than their daily classroom education. Pre and post test data was collected over a 9-day time period from the participant's home. The results of this study show a significant effect on word level reading accuracy for those participants who completed the intervention, while the participants on the wait list, showed a decrease. The results also indicated a significant effect in passage level reading accuracy and reading comprehension for those participants who completed the intervention, and a slight change with the participants in the control group (p.263). Overall, the use of the computer based intervention ABRACADABRA, showed an increase in both reading comprehension and reading accuracy with elementary students with ASD.

Instead of just one nine-year-old male, Kamps, Barbetta, Leonard and Delquadri (1994) worked with one nine-year-old male and two eight-year-old males. Instead of computer programs, Kamps, Barbetta, Leonard and Delquadri (1994) studied the instructional strategy of peer tutoring. The purpose of their study was to measure the effect of the literacy instructional strategy of Class Wide Peer Tutoring (CWPT) on the literacy reading skills of students on the Autism spectrum. The three male participants were selected from three different elementary schools. The study took place within the students' general education classrooms. While the CWPT took place, the learner read for 8 minutes, while the tutor provided positive and constructive feedback. At the conclusion of the reading, the tutor then asked comprehension questions for three minutes. Upon completion of the CWPT, the researchers had the three students read for two minutes, followed by immediate comprehension questions such as who, what, where, when and why questions. The results showed that before the implementation of CWPT, the three male students scored 47%, 24%, and 67% on reading comprehension questions; then upon completion of the tutoring, the students' comprehension scores increased to 85%,

85%, and 100%. Results showed the CWPT strategy to be a positive instructional strategy to use when teaching literacy skills to students in grades 3 and 4 on the Autism spectrum.

Dugan, Kamps and Leonard (1995) did not investigate peer tutoring but did look at another peer mediated strategy, cooperative learning. They not only selected students on the Autism spectrum for their study, but also included several general education students. The participants were two fourth grade Autistic students from an inclusive social studies classroom, and 16 general education students (6 female and 10 male students). The first student was a 10 year old female named Ann, who was functioning at a moderate level on the Autism Spectrum. Ann struggled with comprehension. The second student was a nine year old boy named Matt, also struggling with comprehension and abstract reasoning: "Matt appeared to be anxious, rarely initiated talking to peers, and preferred adult attention and contact" (p.177). Dugan, Kamps and Leonard (1995) reported that with the rise in number of Autistic students in the general education classroom, peer-mediated strategies were being implemented to meet the educational goals of students with Autism. Cooperative learning groups are one example of a possible peer mediated strategy. Dugan, Kamps and Leonard define cooperative learning as a "small group of learners working together as a team to complete a task or common goal" (p.175).   The study started by having the teacher complete a 40 minute lecture style lesson where the students were learning through question and answers and the use of visuals, such as maps. To complete the study of cooperative learning groups, the teaching style was changed to a 10 minute introduction of a topic, followed by the use of cooperative learning groups. Within the groups the students were identifying key vocabulary words and facts from a given text. Data were collected weekly on pretests and post tests on fourth grade social studies curriculum and materials. Results showed that academic growth was higher for all students during the cooperative groups than during the original lecture style teaching. Engagement ranged from 1% to 17% during lectures prior to groups, and 72% to 90% during cooperative learning groups. These outcomes support the instructional strategy of integration of cooperative learning groups into the general education classroom for the benefit of students on the Autism spectrum.

Much like the study completed by Dugan, Kamps and Leonard (1995), over ten years later, Ledford, Gast, Luscre and Ayres (2008) also completed a study using small groups for instruction. The participants in this study were six students with ASD, ranging in ages from five to eight years. The study took place in a self- contained classroom for students with ASD. All

six participants were given a pre-test in which they were assessed on their abilities to read 40 sight words aloud from the "Edmark Functional Word List" (p. 89). The participants were placed into three groups based on their skill levels, and given two instructional sessions: one was completed one-to-one and the other was a group session. Using the Edmark Functional Word List, 12 words were selected by the participant's parents, researches and teachers. The 40 words used previously in the baseline, were eliminated from the study. The same 12 words were given to each group. The participants were each given six "target words" (p.89) and six "observational words" (p.89). The one- to- one sessions were 15 minute sessions completed prior to small group instruction. The small group sessions were composed of one teacher and 2 students. Instruction during the small group sessions focused on 4 words, 2 targeted words from each student. Small group instruction continued until each student in the group maintained a 90% unprompted response of their targeted words, over three consecutive days. Prior to the study, all six participants read 0% target words correctly throughout the baseline and initial sessions. During the actual study, all six participants reached 100% accuracy of their targeted words. At the conclusion of the study, the participants identified 94% of their target words Ledford Gast, Luscre and Ayres indicated a relationship between small group instruction and learning. The results appear to show that small group instruction is an effective instructional reading strategy for students with ASD.

Simpson, C. G., Spencer, V.G., Button, R., Rendon, S. used an entire elementary classroom The self-contained- LIFE skills classroom was composed of eleven students with ASD, nine boys and two girls. To help expose the students to literature, guided reading groups were created by the student's teacher. An interest inventory, running records and a Diagnostic Reading Assessment (DRA) were given to the students, to help the teacher formulate a baseline reading level for each student. The students were placed into guided reading groups, ranging from 2- 4 students, which would change on a weekly basis according to the skills being taught. Fifty percent of the students were focused on letter identification, while the other 50% focused on reading comprehension at a second grade level. The students rotated through two reading stations, lasting twenty minutes each. The guided reading station consisted of reading a 10-15 page book, with 5-10 words per page and a five to ten minute mini-lesson on a pre-reading skill (Simpson, C. G., Spencer, V.G., Button, R., Rendon, S., 2007). At the second station, the students completed a writing activity based on their reading. In order to measure progress of the

students, the classroom teacher completed weekly running records and the DRA. This guided reading model was used for a full school year with the participants, resulting in a growth rate of 6-24 months. The students not only improved in their reading levels, but also in their literacy confidence. Improvement was seen in the areas of fluency, comprehension, phonics, sound blending and listening comprehension. "For students in the LIFE skills program with ASD, this was considered a significant growth in reading skills" (Simpson, C. G., Spencer, V.G., Button, R., Rendon, S., 2007). The results from this study show how using guided reading as a literacy strategy with students with ASD can have positive results.

