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The Impact of iPads on Literacy for Students with Cognitive Disabilities

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Table of Contents

Chapter		Page
I.	Introduction to the Study	7
II.	Review of the Literature	9
III.	Design of the Study	20
IV.	Results and Discussion	30
V.	Conclusions and Recommendations	37
References		42
Appendix		
A.	Pre- and post-test Dolch sight words	47
B.	Dolch sight word Apps log	49
C.	Literacy skill builder App list log	50
D.	Reading A to Z literacy skills progress graph	51
E.	Student self-reflection goal sheet	52
F.	Literacy skill App list Log	56
G.	iPad Apps used within research project	59

List of Tables

Table	Page
3.1: Study A Procedures (Class 1)	23
3.2: Study B Procedures (Class 2)	26
3.3 Study C Procedures (Class 2)	29
4.1 Study A: Dolch Sight Words Set 1 (Without iPads)	32
4.2 Study A: Dolch Sight Words: Set 2 (With iPads)	32
4.3 Study B: Units 1 & 2 Main Ideas & Details Comparison	34
4.4 Study C: Graphing & Self-Reflection Units Comparison	36

Abstract

Over the last few years there have been rapid advances in technology, especially its use within the classroom. Yet not many studies have examined the effectiveness of these technological tools. This, in addition to the added benefit of technology's engaging features, led me to explore a variety of Apps to improve literacy skills. This action research project tested the impact of technology (iPad Apps), progress monitoring, and self-reflection on literacy skill development for students with cognitive disabilities. The participants were 7 high school students with a cognitive disability, from a mixed gender group ranging from age 14-21 years old. The research project consisted of three studies. The first study (Study A) examined the use of iPads to assist in the learning of the Dolch sight words through small group Direct Instruction. The students took a pre- and post-test on the Dolch sight words and weekly tests. The second study (Study B) examined the use of iPads in addition to small group Direct Instruction of specific literacy skills using the program Reading A to Z.

Two units of instruction, one focused on main ideas and details and the other on making inferences, were taught using small group Direct Instruction and no technology use. To compare data, two other units were taught focusing on the same two skills with the use of iPads.

Results from the Reading A to Z book unit assessments were compared to determine if the use of an iPad had any influence on skill growth. In the third study (Study C), students examined graphical representations of their literacy skill scores from Study B, reflected on their progress, and set new goals. I compared their Reading A to Z assessments and literacy skills graph to their self-reflection goals. Results showed that when iPads were included students knew 2.75 more words after completing the instruction, students increased their literacy skills by 15% and students demonstrated engagement through progress-monitoring and self-reflection.

Chapter One

Introduction to the Study

I tested the impact of technology on literacy skills for students with cognitive disabilities through an action research project. Through teaching and research I have learned that when technology is combined with literacy, students are given a multisensory approach to learning. According to Levy, “the combination of rich graphics, an intuitive touch screen, and lightning-fast processing speed is bringing educational technology to new levels of student engagement” (Levy, 2011, p. 1). While iPads are being used more often as instructional tools, there is little research on whether iPads have a positive impact on the literacy aspect of academics for students with cognitive disabilities specifically. In a systematic review of empirical studies that used iPads or iPods with students with disabilities, Kagohara, et al. (2013) found only one study that reported on the impact of teaching academic skills (spelling). Through research, I have further investigated the information pertaining to students with cognitive disabilities and the use of iPads to support building literacy skills.

The study was conducted in a special education classroom at a high school located in the Midwest region of the United States. Seven high school students enrolled in the special education program participated in this project. The participants were a mixed gender group of students with a cognitive disability, ranging from 14 to 21 years of age. The project was conducted from September 8, 2014 to December 12, 2014.

The following questions were investigated: Does the use of iPads and small group Direct Instruction compared to small group Direct Instruction alone impact students’ with disabilities knowledge and retention of Dolch sight words? Does the use of iPads in conjunction with small group Direct Instruction impact students with disabilities’ literacy skills and if so in what ways?

In what ways does students' progress monitoring and self-reflection impact their literacy skills?

The research project was made up of three studies. The first study (Study A) examined the use of iPads to assist in the learning of the Dolch sight words through small group Direct Instruction. The students took a pre- and post-test on the Dolch sight words and weekly tests. The second study (Study B) examined the use of iPads in addition to small group Direct Instruction of specific literacy skills using the program Reading A to Z.

Two units of instruction, one focused on main ideas and details and the other on making inferences, were taught using small group Direct Instruction and no technology use. To compare data, two other units were taught focusing on the same two skills with the use of iPads. Results from the Reading A to Z book unit assessments were compared to determine if the use of an iPad had any influence on skill growth. The third study (Study C) had the students chart their literacy skill progression for Study B and had the students self-reflect to set new literacy goals to work on. I examined their Reading A to Z assessments, literacy skills graph, and their self-reflection goals for improvements on their literacy skills.

The focus of this project was to determine if the use of iPads had an effect on literacy skills for students with cognitive disabilities when paired with small group Direct Instruction. The project influenced my decision to continue to use iPads within my literacy instruction when working with students with cognitive disabilities and provided information on how to use iPads to support student learning effectively. It also showed how students with cognitive disabilities are able to become metacognitive learners by progress monitoring and self-reflecting. By completing this project, I am able to share my results with my coworkers and other teachers to better assist their literacy programs. The literature review that follows in Chapter Two discusses relevant research on technology, literacy and self-reflection.

Chapter Two

Review of the Literature

Advances in technology continue to provide students with plentiful opportunities to expand and enrich individual learning experiences, especially for those with cognitive disabilities. These experiences allow students to better communicate their knowledge to others and access material in non-traditional ways. When technology is combined with literacy, students experience a multisensory approach to learning. The use of technology within the classroom has been increasing over the past few years; however, there is a lack of research on whether iPads have a positive impact on the literacy portion of academics for students with cognitive disabilities. Can the use of iPads in literacy have a positive effect on learning?

To address this issue, I first explored the role of technology in the literature. This then led into researching the current practices used in today's society that involve the use of technology. In order to better understand the use of iPads, I also explored their contribution to building literacy skills and their use for progress monitoring. Another interesting area I researched was promoting self-reflection in students with cognitive disabilities.

Role of Technology

The role of technology is continually evolving as new devices are created. Salend informs educators that “using technology should facilitate the teaching, learning, and assessment processes without altering the classroom-based instruction, tasks and skills that are being taught and assessed” (2009, p. 49). Salend encourages readers to use technology as a way of delivering and practicing the material, not as a tool of restructuring the content. The Universal Design for Learning (UDL) provides a framework for structuring unit plans with a focus on designing curriculum that is appropriate for all students. Education and learning are continual and lifelong,

it does not stop after memorizing a term; it is a process that continues to expand and develop into critical thinking. To be knowledgeable of content, students need to be able to use and demonstrate what they have learned through multiple ways of delivery. By giving students these experiences to learn and present content, teachers are educating students to be higher level thinkers, which will allow them to succeed in the world. The Universal Design for Learning helps teachers structure their curriculum to meet these goals by providing a framework. The framework gives educators the ability to understand how to create classes and content that meets the needs of all learners. UDL attempts to support all learners and influences the design of curriculum and how content is addressed (Meo, 2008). When combined with technology, it provides students with more opportunities to strengthen their literacy skills through hands on learning experiences with devices. This design focuses on the individual student to make sure the child is receiving appropriate instruction. Educators want students to be successful in the classroom and with the use of technology students with disabilities are given the support needed to perform at the level of their peers.