Direct Instruction is another teaching strategy that was used at the Elementary level., conducted a study using 18 participants, with ages ranging from 4-18. Out of the 18 participants, 15 were males, and 3 were females. Of those that completed the study, 7 participants were diagnosed with PDD, 1 participant was diagnosed with Asperger syndrome and 10 participants were diagnosed with Autism disorder (Shillingsburg, M.A., Bowen, C.N., Peterman, R.K., & Gayman, M.D., 2015) The participants received direct instruction from therapists who received 3 hours of DI training directly prior to the start of the study, within treatment rooms of the clinic. The therapists conducting the study were given DI Language for Learning teaching materials. This included a teacher presentation book, and a teacher's guide with assessments and scripted lessons. (p. 30) The participants were all given a placement test, the assessment battery and the post-tests. The participants were then placed to start at various lessons based on their placement test scores. 6 participants were placed to start at lesson 11, 4 participants at lesson 21, 5 participants at lesson 31, and 1 participant at lesson 41 (p. 51) Participants were then divided into 3 groups, so that each group would have participants from each starting point. Group 1 had 8 participants, group 2 had 9 participants and group number 3 had 9 participants. The results indicate that the pre-assessment scores immediately preceding the DI for the participants in all groups increased. The participants that started at lesson 11 started with an average score between 25.3%- 37.9% and increased to 82.8%-100%. The participants that started at lesson 21 started with an average range of 24%-62.1% and increased to 74.1%-100%. The participants that started at lesson 31 started with a range of 31.1%-80, and increased to 84%-100%. The final participant that started at lesson 41, started with an average score of 34.4%-77.7% and increased to 86.2%-100%. Overall, the results indicate that the DI Language for Learning curriculum was effective in increasing language scores in 18 children diagnosed with ASD (p.52).

Similar to the study by Shillingsburg, M.A., Bowen, C.N., Peterman, R.K., & Gayman, M.D. (2015), Crowley, K., McLaughlin, T., & Kahn, R. (2013), also used Direct Instruction as a strategy for teaching students with Autism. For this study, two participants were selected. The first participant was a 7-year-old male in the first grade, diagnosed with ASD. The second participant was a 7-year-old male kindergarten student. This participant was learning how to use an iPad with the program Proloquo2Go as a form of communication within the classroom. This study was conducted at the student's elementary school, which was located in a low socioeconomic neighborhood in the Pacific Northwest. Participant number 1 completed the study in a classroom down the hallway from his usual classroom, while participant number 2 completed the study in his regular classroom. For the use of this study, 3x5 inch flashcards were made with lower case, handwritten words. Different groups of words were used for each participant based on their differences in sight word skills. A data collection sheet, and a reading racetrack were used during each intervention session. Each intervention session lasted from 15-20 minutes. For each participant a group of sight words were selected from the Dolch sigh word list. Participant number 1 had a total of 22 sight words, while participant number 2 had 18 selected sight words. At the start of each session, the students were asked one at a time to say the word written on the flash card. The participants had 5 seconds to answer the word correctly, before it was counted as an incorrect answer. Students were allowed to say "skip" if they didn't know the word, however both participants were encouraged to try and sound out each word. If the participant didn't know the word, or made a mistake, the flashcard was put into a pile to be used with the intervention. At the start of each intervention session, the instructor showed the participant a flashcard, stating "this is the word…" The participant would then repeat the word. This was completed three to five times for each word. Once all the words were practiced, the participant would be asked the words again without any help or prompting. If the participant got the word correct, it went back to the end of the pile. If the student got the word wrong, it went back 1 card (p. 302). After this portion of the intervention, the reading racetrack portion of the intervention was used. The participants sight words were written around the racetrack in a varying order so that the student could not anticipate a pattern. A small plastic bear was moved around the racetrack as the participants read each word. The results for this study showed that during the baseline, participant number 1 was not able to identify any words, and at the conclusion of the intervention, an average of 3 words were read correctly (out of 5). Participant

number 2 also started with a baseline of 0 words, and increased to an average of 2 words correctly after the intervention (p.304). This study shows a positive and effective correlation of DI flashcards and reading racetracks with two students with autism and improving sight word recognition and vocabulary.

Literacy Instructional Strategies for Middle School Level ASD Students

The studies reviewed in this section look at the use of instructional strategies with participants with ASD in the middle school level, grades 6-8. Flores and Ganz (2007) conducted a study consisting of four children from a private school for individuals on the Autism spectrum, two of which were diagnosed on the Autism spectrum. The students' ages ranged from 10 to 14 years. The purpose of their study was to "determine the effectiveness" (p.246) of a differentiated instruction (DI) program (DI) called *Corrective Reading Thinking Basics* when teaching comprehension skills to students on the Autism Spectrum To begin the study, all students were given a baseline assessment. Two researchers then followed a scripted teacher's manual where they focused on teaching the students three skills: inferencing, use of facts, and analogies. Flores and Ganz (2007) implemented the strategy of DI by modeling the skills for the students, guiding the students through the skills, and then watching as the students completed the skills independently. This continued until the students reached 100% accuracy three times. Once the student mastered the skill three times, the amount of instruction decreased, and a new skill was introduced. The study showed that all four students had an increase in the targeted comprehension skills. The students on the Autism Spectrum showed the most growth in the targeted skill of "use of facts" (p.248). Both students started the study with a baseline score of 0% and increased to an 83% and 94% after DI instruction. This study shows positive results for the use of DI as an instructional strategy with students on the Autism Spectrum.

Flores and Ganz followed their 2007 study with a 2009 study that examined the use of direct instruction (DI) for when it comes to teaching reading to ASD students in the middle school age range.   The participants in this study were four students: Hildi aged 12, Sally aged 11, Jane aged 13and Chad aged 14 years. All participants were in the fifth grade, with the exception of Chad in sixth grade. Prior to instruction, the researchers administered two placement assessments created by the Direct Instruction Program and a Running Record

complete with comprehension questions. The DI program was used for approximately 20 minutes every day, during the participants'regularly scheduled reading class. The DI program focused on dividing comprehension skills into smaller skill sets. The selected skills were "picture analogies, deductions, inductions and opposites" (p.43). Data were collected until all participants' demonstrated consistent progress. The researcher followed the program by first modeling the skill for the students, leading as the students demonstrated the skill, and concluding by asking the students to perform the skill. After six weeks of instruction, performance for the two participants "maintained a level of 100%" (p.44). Hildi's deductions decreased to 83% and Chad's decreased across the board: however he remained above a 75% which was significantly higher than his pre-assessment. This middle school study "extends previous research (Flores & Gantz, 2007) in which the students' maintained performance was measured after one month. (p.51). This article is consistent with the previous article by Flores & Gantz in which this study shows positive results for the use of DI as an instructional strategy with students on the Autism Spectrum.

Knight, V. F., Spooner, F., Browder, D. M., Smith, B. R., & Wood, C. L. (2013) also conducted a study using direct instruction along with graphic organizers, to teach science vocabulary words and comprehension to middle school students with Autism. The participants in this study were three urban middle school students (one female and two male) with ASD. The first participant was a 14-year-old female student diagnosed with ASD. She was reading with a 5th grade reading level, and a comprehension level of third grade. Participant number 2 was a 13-year-old male diagnosed with ASD. This student was reading at a 6th grade level with a comprehension level of third grade. The last participant was a 14-year old male diagnosed with ASD. This student had a third grade reading level, and a comprehension level of second grade. The study was completed inside a resource room in an urban public middle school. The school was located in the southeastern part of the country. For this study, the students were taught science vocabulary words through direct instruction. Through the use of a T-chart, questioning and modeling, the instructor taught the participants vocabulary words related to a big idea or topic. For instance, the instructor taught the students vocabulary words related to the big idea of convection (precipitation, condensation) (p.6). Once the students were taught the vocabulary words, the students were instructed to place the words on a graphic organizer. The students were taught how to place the words and use arrows to help explain the vocabulary word. The students

were then asked questions at the end of the intervention in order to help determine comprehension of the vocabulary words. Once a student's performance met a criterion of 15 out of 16, data was collected to determine the student's retention of the definitions and concepts. Participant 1 started with a mean of 3.3 and achieved a mean of 12.5 after the intervention process. Participant 2 started with a mean of 2.6 and achieved a mean of 12, and participant 3 started with a mean of 2.6 and achieved a mean of 9.5 after the intervention procedures. The results of this study showed that all 3 participants had an increase in their comprehension of vocabulary words. This study shows that the use of graphic organizers with direct instruction is an effective teaching strategy for middle school students with ASD.

Unlike the study completed by Knight, V. F., Spooner, F., Browder, D. M., Smith, B. R., & Wood, C. L. (2013) which focused on Direct Instruction, Howorth, S., Lopata, C., Thomeer, M. & Rodgers, J. (2016) looked at the use of self-regulated strategy development (SRSD) to increase reading comprehension with middle school students with ASD. The specific SRSD that was used in this study was the think before reading, think while reading and think after reading (p. 41). This intervention is meant to help scaffold students reading by focusing on the elements of reading before, during and after reading. For this study, four male students aged 10 and 11 were selected from three school districts in the Northeastern United States. As a baseline, the students were asked to read a passage aloud. After reading the passage, the students were asked to retell as much of the passage as they could, and complete a series of comprehension questions. The TWA intervention was conducted over a 45-minute session. The first part of the intervention was set aside for a review of the rules and an introduction to vocabulary. The next 35 minutes was used for the actual TWA intervention, and the final 5 minutes was used as a review of the lesson. During the first two TWA intervention sessions, the instructor modeled how to use a think aloud strategy. During the third and fourth session, the instructor and the student completed the intervention together, and by the fifth and sixth session, the student was able to independently complete the TWA strategy. All of the sessions were videotaped and monitored for instruction. The results of this study indicate an increase in comprehension for all four students. Student number one had a comprehension baseline of 77% and increased to 91% after the implementation of the TWA strategy. Student number 2 showed an increase from 63% to 75%, while students 3 and 4 showed an increase in over 19%. The results from this study show that the use of the TWA strategy on middle school students with ASD is effective for increasing

reading comprehension.

Literacy Instructional Strategies for High School Level ASD Students

The studies reviewed in this section have participants at the high school and adolescent level, with an age range of thirteen to 21 with ASD. Reutebuch, C. K., Zein F. E., Kim, M. K., Weinberg, A.N., Vaughn, S.V. (2014), conducted a study with 3 participants, ages ranging from 15 to 17. The students were in grades 9, 10 and 11. The study was completed in a rural school district in Central Texas. The district is comprised of 65% economically disadvantaged, and 50% of the population were Hispanic/Latino. All participants in the study have been identified with ASD. The purpose of this study was to pilot the use of Collaborative Strategic Reading- High School (CSR-HS), a reading comprehension intervention, to show changes in a student's reading comprehension (p.98). The location of this study was a portable classroom within the student's regular high school. The 3 participants met daily for 30 minutes with a peer, and once a week individually for 50 minutes. The students were accompanied to both sessions with their normally assigned staff members. The intervention was administered by two trained graduate students, and was implemented for a total of 16 weeks with each of the three participants. The materials for each session included: a lesson plan, an assigned text, a checklist for the students to monitor their own completion of a task, learning logs for the students to complete, data sheets, a timer and writing instruments (p.101). The intervention consisted of a teacher introduction (2-3 minutes), before reading (2-3 minutes), during reading (10-12 minutes) and after reading (10-12 minutes). During the teacher introduction, the assessor made sure the pairs were ready with all their materials. During the before reading phase, the students were introduced to the topic and pre-taught key words which were written in their learning logs. During the reading phase, the students read the assigned text and answered true/false questions about the given text. After the reading, the students summarized what they read using graphic organizers along with generating and answering questions with their partner. The results indicated that two of the three participants averaged between 50-100% on comprehension questions during the intervention phase, and 75-100% on comprehension questions during the maintenance and independent phase (p.108), thus showing that the CSR-HS had a positive effect on reading comprehension at the high school level with students with ASD.