In the beginning stages of technology, devices were used for entertainment and for basic needs, such as typing. Throughout the years, it has developed into assistive technology supporting students with and without disabilities to be successful within the general population. The way the device is used within the classroom depends on the student, their ability level and their specific need. Some students may use the device for note taking skills and others may need a device that does more such as function as a communication system. Students with disabilities use technology academically, to communicate with others, for leisure activities, and for employment (Kagohara, et al., 2013). Assistive technology is used as a tool to support an individual's daily life.

Teachers are now educating students about the endless possibilities of technology. It is the teacher's role to model the use of technology, include it within the unit plan to engage students, and explore and learn how it can be an asset to students' educational experiences. Walters and Baum state that with the use of technology "we have been able to develop and implement learning activities that allow students to achieve the level of 'create' at the peak of Bloom's Taxonomy" (2012, p. 1). Bloom's Taxonomy is a framework used by teachers to structure units to contain areas of high level thinking. By incorporating technology use into units associated with the high levels of thinking, it gives students the ability to demonstrate their knowledge and creativity. It also gives students unique learning experiences that foster skills that will promote learning. The use of technology has the potential to help students reach a higher level of thinking and processing.

As technology grows within the classroom, iPads have gained recognition for their individual applications. Malleette and Barone (2014) looked into ten specific applications (Apps) that assist students within the classroom. They found that the Evernote App provides students with the ability to change the way students take notes. It allows the user to take typed notes, record information through audio, and insert photos (Malleette & Barone, 2014). Not only is the tool great for class lectures, but it also allows students to brainstorm ideas. This specific iPad App allowed students with disabilities to take notes in a way that fit their unique learning style.

Many students with developmental disabilities use augmentative and alternative programs to communicate their wants and needs. Augmentative and alternative communication systems are either devices that have speech built into the device or are visual aids used to gesture the individual's ideas and thoughts (Gevarter, O'Reilly, Rojeski, Sammarco, Lancioni, & Sigafos, 2013). In the study by Flores, Musgrove, Renner, Hinton, Strozier, Franklin, and Hill

(2012), they found that the use of iPad picture-based applications increased communication behaviors, while the use of picture-base cards did not. The iPad interaction built a stronger sense of communication for the students with disabilities. The use of augmentative and alternative programs has allowed students with disabilities to better express their ideas and opinions. By clicking on a digital picture representation, individuals are able to more readily participate in discussions and have conversations with their peers.

Literacy Practices

When assisting struggling readers, it is important to provide students with intense instruction within a small or one-on-one group setting (Foorman & Torgesen, 2001). One specific approach to use is Direct Instruction. In Ruwe, McLaughlin, Derby, and Johnson (2011), the researchers examined Direct Instruction of sight word flashcards. The purpose of the study was to “assess the effectiveness of the Direct Instruction in improving sight word knowledge and to assess the effects of a Direct Instruction flashcard system on target words when they were read in passages” (Ruwe et al., 2011, p. 243). The case involved three middle school students with cognitive disabilities, placed in a self-contained special education classroom located in the Pacific Northwest region. Two of the participants were fourteen and thirteen years old and were in eighth grade. The two students had reading levels of a kindergartener and a third grader. The third participant was fourteen years old with limited data that suggested a below grade level for reading. The materials used in the study were flashcards containing each of the students’ sight words, a list of the entire bank of sight words presented at the end of each session, and a final double copy of various one-hundred word passages to assess their ability to read the sight words within a context. To gather a baseline, an ABAB design was used to evaluate the effectiveness of the Direct Instruction Flashcard procedure. During the experiment, the session started with five

minutes of direct flashcard instruction for a certain set of sight words. After the instruction, the students were given the list of sixty sight words, which the students read. This was repeated for each of the three sets for each student. For the baseline results, the average number correct out of twenty for each set was 12.67, 12.0, and 12.43. The overall average of all three sets was 12.37. During the Direct Instruction flashcards instruction, the number of correct sight words read increased by 6.08 words (Ruwe et al., p. 255). The overall average was 18.45. This indicates that the use of Direct Instruction flashcards instruction is successful and beneficial for struggling learners. Another study assessing the direct instruction of sight word by Browder, Wakeman, Spooner, Ahlgrim-Dezell, and Algozzine, (2006) found that out of 128 studies using a systematic prompting and fading technique was the most successful approach. When both Direct Instruction and the Reading Racetracks procedures were used together, they both contained positive results for sight word identification. Crowley, McLaughlin, and Kahn (2013), reported on a similar study focusing on Direct Instruction flashcards to increase sight word recognition. These studies show that Direct Instruction used with flashcards can promote sight word identification.

In addition to using prompting, another focus has been teaching letter sound association. Campbell and Mechling (2009) conducted a study investigating the effectiveness of computer-assisted instruction with SMART Board technology. Their focus was on teaching letter sounds to a group of students within a small group setting. The participants of the study were three kindergarteners. Their selection was based off of the students' Individualized Education Plan goals, which all focused on a need for improvement on letter sound identification. Before testing the students, a test was performed to make sure the students could stay focused for more than fifteen minutes in a small group setting. It also determined their ability to imitate letter sounds

and their level of ability to use the SMART Board. There were three slides focusing on different tasks involving a letter sound. The process and implementation was similar to the questions and statements used in Direct Instruction. Prior to the instruction the students ranged from 16.7% to 33.3% accuracy and after the small group instruction the three students ranged from 58.3% to 83.3% (Campbell & Mechling, 2009, p. 55). The use of the combinations of strategies and technology demonstrated to be a positive multisensory intervention. Technology covers a vast amount of devices that can assist students. Above are just some of the pieces of technology used within the classroom instruction. One piece of technology that could be more beneficial for students with cognitive disabilities is the iPad.

Using iPads to Build Literacy

iPads can assist with teaching early literacy skills. Northrop and Killeen (2013, p. 533) proposed “a framework for effective teaching with Apps”. One example described how to teach letter-name phonics with the use of an iPad (Northrop & Killeen, 2013). The researchers stressed that the material still needs to be taught directly and recommended that the iPad be used for practicing the concepts learned. The researchers provided a list of Apps that were beneficial in teaching students early literacy skills such as letter identification, phonics, sight words and comprehension.