Direct Instruction is another teaching strategy that was examined using high school students with Autism. O'Connor, and Klein (2004) explored direct instruction strategies with twenty adolescent students and the effects it had on reading comprehension. Initially for this study, 72 students were selected. Of those 72 students, 25 participants were chosen who showed moderate to high levels of decoding skills with low level comprehension skills (p. 118) 5 of the participants were used as a pilot study, and 20 of the participants were used for the actual study. Of the 20 participants that were selected, 19 of them were male, and 1 was female. The participants were allowed to pick a quiet location to complete the study. 14 participants chose to complete the study at home, and 6 chose to complete the study at the school. In order to conduct the study, five stories were adapted from a 6th grade level of a reading series. 4 versions of each story were then prepared. There was a control version, which was unaltered, and a "cloze version which included 12 blanks distributed throughout the text" (p.119). During the study the students would be using the direct instruction strategies of pre reading questioning and anaphoric cuing. For each passage, a set of questions were prepared for the participants to answer, including a retelling, identifying the main idea and characters, generating a tile for the story and generating for 4 why or how questions. The participants were asked to read the given passage aloud. Each student read the 5 passages. Instructions for each type of intervention were given immediately before the passage. At the completion of each passage, the students were asked the questions, and verbally gave their answers to minimize the effects of differences in students writing, and the students answers were then transcribed (p.120). The results of this study indicate that anaphoric cuing significantly increased students' comprehension. Overall, this study shows that the use of direct instruction with high school students with Autism is effective in increasing comprehension of a text.

Cadette, J., Wilson, C., Brady, M., Dukes, C., & Bennett, K. (2016), also looked at the use of direct instruction with high school students with ASD as a way to increase comprehension of a text. For this study, three male secondary students ages 15-17, and diagnosed with ASD, were selected to participate. The Wh- Question Comprehension (Vicker 2004) test was given to all the participants prior to the start of the study to determine their current comprehension. All participants scored under 50% when asked who, what and where questions. The participants also needed to pass the Reading Mastery placement test, and obtain parent consent in order to receive interventions. The study took place at a charter high school, in an unoccupied room. Other than

the participants, the instructor and a research assistant, no other students or adults were present. The Reading Mastery Signature Edition language curriculum was used for this study. This included scripted lessons and presentation books (p. 2971) Data was collected on each student individually. Assessments lasted from 3 to 15 minutes and consisted of 12 wh questions. Through the use of direct instruction, the instructor would model for the students, then they would complete the lesson together, and then the students would independently answer the questions. Once all three steps were completed, the student independently completed the entire exercise independently. The results from this study showed that the use of Reading Mastery as a form of DI was effective in teaching high school students with Autism to answer who, and what questions with mastery.

Hart, J.E., & Whalon, K.J. (2012) used the instructional strategy of computer based technology to increase student comprehension with a high school student with ASD. The participant was a 16-year-old male, with ASD and moderate intellectual disabilities. The participants measured reading level was that of a 2nd grader, and could write simple 4-6 word sentences (p.439). The study was conducted in a public high school resource room during science instruction. The instruction took place after lunch, 4 days per week. During this science instruction, it was noted through observations and video data, that the participant would lose focus frequently while the teacher lectured and gave notes on the whiteboard (p.440). For this study, an ABAB reversal design was used to evaluate the effectiveness of an IPad intervention. For the baseline of this study, the participant was observed for 25 minutes in his instructional science classroom. His responses to questions were recorded for 6 weeks. For the actual study, a video modeling script was created by the teacher, along with videotaped verbal prompts. The results of this study showed that the VSM (video self-modeling) intervention using an IPad was effective for increasing the frequency of correct, unprompted responses to questions of an adolescent with ASD. This study also showed that this type of intervention was not only effective, but it was easy to implement, it did not interfere with other classroom activities and it was not distracting to other students in the classroom (p.443).

Summary of the Review

This literature review is a cumulative review of 18 research studies. The sections of this review looked at studies by the grade levels of the participants: students at the elementary school level (grades K-4), at the middle school level (grades 5-8), and at the high school level (grades 9-12). Within the three sections, the studies were organized by the instructional strategy implemented in the study. For elementary participants, the instructional strategies used are computer based, Class Wide Peer Tutoring (CWPT), cooperative learning groups, and Direct Instruction (DI). For middle school participants, the instructional strategies used are Differentiated Instruction (DI) and Think before reading, Think while reading, and think after reading (TWA). For adolescents and adults with ASD the instructional strategies used were computer based technology, Class Wide Peer Tutoring (CWPT) and Direct Instruction (DI).

Chapter 3: Methodology

To begin to answer the question of what are effective literacy instructional strategies for general education teachers to use when teaching students on the Autism Spectrum, a detailed review of the literature was completed. The next step is to analyze the studies found. This chapter describes the data collection, and details the data analysis and synthesis. The data collection section describes how the research studies were organized. The data analysis section describes how all the research studies make connections. The synthesis section summarizes the results of the data and its findings.

Data Collection

The data for this thesis is composed of 18 studies found from educational databases of peer reviewed research studies. The data were then classified into three specific categories according to the grade level and age of the participants: students at the elementary school level (grades K-4), at the middle school level (grades 5-8), and at the high school level (grades 9-12). These categories were used based on preliminary data. These specific categories were then used to organize further data analysis, which is explained in the next section.

Data Analysis

To start, all research studies were analyzed to determine categories for the data. The studies were then analyzed and synthesized to produce new findings. The findings from each category were then synthesized again to create results pertaining to the research question for this study. The following is a detailed analysis of the process and its results.

The first category of research studies looked at using instructional strategies with students at the elementary school level (grades K-4). Of the 10 studies in this category, 4 studies focused on the instructional strategy of computer based programs while teaching literacy skills. (Whitcomb, S., Bass, J., & Luiselli, J. (2011); Williams, C., Wright, B., Callaghan, G., & Coughlan, B. (2002); Bosseler and Massaro, (2003) and Bailey, B., Arciuli,

J., & Stancliffe, R. J. (2017). The instructional strategy of Class Wide Peer tutoring was implemented throughout literacy instruction in one article Kamps, D. M., Barbetta, P. M., Leonard, B. R., & Delquadri, J. (1994). The instructional strategy of cooperative learning groups was used in 3 out of the 10 studies (Dugan, E., Kamps, D.& Leonard, B. (1995); Ledford, J. R., Gast, D. L., Luscre, D., Ayres, K. M. (2008); Simpson, C. G., Spencer, V.G., Button, R., Rendon, S., 2007) One study used used guided reading as a form of cooperative learning groups (Simpson, C. G., Spencer, V.G., Button, R., Rendon, S., 2007). Direct Instruction was an instructional strategy that was used in 2 out of the 10 articles. (Shillingsburg, M.A., Bowen, C.N., Peterman, R.K., & Gayman, M.D. (2015); Crowley, K., McLaughlin, T., & Kahn, R. (2013) Analysis of this research shows that students at the elementary school level (grades K-4) with ASD, would benefit from effective and appropriate instructional strategies to be used with literacy instruction such as computer based programs, Class Wide Peer Tutoring, (CWPT), Cooperative Learning groups and Direct Instruction (DI). The use of these instructional strategies within a general education classroom with students with ASD, can impact the literacy areas of reading accuracy, vocabulary, phonics and comprehension.

The second category of research studies looked at using instructional strategies with students at the middle school level (grades 5-8) with students with ASD. Of the 4 studies in this category, 3 used the instructional strategy of Direct Instruction (DI). (Knight, V. F., Spooner, F., Browder, D. M., Smith, B. R., & Wood, C. L. (2013)); Flores, M. M., & Ganz, J. B. (2007); Ganz, J., & Flores, M. (2009). Another instructional strategy found to have a positive impact on literacy instruction with middle school students with ASD was Think before reading, Think while reading, and Think after reading (TWA). (Howorth, S., Lopata, C., Thomeer, M. & Rodgers, J. (2016). Analysis of this research has determined that for students with ASD at the middle school level (grades 5-8), the most effective instructional strategy used with literacy instruction was Direct Instruction (DI). Other strategies that showed positive results were Think Before reading, Think While reading, and Think After reading (TWA). The use of these instructional strategies within a general education classroom with students with ASD, can impact the literacy areas of comprehension and reading accuracy.

The third category of research studies looked at using instructional strategies with

students at the high school level (grades 9-12) with ASD. The implementation of the instructional strategy of computer based programs were used in 1 out of 4 research studies. (Hart, J.E., & Whalon, K.J. (2012). The implementation of the instructional strategy Class Wide Peer Tutoring was also used in 1 out of 4 research studies. (Reutebuch, C. K., Zein F. E., Kim, M. K., Weinberg, A.N., Vaughn, S.V., (2015). Direct Instruction (DI) was another instructional strategy that was implemented in 2 research studies. (O'Connor, I.M., & Klein, P.D. (2004) and Cadette, J., Wilson, C., Brady, M., Dukes, C., & Bennett, K. (2016). All four studies in this category were targeting the literacy skill of comprehension. Analysis of this research determined that for students with ASD at the high school level (grades 9-12), the most appropriate instructional strategy to be used with literacy instruction is the use of computer based programs, Class Wide Peer Tutoring (CWPT) and Direct Instruction (DI). Using these instructional strategies in a general education classroom with students with ASD can impact the literacy area of comprehension.

Figure 1: Summary of Data Analysis

Instructional Strategies	Comprehension	Reading Accuracy	Phonics	Vocabulary
Class wide Peer Tutoring (CWPT)	Elementary High School	Middle School		
Computer based Instruction	Elementary High School	Elementary		Elementary
Cooperative Learning Groups	Elementary	Elementary	Elementary	
Direct Instruction (DI)	Middle School High School		Elementary	Elementary Middle School
Think before, during and after reading (TWA)	Middle School			

Synthesis

The results from the analysis of each category can now be synthesized into findings related to the research question of this study: What are effective literacy instructional strategies for use by General Education teachers with students with ASD. After looking at the analysis presented in Figure 1, the first finding of this study shows that five instructional strategies used with literacy instruction can have a positive impact on student learning with students with ASD. These include class wide peer tutoring, computer based instruction, cooperative learning groups, direct instruction and TWA. The second finding is at the middle school and high school level, comprehension is the area of literacy instruction where most instructional strategies are being applied. The third finding is that the instructional strategy of cooperative learning groups are most effective with students with ASD at the elementary level. The fourth and most significant finding of this synthesis are which instructional strategies are the most effective for which grade level and age range of students. The most effective instructional strategy are those strategies that can be applied across grade levels. The analysis shows there are 3 such instructional strategies that can be applied across multiply grade categories; direct instruction (DI), Class Wide Peer Tutoring (CWPT) and computer based programs. All general education teachers with students with ASD would benefit from knowing how to effectively teach and use these five instructional strategies while implementing literacy skills to students with ASD. These findings and results will form a professional development project focused on helping general education teachers implement effective instructional strategies for teaching literacy skills to students with ASD. This professional development project is described in the next chapter.

Chapter 4: Results and Application

Results of the Review

Through a completion of a literature review to determine what are effective instructional strategies for teaching literacy skills to students with ASD, the researcher has determined four significant findings. The first finding is that according to research, five instructional strategies produce effective results on literacy instruction with students with ASD. The second finding is at the middle school and high school level, comprehension is the area of literacy instruction where most instructional strategies are being applied. The third finding is that the instructional strategy of cooperative learning groups are most effective with students with ASD at the elementary level. The fourth finding is that the most effective instructional strategies can be applied across all three grade levels of elementary, middle school and adolescents: direct instruction (DI) and Class Wide Peer Tutoring (CWPT)

Application of Results to a Professional Development Project

The results from this research study have a significance to elementary general education classroom teachers who have students with ASD in their classrooms. The findings from this research study can inform these teachers about how to use specific teaching strategies effectively with students with ASD in order to increase literacy skills of those students. The most applicable way to share this research with general elementary education teachers is through professional development in the form of a handout.

Design of Professional Development Project

The design of this professional development project will be in the form of a mini-workshop, including examples of instructional strategies and a handout. The workshop and handout for this Professional development is intended for general education teachers with ASD students, ranging from grades K-adolescent. Teachers a handout given out during a will be able to access this handout and workshop during a designated staff development day. The information and

strategies provided to the educators through this workshop and handout, will be supported by the research findings through this study.