Flewitt, Kucirkova, and Messer (2014), conducted a study that explored the literacy learning opportunities offered to students with disabilities through the use of touch screen surfaces on an iPad. The study was a follow up, which focused more on the touch screen component. The English Midlands was the setting and the population was a focused sample of three to nineteen year old students with disabilities. The methods used were field notes from a single observation, four interviews, and thirteen video clips. The researchers found that the

multi-sensory interaction of touch motivated the students to want to be more independent and determined to complete literacy activities (Flewitt et al., 2014, p. 111). Again creativity and motivation was also a strong indicator of student drive. The use of iPads can bring out creativity and motivation, as the authors explained, “students deep engagement in this literacy activity appeared to be further enhanced by the inclusion of somatosensory stimulation in their writing, through physical touch of the iPad” (Flewitt et al., 2014, p. 113). The use of touch screen devices can be a rewarding and stimulating tool for students.

Ae-Hwa, Vaughn, Klingner, Woodruff, Reutebuch, and Kouzekanani presented a study focusing on “improving the reading comprehension of middle school students with disabilities through computer-assisted collaborative strategic reading” (2006, p. 235). The participants involved were two teachers and thirty-four students. The intervention spanned over ten to twelve weeks of fifty-minute sessions. The intervention group was trained on and then used the Computer Assisted Collaborative Strategic Reading program (CACSR), while the comparison group was given reading resource materials. To measure all the students’ comprehension, a pre- and post-test was given. The assessment used was the Woodcock Reading Mastery Test-Revised. The intervention group was also given a test that measured the specific skills emphasized in the CACSR program. The researchers found “a statistically significant difference between intervention and comparison groups’ reading comprehension ability” (Ae-Hwa et al., 2006, p. 235). The results were depicted by the use of a researcher-developed measure and a standardized measure using the Woodcock Reading Mastery Test. The main take away of the study was that the students perceived the intervention as positive and helpful in improving reading skills. Although this study did not use iPads, it did include a program that was interactive and similar to Apps used on the iPad.

A comparable study was completed by McClanahan, Williams, Kennedy, and Tate (2012) focusing on how the use of an iPad as a tool for a reading intervention positively affected the student's confidence and sense of control over learning. The study conducted involved a fifth grade student with Attention Deficit Hyperactivity Disorder. The instructor chose to use the iPad with the student because it allowed for the tutoring to be self-paced and individualized. Before any iPad instruction took place, the educator conducted an assessment of the student's literacy strengths and areas of weaknesses. Further units were then created based on results of the student's performance and skills still needed. The intervention spanned a six week time period, meeting twice a week for twenty minutes. A pre- and post-assessment was used to measure progress. Specific applications, for example Vocabulary Builder, Miss Spell's Class and ABC Alphabet Phonics, were downloaded to the iPad to build specific skills. The researchers found that the iPad allowed the student to be more metacognitive and kept the student's attention throughout the session. Looking at the pre- and post-tests, there was a gain of one year's growth in reading. A limitation in the study is that some of these results were based off of observation and do not contain numerical indicators of progress.. This study showed how iPads can positively support literacy instruction.

Use of Technology for Progress Monitoring

The use of technology allows educators to use computerized assessments to assess student achievement, in addition to students being able to express their creativity and critical thinking skills (Levy, 2011). Educators are always looking for ways to assess and improve students' reading skills. With students being eager to use technology within the classroom, it might make progress monitoring easier. Fuchs and Fuchs (2002) explained progress monitoring, teachers assess students' academic performance on a regular basis (weekly or monthly)

for two purposes: to determine whether children are profiting appropriately from the typical instructional program and to build more effective programs for the children who benefit inadequately from typical instruction. (p. 1).

Förster and Souvignier (2011) studied the adequacy of using a computer-based assessment instrument to progress monitor student reading performance. The results indicated that the tool is comparable to other reading progress monitoring systems. It also assisted in looking at specific reading skills and progress for diagnostic measures. When selecting an assessment to use, it is important to find one that assists in providing data to educators in order to properly support students. Using a computer-based assessment system allows students to take tests independently on their own time. This allows for instructional time to be spent on appropriate skill interventions. Förster and Souvignier (2011) found that teachers were pleased with the preparation, execution and testing results. They also found that the time spent on collecting data was just as valuable as time spent on interventions (Förster & Souvignier, 2011). Buzhardt, Walker, Greenwood, and Heitzman-Powell (2012), examined the use of computer-based assessment and found that it has become more efficient and effective. With recent advances in technology devices that are now more portable, students can use the devices in different locations within the classroom (Buzhardt, et al., 2012). The researchers also argued that it is not the specific piece of technology used that matters, but rather it is the design and implementation that determines the effectiveness.

Promoting Self-Reflection

To teach students to understand what they are learning and how they learn teachers need to encourage students to become metacognitive learners. Ritchhart, Church, and Morrison (2011) describe a metacognitive learner as having the ability to be aware of one's own knowledge and

learning process to direct one's learning in planning and monitoring to complete specific tasks. To encourage students to become metacognitive learners and to be able to self-reflect the first task is to support students to be empowered problem solvers (Kolb & Stuart, 2005). Students need to personally see what is wanted and needed to succeed. Empowering students teaches them what to do and how to react in a positive way. In order to encourage students to feel empowered opportunities to practice problem-solving are necessary. Conway (2001) explored the possibilities of using assessment for learning to promote student responsibility by designing a student-led project, which empowered the students to take responsibility of their own learning outcomes. The students were given guidelines, but it was up to the students to conduct the research and complete the project in way that would reflect what the students learned. Conway (2001) indicated that the biggest challenge was assisting and monitoring the different directions the students took. Overall, the researchers found success in terms of the students' creativities and ability to complete each of the student-led projects. In similarities, Schunk (1983) explored how self-monitoring math instructional progress affected students' achievement and their perception of self-efficacy. He found that by students self-monitoring their performances during a math class increased the students overall time on task and mathematical achievement scores (Schunk, 1983). By teaching students to take interest and led their own learning, educators are empowering students to take control of their learning.

Synthesis

The research articles support the idea that technology is changing the way students learn, by impacting students' engagement, motivation and interactions (Kagohara, et al.; 2013; Levy, 2011; Meo, 2008). As shown through the multiple studies mentioned above technology can be used in conjunction with direct instruction to promote literacy skills, assess abilities and guide

students to take control of learning pathways (Campbell & Mechling, 2009; Crowley, McLaughlin, & Kahn, 2013; Ruwe, McLaughlin, Derby, & Johnson, 2011). Therefore technology has a potential to encourage students to become better metacognitive thinkers by providing opportunities to create and explore on an individual basis (Conway, 2001; Kolb & Stuart, 2005; Schunk, 1983). The research here supports the idea that technology can impact a student's education through multiple ways. Using the Universal Design for Learning as a framework, I connect the use of technology (iPads) with small group Direct Instruction to promote literacy skills for students with cognitive disabilities.

Chapter Three

Design of the Study

The purpose of this project was to better understand the power of technology for students with cognitive disabilities. I am always searching for the best type of instruction for each of my students. After researching the literature, I was interested in finding out more about the influence of technology on literacy skills for students with cognitive disabilities. I also wanted to learn more about students with cognitive disabilities using progress monitoring tools and setting goals for self-reflection.

I conducted an action research study, which contains both quantitative and qualitative data. The focus was to determine if the use of iPad Apps influenced literacy skills development of students with cognitive disabilities. The project was conducted from September 8, 2014 to December 12, 2014. The context, participants, Study A, Study B and Study C are explained below.

Context

The study was conducted within the Midwest region of the United States. The school community was populated with 7.4% minorities, (approximately 0.5% American Indian, 1.3% Asian, 1.0% Black, and 2.8% Hispanic) and 10.9% of the community is economically disadvantaged. Approximately 10.8% of the school population is designated as special needs. The participants are from a rural district which services more than 4,993 students, kindergarten through twelfth grade, with six elementary schools, one middle school, and one high school. The high school itself serves over 1,734 students-ninth through twelfth graders. Over 78% of the students attend college after graduation.

Participants

There are three separate studies in this project, Study A, Study B, and Study C. All of the research participants were high school students with a cognitive disability who were enrolled within the special education program. Due to the range of students' abilities, not all of the interventions were appropriate for all students. Students were assigned to a study based on their class time and their needs, which were determined by examining their reading level assessments from the previous year. Study A included students in Class 1, and Study B included students from Class 2. Study A and B were conducted at the same time. Study C involved the same group of students from Study B (Class 2) and was started immediately after Study B ended.

There were four male students (ages 14 to 21) who participated in Study A. There were three students (ages 15 to 19) who participated in both Study B and Study C (Class 2) two males and 1 female. The questions, instruments, procedure, and analysis are explained for each Study A, B, and C, below.

Study A

The central question for the first study was, does the use of iPads and small group direct instruction compared to small group direct instruction alone impact students' knowledge and retention of Dolch sight words?

Instruments. In study A, I used a pre- and post-test of the Dolch sight words (see Appendix A) and a Dolch sight words Apps log (Appendix B) to obtain data. The students used the Dolch sight words Apps log to record their time spent on each of the pre-selected iPad Apps. I created this Log by finding 3 iPad Apps that focus on practicing the Dolch sight words (see Appendix B). I designed it so that it would be a quick thirty second process of filling in the date and the amount of time spent on the selected App for the day at the end of class. I also filled out

a teacher reflection journal to document notes about the study. For an overall view of all the iPad Apps used within the research project list see Appendix G.

Procedures. Study A involved four students from Class 1. Before starting any units with the students, I randomly split the Primer-Level Dolch sight words list into two sets. After determining the two sets, I prepped the students for four days with the routine that the students followed for the following 6 weeks. This helped them adjust to the transition in how the class time was spent. I then conducted a pre-test using the Dolch sight words Set 1. Following the pre-test, I started small group Direct Instruction with the students teaching the Dolch sight words Set 1 without the use of iPads. The students completed a total of 2 weekly check assessments at the end of each week. At the end of week 3, a final post-test was given for the Dolch sight words Set 1. See Table 3.1 for Study A breakdown.

During week 4, I gave the students a pre-test for the Dolch sight words Set 2. Throughout the following weeks I used Direct Instruction to teach the students the Dolch sight words Set 2 and also incorporated the use of the 3 selected iPads Apps. The students were taught the 3 different Apps that were used within this study. Each of the Apps contained the words that were being assessed. The students each were given 15 minutes of instruction time each day to work on Dolch sight word Apps. The students recorded their time spent on each App on the Dolch sight word Apps log (see Appendix B). The students also completed a total of 2 weekly check assessments at the end of each week. At the end of week 6, a final post-test was given for the Dolch sight words Set 2.

Analysis. In Study A, I determined the number of words identified correctly on each Dolch sight word test. Next, I calculated the difference between the post-test and the pre-test for each set. I then compared the pre-tests and post-tests of both sets of words to see if the students

made any progress. I also compared the number of words identified correctly on the post-tests (Set 1 without iPads to Set 2 with iPads), which informed me whether or not the use of technology made an impact. Specifically, I compared the number of words correct on set 1 (from the Direct Instruction experience) to the number of words correct on set 2 (Direct Instruction combined with iPads experience).

A total of 4 weekly checks were conducted as formative assessments, however these were not included in overall data. I also used my reflection notes to detect any flaws or interesting facts within the study, such as time spent on the iPad, days absent from instruction and the Apps used within the timeframe of the study.

Table 3.1

Study A Procedures (Class 1)

Instructional Experience	Data Collected and Instructional Activities each Week
<ul style="list-style-type: none"> • Set 1 Dolch Sight Words 	<p><u>Week 1:</u> -Pre-Test -Weekly Check Assessment</p>
<ul style="list-style-type: none"> • Direct Instruction 	<p><u>Week 2:</u> -Weekly Check Assessment</p>
<ul style="list-style-type: none"> • Without iPad Use! 	<p><u>Week 3:</u> -Post-Test</p>
<ul style="list-style-type: none"> • Set 2 Dolch Sight Words 	<p><u>Week 4:</u> -Pre-Test -15 minutes daily on iPads (on select sight word Apps) -Weekly Check Assessment</p>
<ul style="list-style-type: none"> • Direct Instruction 	<p><u>Week 5:</u> -15 minutes daily on iPads (on select sight word Apps) -Weekly Check Assessment</p>
<ul style="list-style-type: none"> • With iPad Use! 	<p><u>Week 6:</u> -15 minutes daily on iPads (on select sight word Apps) -Post-Test</p>

Study B

The essential question for the second study was, does the use of iPads in conjunction with small group instruction impact students with disabilities' literacy skills and if so in what ways?

Instruments. For Study B, I used the pre-made Reading A to Z book assessments from the Learning A to Z program. Each assessment took place at the end of each book unit. I also created a literacy skill builder App List Log (see Appendix C). I selected the four Apps, because the Apps targeted the two literacy skill areas that I compared in Study B (main ideas and details and making inferences). The students completed the literacy skill builder App List Log daily during units 2 and 4. Once again, I also filled out a teacher reflection journal for my observations.

Procedures. Study B and C involved 3 students from Class 2, a different class and student population from Study A. During the first unit I prepped the students with the routine that the students followed throughout the study. I also reviewed the different literacy skills that the Reading A to Z program incorporated throughout the units. I focused on two reading skill areas in Study B: identifying main ideas and details, and making inferences. The first two units focused on the reading skill main ideas and details. Unit 1 was completed using small group direct instruction of assigned reading material for the unit without the use of iPads. The unit took two weeks to complete. At the end of the unit 1, the students completed the Reading A to Z Book Unit Assessment: Level K . Unit 2 focused on the same reading skills: main ideas and details. The difference for this week was the incorporation of the use of iPads. In addition to the small group direct instruction, the students also spent 15 minutes daily on the iPads. The students documented their time on the iPads and the App used on their literacy skill builder App list log (see Appendix C). The Apps used this week targeted the reading skills area main ideas

and details. At the end of unit 2, the students completed the Reading A to Z Book Unit Assessment: Level K, which was the same test that students completed at the end of unit 1.