Literacy Coaching Project Goals and Objective

The goal of this professional development handout is to help support and guide general education teachers who teach students with ASD. To meet this goal, the following learning objectives were created to assist in the implementation. The first objective of this professional development workshop and handout is that educators will learn appropriate and effective instructional strategies for students with ASD at their grade level. The second objective is that educators will learn examples and knowledge about how to apply these strategies in their classrooms. The third objective is that the educators will be able to successfully incorporate these newly learned strategies into their classrooms with their students with ASD.

Proposed Audience and Location

The intended professional development project is for the professional audience of general education teachers with students on the Autism spectrum in grades kindergarten through adolescent. Three specific handouts will be created, based on the three grade levels research was conducted on. The educators will receive a handout at a professional development meeting given on an assigned professional development day, or assigned faulty meeting by school administrators, based on their grade level taught. A handout will be available on the researchers' school website, and can be emailed or faxed to any teacher outside of the researchers' school district, upon request. Additional grade level handouts can be made available to any teacher by request.

Proposed Project Format and Activities

This professional development will take the form of a mini workshop and handout. The handout will include an introduction to the purpose of the professional development. Included in the handout will be a summary of the data, including the table in Figure 1. The handout will then

provide educators with examples and explanations of instructional strategies applicable to their appropriate grade level, along with the literacy skill that specific strategy supports. Also provided on the handout will be additional resources including websites, articles and materials that maybe needed when implementing these instructional strategies in their classrooms. Attached to the handout will be a brief survey where educators may make comments, or ask for additional information about ASD or a specific instructional strategy. During the workshop, teachers will also be able to see examples of the instructional strategies used with model students and teachers from the school.

Proposed Resources for Project

The needed resources for this professional development handout include a computer with a screen for the participants to better view the handout (s). Creating the handout will require time to design an easy to read and follow handout that the teachers will find effective. A location to hold the workshop within the school will be needed, along with a few students to help model how to implement the instructional strategies effectively.

Proposed Evaluation of Project

Following the completion of the professional development meeting, the educators will be asked to complete a survey on the effectiveness of this professional development session. The survey will ask questions to determine if the information was clearly presented in the workshop and handout, if the instructional strategies are applicable to their classrooms and if the instructional strategies were explained and modeled enough to be applied to their classroom with their students with ASD.

Project Ties to Professional Standards

This professional development project ties to the professional standards of the International Literacy Association. Standard 6, of the International Literacy Association (ILA), states that "Candidates recognize the importance of, demonstrate, and facilitate professional learning and

leadership as a career-long effort and responsibility." (IRA, 2010) The general educators who participate in this meeting are professionals who recognize the importance of extending their knowledge on the most appropriate and effective teaching strategies of students with Autism. The IRA also states that "learning is often collaborative and occurs in the workplace through grade-level meetings, academic team meetings and workshops." (IRA, 2010) Along with relating to the IRA standards, this professional development project also ties to the New York State Common Core Learning Standards (CCLS). Under the CCLS, Literacy is addressed through the following standards: Reading Literature, Reading Informational Text and Reading Foundational Skills. General educators of students in grade k-12, can apply the instructional strategies they have learned about to better educate their students with ASD while learning the key foundations of reading, reading literature and informational texts.

Chapter 5: Discussion and Conclusion

Overview of Study and Findings

This thesis project is a Professional Development Project used to complete a review of literature about what are effective literacy strategies for general education teachers to use when teaching students on the Autism Spectrum, literacy instruction. The researcher took a personal interest in this topic based on her own teaching experience of students on the Autism Spectrum. The most appropriate way to address this question was to complete an exhaustive literature review and synthesis. After a synthesis of the research was completed, four significant findings were produced. The first finding is that according to research, five instructional strategies produce effective results on literacy instruction with students with ASD. The second finding is at the middle school and high school level, comprehension is the area of literacy instruction where most instructional strategies are being applied. The third finding is that the instructional strategy of cooperative learning groups are most effective with students with ASD at the elementary level. The fourth finding is that the most effective instructional strategies can be applied across all three grade levels of elementary, middle school and adolescents: direct instruction (DI) and Class Wide Peer Tutoring (CWPT). These findings are pertinent to the professional development of general elementary teachers with students on the Autism spectrum and will be shared with them through a professional development project in the form of a handout.

Significance of the Findings

These findings are significant to the profession of education because they can enhance teacher instruction in the general education classroom. The strategies that were researched can provide teachers with support and proper literacy instruction when teaching students on the Autism Spectrum. These findings are also significant to the field of literacy because they provide research based strategies that can be applied to students on the Autism Spectrum across multiple grade levels.

Limitations of the Findings

The findings from this study do show that there were some limitations. Based on the previous research completed on this topic, research about literacy instructional strategies for students with ASD has proven hard to find and very slim. Although there is research about instructional skills for various grade levels, the specific number of students found in each grade level placed a limitation, especially in the middle school and adolescent range. Hopefully with the growing number of reported students with ASD, more research will be conducted in each grade level to provide a greater sense of impact at each grade level.

Conclusion: Answer to the Research Question

The research question that started this study is, what are effective literacy strategies for use by general education teachers when teaching students on the Autism Spectrum. After completing this study and research synthesis, the researcher determined four findings: five instructional strategies produce effective results on literacy instruction with students with ASD. The second finding is at the middle school and high school level, comprehension is the area of literacy instruction where most instructional strategies are being applied. The third finding is that the instructional strategy of cooperative learning groups are most effective with students with ASD at the elementary level. The fourth finding is that the most effective instructional strategies can be applied across all three grade levels of elementary, middle school and adolescents: direct instruction (DI) and Class Wide Peer Tutoring (CWPT). Together these findings provide the answer to the research question. The literacy instructional strategies to be used with students with ASD that have been proven to be appropriate are strategies that include Class Wide Peer Tutoring (CWPT), Computer Based Instruction, Cooperative Learning Groups, Direct Instruction (DI), Think before, during and after reading (TWA).

Recommendations for Future Research

The limitations of this research will provide a start as a basis for future research. The researcher recommends more research that looks into more literacy instructional strategies for students with ASD. The second recommendation is that more of this research is directed at the middle and high school adolescent age range. A final recommendation is to provide some research with reading and writing strategies across all grade levels, especially the elementary age range. Continued research on effective literacy strategies for students on the Autism Spectrum will provided general education teachers with more research based strategies to help students on Autism continued success in the general education classroom.

REFERENCES

Autism Spectrum Disorder. (2015). Merriam-Webster Online Dictionary.

Bailey, B., Arciuli, J., & Stancliffe, R. J. (2017). Effects of ABRACADABRA Literacy
      Instruction on Children with Autism Spectrum Disorder. *Journal of Educational
      Psychology*, *109*(2), 257-268. doi:10.1037/edu0000138

Bosseler, A., & Massaro, D.W. (2003). Development and evaluation of computer-animated tutor
      for vocabulary and language learning in children with autism. *Journal of Autism and
      Development Disorders*, 33 (6), 653-672. doi: 10.1023/B:JADD.0000006002.82367.4f

Cadette, J., Wilson, C., Brady, M., Dukes, C., & Bennett, K. (2016). The Effectiveness of Direct
      Instruction in Teaching Students with Autism Spectrum Disorder to Answer 'Wh-'
      Questions. *Journal of Autism & Developmental Disorders*, *46*(9), 2968-2978.
      doi:10.1007/s10803-016-2825-2

Carnine, J. Silbel, E.J, Kame'enui S. G., Tarve (2017). What is Direct Instruction?
      https://www.education.com/reference/article/what-direct-instruction.

CCLS (Common Core Learning Standards). (2015). English Language Arts Standards. Retrieved
      from http://www.corestandards.org/ELA-Literacy/

Chandler-Olcott, K., & Kluth, P. (2009). Why everyone benefits from including students with
      Autism in literacy classrooms. *The Reading Teacher*, 62 (7), 548-557.

Crosland, K., & Dunlap, G. (2012). Effective strategies for the inclusion of children with autism
      in general education classrooms. *Behavior Modification*, 36, 251-269.
      doi:10.1177/0145445512442682

Crowley, K., McLaughlin, T., & Kahn, R. (2013). *Using Direct Instruction Flashcards
      and Reading Racetracks to Improve Sight Word Recognition of Two Elementary Students
      with Autism. Journal of Physical and Developmental Disabilities. 25 (1), 297-311.
      Doi: 10.1007/210882-012-9307-z*

Dugan, E., Kamps, D[.,] & Leonard, B. (1995) Effects of Cooperative Learning Groups Using
      Social Studies for Students with Autism and Fourth Graders. *Journal of Applied
      Behaviors Analysis*. 25, 178-188. http://doi.org/10.1901/jaba.1995.28-175

Flores, M. M., & Ganz, J. B. (2007). Effectiveness of direct instruction for teaching statement
      inference, use of facts, and analogies to students with developmental disabilities and
      reading delays. *Focus on Autism and Other Developmental Disabilities*, 22, 244- 251.
      doi: 10.117/10883570220040601

Ganz, J., & Flores, M. (2009). The effectiveness of direct instruction for teaching language to Children with autism spectrum disorders: identifying materials. *Journal of Autism and Developmental Disorder*, 39, 75-83. Doi: 10.1007/s10803-008-0602-6

Gee, J 1991, 'What is Literacy? In Rewriting Literacy. C Mitchell & K Weder (eds.), Bergin & Ganey, New York, pp. 1-11.

Hart, J.E., & Whalon, K.J. (2012). Using Video Self-Modeling Via iPads to Increase Academic Responding of an Adolescent with Autism Spectrum Disorder and Intellectual Disability. *Education and Training in Autism and Developmental Disabilities.* 47(4), 438-446.

Huemer, S. V., & Mann, V. (2010). A Comprehensive Profile of Decoding and Comprehension in Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, *40*(4), 485–493. http://doi.org/10.1007/s10803-009-0892-3

Heimann, M., Nelson, K.E., Tjus, T. & Gillberg, C. (1995). Increasing reading and communication skills in children with autism through an interactive multimedia computer program. *Journal of Autism and Developmental Disorders*, 25 (5), 459-480.

Howorth, S., Lopata, C., Thomeer, M., & Rodgers, J. (2016). Effects of the TWA strategy on expository reading comprehension of students with autism. *British Journal of Special Education*, *43*(1), 39-59. doi:10.1111/1467-8578.12122

Kaderavek, J. N., & Rabidoux, P. (2004). Interactive to Independent Literacy: A Model for Desingning Literacy Goals for Children with Atypical Communication. *Reading & Writing Quarterly*, *20*(3), 237-260.

Kamps, D. M., Barbetta, P. M., Leonard, B. R., & Delquadri, J. (1994). Classwide peer tutoring: an integration strategy to improve reading skills and promote peer interactions among students with autism and general education peers. *Journal of Applied Behavior Analysis*, *27*(1), 49–61. http://doi.org/10.1901/jaba.1994.27-49

Kamps, D., Heitzman-Powell, L., Rosenberg, N., Mason, R., Schwartz, I., & Romine, R. (2016). Effects of Reading Mastery as a Small Group Intervention for Young Children with ASD. *Journal Of Developmental & Physical Disabilities*, *28*(5), 703-722. doi:10.1007/s10882-016-9503-3

Kluth, P., Chandler-Olcott, K. (2008). A land we can share: Teaching literacy to students With Autism. Baltimore: Paul H. Brooks Publishing Co.

Knight, V. F., Spooner, F., Browder, D. M., Smith, B. R., & Wood, C. L. (2013). Using Systematic Instruction and Graphic Organizers to Teach Science Concepts to Students With Autism Spectrum Disorders and Intellectual Disability. *Focus On Autism & Other Developmental Disabilities*, *28*(2), 115-126. doi:10.1177/10883576124753

Ledford, J. R., Gast, D. L., Luscre, D., Ayres, K. M. (2008). Observational and incidental learning by children with autism during small group instruction. Journal of Autism and Developmental Disorders, 38, 86-103. doi:10.1007/s10803-007-0363-7

Mirenda, P. & Erickson, K. (2000). Augmentative communication and literacy In A.M. Wetherby & B.M. Prizant (Eds.), Autism spectrum disorders: A transactional developmental perspective (pp. 333 – 367). Baltimore: Paul H. Brookes

No Child Left Behind Act of 2001, P.L. 107-110,20 U.S.C. 6319 (2002)

NICHD (National Institute of Child Health and Human Development). (2000). *Report of the National Reading Panel. Teaching children to read: An evidence based- assessment of the Scientific research literature on reading and its implications for reading instruction*. Retrieved on January 25th, 2014, from http://www.nich.nih.gov/publications/pubs/nrp/ Pages/smallbook.aspx

O'Connor, I.M., & Klein, P.D. (2004). Exploration of Strategies for Facilitating the Reading Comprehension of High Functioning Students with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders, 34 (2), 115-127. Doi: 10.1023/B: JADD.0000022603.44077.6b*

Rayner, K., Foorman, B.R., Perfetti, C.A., Pesetsky, D.& Seidenberg, M.S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest*,2(2), 31-74.