Analysis. I first compared results from the literacy skills assessments. I did this by comparing data from unit 1 to unit 2 (main ideas and details), and then also unit 3 to unit 4 (making inferences). I looked at the number of correct answers (out of a total of ten) on each of the literacy skill assessments. Unit 1 and 3 were strictly Direct Instruction, while unit 2 and 4 included Direct Instruction and the use of the iPads. This assessed whether or not there was a difference between the week using technology and the week not using technology. My reflection journal also gave me information about the different weeks and how the students reacted.

Table 3.2

Study B Procedures (Class 2)

Instructional Experience	Data Collected and Instructional Activities each Week
<p><u>Unit 1</u></p> <ul style="list-style-type: none"> • Focus: Main Ideas & Details • Direct Instruction • Without use of iPads! 	<p><u>Week 1:</u> -Read book -Work on unit 1 material</p> <p><u>Week 2:</u> -Re-read book -Finish unit 1 material -Take Reading A to Z Main Ideas & Details assessment for Unit 1</p>
<p><u>Unit 2</u></p> <ul style="list-style-type: none"> • Focus: Main Ideas & Details • Direct Instruction • With use of iPads! 	<p><u>Week 3:</u> -Read book - Work on unit 2 material -15 minutes daily on iPads (main ideas and details Apps)</p> <p><u>Week 4:</u> -Re-read book -Finish unit 2 material -15 minutes daily on iPads (main ideas and details Apps) -Take Reading A to Z Main Ideas & Details assessment for Unit 2</p>
<p><u>Unit 3</u></p> <ul style="list-style-type: none"> • Focus: Making Inferences • Direct Instruction • Without use of iPads! 	<p><u>Week 5:</u> -Read book - Work on unit 3 material</p> <p><u>Week 6:</u> -Re-read book -Finish unit 3 material -Take Reading A to Z Making Inferences assessment for Unit 3</p>
<p><u>Unit 4</u></p> <ul style="list-style-type: none"> • Focus: Making Inferences • Direct Instruction • With use of iPads! 	<p><u>Week 7:</u> -Read book - Work on unit 4 material -15 minutes daily on iPads (main ideas and details Apps)</p> <p><u>Week 8:</u> -Re-read book -Finish unit 4 material -15 minutes daily on iPads (main ideas and details Apps) -Take Reading A to Z Making Inferences assessment for Unit 4</p>

Study C

The critical question for the second study was, in what ways does students' progress monitoring and self-reflection impact their literacy skills?

Instruments. For Study C, I had the students use their Reading A to Z book assessments from the units within Study B (four units) to create a bar graph on the computer displaying their amount of correct and incorrect answers for each of the Reading A to Z literacy skills areas. After completing the graph, the students completed a student self-reflection goal sheet (see Appendix F). This allowed the students to assess their literacy skills progress and set a new literacy skill area goal for their next book unit to focus on. I designed the goal sheet to prompt students to start being metacognitive about their learning and to guide their own learning.

Procedures. The same 3 students, who completed Study B, continued into Study C. To start the study, students were given their four unit Reading A to Z unit assessments from Study B. Each of the questions assessed through their Reading A to Z unit assessments targeted certain reading skill areas. The students used their assessment data to graph their reading progress on the computer to create a bar graph that represented the number of correct and incorrect answers for each reading skill (see Appendix D, for a student sample). This gave the students a visual representation of their reading skills progress.

After creating their reading skills progress graph, the students completed the Student Self-Reflection Goal Sheet (see Appendix F). The self-reflection goal sheet gave the students the chance to reflect on their own progress and to see their areas of strength and weaknesses. After completing the first self-reflection goal sheet, the students chose a reading skills area that they wanted their next unit to focus on. The students each identified their skill area and then started a new unit that focused on that reading skills area. In conjunction with the Direct

Instruction unit the students also were given 15 minutes of daily use of the iPads. The Apps used on the iPads were a select few that focused on the different reading skills within the Reading A to Z program. The students recorded their iPad use on their Literacy skill App List Log (see Appendix F). After completing their first new targeted reading skills unit, the students updated their Reading A to Z Literacy Skills Progress Graph. After adding information to their graph, they completed a second student-reflection goal sheet. This allowed them to identify another reading skills area to target for their second unit. The students again completed another unit focusing on their target reading skill while also spending time on the iPads. At the end of week 4, students completed the unit 2 Reading A to Z Unit Assessment and updated their Reading A to Z Literacy Skills Progress Graph. I used the graph to see whether or not the students were using it to set literacy skills goals that reflected their areas of weakness and to see if it made a difference. My teacher reflection journal was most beneficial for this study by allowing me to jot down observations about how the students responded to their self-guided learning.

Analysis. Study C allowed me to continue to examine book assessments but also gave the students the view of how their literacy skills were progressing. This study was most beneficial to see whether or not the students enjoyed self-reflecting and guiding their own learning experiences. After the students completed their first Reading A to Z Literacy Skills Progress Graph and a Student Self-Reflection Goal Sheet, I was able to take notes of how the students felt about their reading skills progress and their ability to identify areas of strength and weakness. It also allowed me to assess their self-reflection and goal-setting skills. At the end of their Choice Unit 2, I compared their data to their Choice Unit 1. I did this by comparing their Choice Unit Reading A to Z Literacy Skills Progress Graphs and Student Self-Reflection Goal Sheets. This gave me information on their progress of self-reflection and goal-setting skills. The students also

completed two Reading A to Z Unit Assessments. From each assessment, I pulled the data of the number of questions pertaining to their targeted literacy skill. For example, if a unit contained 2 questions pertaining to main ideas and details (possible choice target skill area), then the amount of correct questions indicated their performance in that skills area for that unit. The two difference choice units focused on two difference skill areas. The students added the number of correct literacy skill questions to their Choice Unit Reading A to Z Literacy Skills Progress Graphs.

Table 3.3

Study C Procedures (Class 2)

Instructional Experience	Data Collected and Instructional Activities each Week
<ul style="list-style-type: none"> • Choice Unit 1 	<p><u>Week 1 &2:</u></p> <ul style="list-style-type: none"> -Complete Reading A to Z Literacy Skills Progress Graph - Student Self-Reflection Goal Sheet -Identify a new target reading skill -Complete Reading A to Z Unit 1 (target reading skill) -Complete Reading A to Z Unit Assessment
<ul style="list-style-type: none"> • Choice Unit 2 	<p><u>Week 3 &4:</u></p> <ul style="list-style-type: none"> -Update their Reading A to Z Literacy Skills Progress Graph -Complete a second Student-Reflection Goal Sheet -Identify a new target reading skill -Complete Reading A to Z Unit 2 (target reading skill) -Complete Reading A to Z Unit Assessment

Chapter Four

Results and Discussion

The results allowed me to better understand the power of technology for students with cognitive disabilities. It also gave me more information pertaining to the benefits of students with cognitive disabilities progress monitoring and goal setting for self-reflection. In addition it also presents data to support the use of iPad Apps to influence literacy skills development of students with cognitive disabilities. The results of Study A, Study B and Study C are discussed below.

Study A

In Study A I attempt to answer the research question: Does the use of iPads and small group Direct Instruction compared to small group Direct Instruction alone impact students' knowledge and retention of Dolch sight words? To start this research, I randomly broke the list of Primer-level Dolch sight words into two sets (Set 1 and Set 2). I then taught the first set of words to four students through Direct Instruction without the use of technology. Table 4.1 displays the results. As displayed in the table, the students could identify 16.5 words on average (out of a total of 26 words) before starting instruction; this is equivalent to 63 percent correct. After three weeks of Direct Instruction, the students completed a post-test. The post-test indicated that the students now on average knew +18.75 words correctly or a 72% accuracy rating. This was an increase of 2.25 words on average or a 9% increase without the use of technology.

After three weeks of teaching Set 1, I then taught the students Set 2 through Direct Instruction, but this time I also included the use of iPads. The students were given both Direct Instruction time and 15 minutes of the use of pre-selected Apps on the iPad. In Table 4.2 the

results indicated that after the Direct Instruction and iPad time combined teaching strategy, the students on average knew 20 words or 76% of the Set 2 word list. This was an increase of 5 words or 19% overall with the use of technology.

When comparing both Set 1 and Set 2 it shows that on average the students knew 2.75 more words after completing the instruction that included both the Direct Instruction and the use of iPads. This was a 10% increase overall. The data does not appear to be large, however, when students with cognitive disabilities can gain knowledge within a six week period it shows progress no matter how big or small the growth is. My teacher reflection journal also indicated that the students' excitement and overall engagement was higher when given time to work on the iPads. I documented that the students' attention span also increased when the Direct Instruction time was shortened and time was given for them to use the iPads. I think that the Apps I selected also impacted their overall learning in a positive way. All three of the Apps focused on the Primer-level sight words that the students were practicing. One of the Apps even allowed me to program which words would be displayed in the activity. The Post-test assessments indicated that the students were making progress, by increasing their word identification. Overall, this study showed that there was an increase in word retention for students with cognitive disabilities when given the opportunity to learn through both Direct Instruction and the combination of Direct Instruction and the use of an iPad.

Table 4.1

Study A: Dolch Sight Words Set 1 (Without iPads)

Students	Pre-Test (total 26 words) (words correct)	Post-Test (total 26 words) (words correct)	Total Change (Difference)
Student A	+19	+23	+4
Student B	+14	+16	+2
Student C	+20	+22	+2
Student D	+13	+14	+1
Average	+16.5 (63%)	+18.75 (72%)	+2.25 (9% increase)

Table 4.2

Study A: Dolch Sight Words: Set 2 (With iPads)

Dolch Sight Words: Set 2 (Yes iPads)			
Students	Pre-Test (total 26 words) (words correct)	Post-Test (total 26 words) (words correct)	Total Change (Difference)
Student A	+20	+24	+4
Student B	+14	+18	+4
Student C	+17	+22	+5
Student D	+9	+16	+7
Average	+15/ 57%	+20 / 76%	+5 /19% increase

Study B

In Study B, I addressed the question: Does the use of iPads in conjunction with small group instruction impact students with disabilities' literacy skills and if so in what ways? I first started this study by teaching a unit without the use of iPads and then teaching another unit

focusing on the same literacy skill with the use of the iPads. Table 4.5 displays the results and indicates that in both of these units all of the students performed higher on their unit assessment that included the use of the iPads. Although the students only gained an overall average of a 15% or 1.50 increase for questions correct on the unit assessments that included the use of iPads, it still shows that students made progress on their literacy skills. The two with iPads assessment scores were higher compared to the units with no iPads. Another interesting result is that Direct Instruction alone also was effective. The students increased their overall average on unit assessments without technology by 13%. This indicates that the Reading A to Z program and Direct Instruction is working for the students. When assessing each unit, the data indicates that the students' assessments did increase by 1 at least question on the second and fourth units (With iPad assessment scores). There was only a small change (difference) in growth between the two literacy skills being assessed. My teacher reflection journal indicated that the students enjoyed working on the iPads and took ownership in documenting their literacy skill builder App List Log. The students also looked forward to class and were more eager to start on the weeks that the iPads were used.

Table 4.3

Study B: Units 1 & 2 Main Ideas & Details Comparison

Units 1 & 2 Main Ideas & Details			
Students:	Unit 1: Without iPads Assessment Score	Unit 2: With iPads Assessment Score	Total Change (Difference)
Student A	+4	+6	+2
Student B	+6	+7	+1
Student C	+6	+8	+2
<i>Average</i>	<i>+5.33 / 53%</i>	<i>+7 / 70%</i>	<i>+1.66 / 17% increase</i>
Units 3 & 4 Making Inferences			
Students:	Unit 3: Without iPads Assessment Score	Unit 4: With iPads Assessment Score	Total Change (Difference)
Student A	+6	+7	+1
Student B	+7	+9	+2
Student C	+7	+8	+1
<i>Average</i>	<i>+6.66 / 66%</i>	<i>+8 / 80%</i>	<i>+1.33 / 14% increase</i>

Study C

Study C attempts to address the question: In what ways does students' progress monitoring and self-reflection impact their literacy skills? After completing Study B, the students were able to see their progress by making bar graphs on the computer displaying the literacy skills covered in the Reading A to Z program and their individual progress for each skill (see Appendix D Reading A to Z Literacy Skills Progress Graph). This gave the students a different view of how they performed on their literacy skill assessments. The students were then asked to complete a student self-reflection goal sheet (see Appendix E). This self-reflection sheet asked

them questions that pertained to identifying their strengths and weaknesses when it came to their literacy skills. The students were then asked how they could improve their literacy skills and why they thought certain areas were lower than others. This gave the students a chance to take ownership and allowed them to set their own personal literacy skill goal. After setting a literacy skill goal, the students completed a unit focusing on that literacy skill. In addition to completing the graph, the students also documented which Apps they used in the iPads for each unit (see Appendix F Literacy skill App List Log). The Apps used were pre-selected based on their literacy skills the students were targeting. At the end of the unit, the students were assessed on a few of the literacy skills involved in the unit. Two of the ten literacy skills questions focus on their target literacy skill. After completing the assessment the students updated their computer generated literacy skills graphs and then completed a second self-reflection sheet. This time around the students were eager to see their progress in the different areas and had more in depth answers as to why they improved or why they struggled in other areas. The students completed this process a third time to target an additional literacy skill area that needed improvements. Overall, the students all did demonstrate growth within their targeted literacy skills. The students on average attained one of the targeted literacy skills questions correct within each unit.