Ritvo, E.R, & Freeman, B.J. (1978). Current research on the syndrome of autism: introduction. The National Society for Autistic Children's definition of the syndrome of autism. *Journal of the American Academy of Child Psychology.* 17(4), 565-75.

Ruwe, K., McLaughlin, T.F., Derby, K.M., & Johnson, J. (2016). The Multiple effects of Direct Instruction Flashcards on Sight Word acquisition, passage reading, and errors for Three Middle School Students with Intellectual Disabilities. *The Journal of Developmental and Physical Disabilities,* 23(3), 241-255. Doi: 10.1007/s10882-010-9220-2

Shillingsburg, M.A., Bowen, C.N., Peterman, R.K., & Gayman, M.D. (2015). Effectiveness of the Direct Instruction Language for Learning Curriculum Among Children Diagnosed with Autism Spectrum Disorder . *Focus on Autism and Other Developmental Disabilities.* 30 (1), 44-56. Doi: 10.1177/1088357614532498

Simpson, C. G., Spencer, V.G., Button, R., Rendon, S. (2007) Using guided reading with students with autism spectrum disorders. *TEACHING Exceptional Children Plus*, 4(1) Article 5. Retrieved January 2016 from http://escholarship.bc.edu/education/tecplus/vol4 /iss1/art5

Sutherland, K.S. (2007). Effects of Reciprocal Peer Tutoring and Self Graphing on Reading Fluency and Classroom Behavior of Middle School Students with Emotional, Social or Behavioral Disorders. *Journal of Emotional and Behavioral Disorders.* 15 (2), 103-118. Doi: 10.1177/10634266020150020101

Tuedor, M. (2006). Universal Access through accessible computer educational programs to develop the reading skills of children with autistic spectrum disorders. *Universal Access in the Information Society*, 5(3), 292-298. doi:10.1007/s10209-006-0047-7

Vygotsky, L.S. (1987). Thinking and Speech. In R. W. Rieber & A.S. Carton (eds.) The Collected Works of L.S. Vygotsky (Vol 1). New York: Plenum.

Weintraub, K. (2014, March). Autism Rates Soar, Now Affects 1 in 68 Children. *USA Today.* Retrieved from https://www.usatoday.com/story/news/nation/2014/03/27/autism-rates-rise/6957815/

Whitcomb, S., Bass, J., & Luiselli, J. (2011). Effects of a Computer-Based Early Reading Program (Headsprout) on Word List and Exit Reading Skills in a Student with Autism, 491- 499.

Williams, C., Wright, B., Callaghan, G., & Coughlan, B. (2002). Do Children with Autism learn to read more readily by computer assisted instruction or traditional book methods ?: A pilot study. *Autism*, 6 (1) 71-91. Doi: 10.1177/1362361302006001006

Yell, M.L., & Drasgow, E. (2005). No Child Left Behind: A guide for professionals. Upper Saddle River, NJ: Pearson /Merrill/Prentice Hall

APPENDIX A: Agenda for Professional Development Workshop

Professional Development Workshop Agenda

There will be one workshop for each grade level- elementary, middle and high school

9:00-9:15: Teacher check-in/ breakfast
- Sign in
- Take handout- one designated for each grade level

9:15-8:45: Introduction
- Definition of key terms: literacy, ASD, Autism
- Background on Autism rates in the United States and the classroom
- Purpose of this workshop

**9:45-10:30: Introduction of Instructional Strategies related to students with ASD
          at this particular grade level**
- Discussion of what an Instructional Strategy is
- Review Summary of Data Analysis
- Discuss findings for this particular grade level

10:30-10:45: Break

10:45-11:45: Examples of Instructional Strategies used at this particular grade level
- Hands on examples with students and teachers to show how to properly implement the instructional strategies

11:45-12:00: Wrap up
- Wrap up, review of strategies, and questions
- Evaluation form of workshop and handout

Appendix B: Professional Development Workshop Evaluation Form

Workshop Evaluation Form

Workshop Title: _____   Date:_____

Place an X in the appropriate box below

Poor	Average	Good	Excellent
1	2	3	4

	1	2	3	4
1. Relevant to classroom instruction				
2. Instructor's knowledge of Instruction Strategies				
3. Organization of workshop				
4. Layout and Information on handout				
9. Examples of Instructional Strategies				
10.Overall rating of this mini workshop				

How could this workshop be improved to help you in your classroom?

Did you find this workshop valuable to you and the students in your classroom?
        If no, why not?

Do you have any other comments or suggestions?

APPENDIX C: Handouts

Handout Contents
>Purpose of professional development
>Explanation of Instructional Strategies used at each grade level
>Additional resources including websites and articles
>Figure 1: Summary of Data Analysis- highlighted for each grade level

Instructional Strategies	Comprehension	Reading Accuracy	Phonics	Vocabulary
Class wide Peer Tutoring (CWPT)	Elementary High School	Middle School		
Computer based Instruction	Elementary High School	Elementary		Elementary
Cooperative Learning Groups	Elementary	Elementary	Elementary	
Direct Instruction (DI)	Middle School High School		Elementary	Elementary Middle School
Think before, during and after reading (TWA)	Middle School			

Feedback Survey Attached to Handout

Was the handout easy to understand and follow?

Were the examples of the instructional strategies easy to understand?
>Do you think they can be implemented in your classroom?

How effective is this information in helping you teach students with ASD in your classroom?
>What will you take away from this professional development?

Would you like any further information or resources on any of these instruction strategies?