Table 4.4

Study C: Graphing & Self-Reflection Units Comparison

Graphing/Self-Reflection Units						
Students:	Target Literacy Skill:	Unit 1: With iPads Assessment Score (#questions of target literacy skill)	Literacy Skill achievement:	Target Literacy Skill:	Unit 2:With iPads Assessment Score (#questions of target literacy skill)	Literacy Skill achievement:
Student A	Vocabulary	(1/2)	+1 / 50%	Cause and Effect	(1/2)	+1 / 50%
Student B	Sequence of Events	(1/2)	+1 / 50%	Vocabulary	(2/2)	+2 / 100%
Student C	Sequence of Events	(1/2)	+1 / 50%	Cause and Effect	(1/2)	+1 / 50%
<i>Average</i>	---	+3 / -3	50%	---	+4 / -2	66%

Chapter Five

Conclusions

This action research project was designed to address three main questions. The first question addressed in the study was, does the use of iPads and small group Direct Instruction compared to small group Direct Instruction alone impact students' with disabilities knowledge and retention of Dolch sight words? Based on the results from Study A, it indicates that after the Direct Instruction and iPad time combined teaching strategy, the students on average knew 20 words or 76% of the Set 2 word list. This was an increase of 5 words or 19% overall with the use of technology. When comparing both Set 1 and Set 2 it shows that on average the students knew 2.75 more words after completing the instruction that included both the Direct Instruction and the use of iPads. This was a 10% increase overall. These results show that the when iPads are used in combination with Direct Instruction students with cognitive disabilities can improve their word identification and retention skills. Ruwe, McLaughlin, Derby, and Johnson (2011), inform educators that "Direct Instruction flashcards provides a research based, systemic, effective form of instruction for increasing student knowledge" (Ruwe et al., 2011, p. 242). The data collected supports this claim and also indicates that the use of technology supports this type of instruction.

The second question addressed in the study was, does the use of iPads in conjunction with small group Direct Instruction impact students with disabilities' literacy skills and if so in what ways? The unit assessments within Study B show that students with disabilities had a 15.5% overall increase in knowledge of the two literacy skills being assessed when students were instructed with Direct Instruction and the use of the iPads. The students not only increased their scores, but also demonstrated excitement and engagement when using the iPads. When iPads are

paired with research-based instruction and specifically selected Apps targeting certain literacy skill areas, students are more likely to improve their reading skills.

The final question addressed in the study was, in what ways does students' progress monitoring and self-reflection impact their literacy skills? When the students were a part of their individualized learning and self-reflecting, they took more ownership. Walters and Baum state that the use of an iPad allows for "portability and kinesthetic interaction" (2012, p. 1.). This gave the students the ability to move around and also interact one-on-one with the iPad. The students felt empowered to be able to drive their lessons in a direction of their choice. Not only did the students see their scores, they also created graphs that displayed their knowledge. This allowed the students to better understand and picture what their areas of strengths and weakness were. The students within the study on average between the two units of progress-monitoring and self-reflection had an average of a 58% increase towards their two targeted literacy skill areas. The students benefited more from the actual progress-monitoring and self-reflection than they did the target reading skills. This finding connects with Schunk (1983) who stated that "the self-monitoring process bears a striking resemblance to the procedures involved in goal setting" (p. 92). The process taught the students how to set goals, progress monitor, and reflect on their own learning. The students' motivation to read and their self-esteem appeared to increase throughout Study C.

In conclusion, all of the studies indicated student growth in one way or another when iPads (and pre-selected Apps) were used within the Direct Instruction units. The benefits of using iPads and self-reflection also appeared to increase student involvement and attention span. Again, I cannot emphasize enough that progress is improvement for students with cognitive disabilities no matter how big the gain.

Limitations

The data collected within the action research project does support the implementation of iPads in conjunction with small group Direct Instruction; however, there are limitations within the study. The most crucial limitation was that students from Study A (Class 1) missed classes throughout the study. Three of the students missed two days a week of instruction and one student missed one day a week throughout the study. At the start of the school year, teachers are given times that the students will be removed from the classroom for their therapy sessions, which all happened to occur within the timeframe of Class 1. However, it was also a benefit for the students to have more one-on-one time working with the instructor on the days that some of the students were at therapy.

Some other possible limitations involving all of the studies may stem from the small population size and short length of the study. Although the small group instruction is meant for a few students at a time, the small population limits the ability to generalize to wider populations. In addition, the students on average were only in classroom for three to four days out of the week. This impacts the amount of instruction time and the ability to compare the students to one another. The length of the studies also could have been increased. Students with cognitive disabilities often make small progress over a long period of time. With more time invested into the studies, the students may have continued to increase their literacy skills.

Another limitation within Study A was that the same assessment was used four different times for each set of words. The students were exposed to the same list and order of words, which could have resulted in the students going off of memory to read each of the words. To improve this limitation a random order list could be generated to perform weekly checks.

The literacy skills (main ideas and details and making inferences) chosen for Study B

were also a limitation. I randomly chose two literacy skills to use within the study. The students may or may not have more experience with these literacy skills or the skills could have been two of the more challenging literacy skills for the students. By conducting Study C and giving the students their own ability to choose the literacy skills to work on, I tried to compensate for this limitation. Another limitation was having the iPad lessons after the first unit focusing on the literacy skill. The students might have made more gains within that literacy skill by completing another unit focusing on the specific skill and/or it could be the involvement of the iPads.

For all three studies, the Apps used and the time spent on the pre-selected Apps within the studies could also impact their results. Along with using the iPads, the students might have gained skills over time (when I tested, iPads always followed no-iPads), and to be more certain on the impact I should have switched the order so that a unit with iPads was measured first.

The timing of the studies was a limitation that was particularly challenging for me. Study A and Study B were conducted at the same time during back-to-back class periods. The preparation for the units was excessive especially when it came time for the students within Study C to start choosing their own literacy skill focus area. I also started the studies a week after school had started. If I were to teach this style again, I would start with a unit on proper iPad use and would provide time to explore the Apps on the iPads. I also would space out the studies for a longer timeframe and try to conduct them at different times. I view these limitations as offering new possibilities to continue exploring.

Recommendations & Implications

The research project has indicated that the use of iPads within the classroom when used with small group instruction can have a positive effect on student literacy skill growth, yet further research should be conducted to test the results with other students. I would recommend a

second research project be conducted to test and compare the results. It would also provide more evidence on how the use of iPads can be used within the classroom to support literacy skill growth.

Within this research project, I set out to test the combination of iPads and small group instruction to promote literacy skills and to investigate student progress monitoring and self-reflection. These findings indicated that the use of iPads within the classroom when combined with Direct Instruction can change the classroom dynamic. The use of iPads increased student motivation and self-esteem when students were involved in their own learning process. The students also demonstrated engagement and motivation when they were able to use the iPads. The students learned both technical skills and reading skills through the use of iPads.

Further research could target each of the studies more in-depth. Study A could continue the study within the Primer-level of the Dolch sight words, but could also progress up to the next level as the students' skills grow. Study B could test the two literacy skills involved within this research project, but could also expand and test any of the other literacy skills within the Reading A to Z program. Study C could branch off and conduct a whole new study focusing on student progress monitoring and self-reflection. . In sum, for all three of these studies if further investigated I would recommend conducting each one separately, each over a longer timeframe, especially when working with students with cognitive disabilities. More data could be collected and compared if performed quarterly or by semester. I would also suggest having a larger population. This would allow for multiple small groups to be compared within the same classroom. The direction of further research is endless with possibilities.

References

- Ae-Hwa, K., Vaughn, S., Klingner, J. K., Woodruff, A. L., Reutebuch, C., & Kouzekanani, K. (2006). Improving the reading comprehension of middle school students with disabilities through computer-assisted collaborative strategic reading. *Remedial & Special Education, 27*(4), 235-249.
- BrainCounts. (2011). Ace writer - dolch sight words HD free lite (7) [Software application]. Retrieved from <https://itunes.apple.com/us/app/ace-writer-dolch-sight-words/id447834523?mt=8>
- Browder, D. M., Wakeman, S. Y., Spooner, F., Ahlgrim-Delzell, L., & Algozzine, B. (2006). Research on reading instruction for individuals with significant cognitive disabilities. *Exceptional Children, 72*(4), 392-408.
- Buzhardt, J., Walker, D., Greenwood, C. R., & Heitzman-Powell, L. (2012). Using technology to support progress monitoring and data-based intervention decision making in early childhood: Is there an app for that?. *Focus On Exceptional Children, 44*(8), 1-18.
- Campbell, M. L., & Mechling, L. C. (2009). Small group computer-assisted instruction with smart board technology: An investigation of observational and incidental learning of non-target information. *Remedial and Special Education, 30*(1), 47-57.
- CFC s.r.o. Sight words learning games and flash cards for reading and spelling success. ▫ learn to read educational program with word bingo, endless gears, alphabet reader and more for curious kids in preschool, kindergarten and 1st grade children by abby monkey (2.0.4) [Software application]. Retrieved from <https://itunes.apple.com/us/app/sight-words-learning-games/id518258478?mt=8>
- Conway, R. (2011). Owning their learning: using 'assessment for learning' to help students

- assume responsibility for planning, (some) teaching and evaluation. *Teaching History*, 144, 51-57.
- 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 Developmental & Physical Disabilities*, 25(3), 297-311.
doi:10.1007/s10882-012-9307-z
- Dolch, E.W., Ph.D. (1948). *Problems in Reading*. Champaign, IL: The Garrard Press.
<http://www.sightwordsgame.com/sightwords/dolch-list-dolch-word-list-dolch-sight-words-dolch-words-3/#sthash.HixHmJnz.dpuf>
- Flewitt, R., Kucirkova, N., & Messer, D. (2014). Touching the virtual, touching the real: iPads and enabling literacy for students experiencing disability. *Australian Journal of Language & Literacy*, 37(2), 107-116.
- Flores, M., Musgrove, K., Renner, S., Hinton, V., Strozier, S., Franklin, S., & Hill, D. (2012). A comparison of communication using the apple iPad and a picture-based system. *Augmentative and Alternative Communication*, 28(2), 74-84. doi: 10.3109/07434618.2011.644579
- Foorman, B. R., & Torgesen, J. (2001). Critical elements of classroom and small-group instruction promote reading success in all children. *Learning Disabilities Research and Practice*, 16(4), 203-212.
- Förster, N., & Souvignier, E. (2011). Curriculum-based measurement: Developing a computer-based assessment instrument for monitoring student reading progress on multiple indicators. *Learning Disabilities*, 9(2), 65-88.
- Fuchs, L. S., & Fuchs, D. (2002). What is scientifically-based research on progress monitoring?

National Center on Progress Monitoring, 1-9. Retrieved from
<http://files.eric.ed.gov/fulltext/ED502460.pdf>

Gevarter, C., O'Reilly, M. F., Rojeski, L., Sammarco, N., Lang, R., Lancioni, G.E., & Sigafos, J. (2013). Comparing communication systems for individuals with developmental disabilities: A review of single-case research studies. *Research in Developmental Disabilities*, 34(12), 4415-4432.

Happy Frog Apps. Inference ace: reading comprehension skills and practice for struggling readers (2.2) [Software application]. Retrieved from
<https://itunes.apple.com/us/app/inference-ace-reading-comprehension/id866920724?mt=8>

Happy Frog Apps. Inference clues: reading comprehension skills and practice for kids who need help: school edition (2.2) [Software application]. Retrieved from
<https://itunes.apple.com/us/app/inference-clues-reading-comprehension/id877775935?mt=8>

Happy Frog Apps (2015). Main idea - sentences: reading comprehension skills & practice game for kids - common core aligned: school edition (2.4) [Software application]. Retrieved from <https://itunes.apple.com/us/app/main-idea-sentences-reading/id895686005?mt=8>

Happy Frog Apps. Main idea - short texts: reading comprehension skills game for kids: school edition (2) [Software application]. Retrieved from
<https://itunes.apple.com/us/app/main-idea-short-texts-reading/id916391506?mt=8>

HAVOC. (2013). Sight words – dolch (1.4) [Software application]. Retrieved from
<https://itunes.apple.com/us/app/sight-words-dolch/id730354578?mt=8>

Kagohara, D. M., van der Meer, L., Ramdoss, S., O'Reilly, M. F., Lancioni, G. E., Davis, T. N., .

. . Sigafos, J. (2013). Using iPods® and iPads® in teaching programs for individuals with developmental disabilities: A systematic review. *Research in Developmental Disabilities, 34*, 147-156.

Kolb, S. M., & Stuart S. K. (2005). Active problem solving: A model for empowerment. *Teaching Exceptional Children, 38*(2), 14-20.

K12Reader Reading Instruction Resources. (2008). Dolch word list worksheets and activities. Retrieved from <http://www.k12reader.com/dolch-word-list/>

Learning A-Z. Raz-Kids (1.24.0) [Software application]. Retrieved from <https://itunes.apple.com/us/app/raz-kids/id474207297?mt=8>

Levy, P. (2011, July 11). Putting iPads to work in elementary classrooms. Retrieved from <http://thejournal.com/articles/2011/07/11/putting-the-ipad-to-work-in-elementary-classrooms.aspx>

Mallette, M. H., & Barone, D. (2014). Interesting ways to use iPads in the classroom. *Reading Teacher, 67*(8), 621-625. doi:10.1002/trtr.1264

McClanahan, B., Williams, K., Kennedy, E., & Tate, S. (2012). A breakthrough for Josh: How use of an iPad facilitated reading improvement. *TechTrends, 56*(3), 20-28.

MindSnacks. (2013). Kids' vocab – MindSnacks (3.3.8) [Software application]. Retrieved from <https://itunes.apple.com/us/app/kids-vocab-mindsnacks/id582128594?mt=8>

Meo, G. (2008). Curriculum planning for all learners: Applying universal design for learning (UDL) to a high school reading comprehension program. *Preventing School Failure, 52*(2), 21-30.

Northrop, L., & Killeen, E. (2013). A framework for using ipads to build early literacy skills. *Reading Teacher, 66*(7), 531-537.

- Ritchhart, R., Church, M., & Morrison, K. (2011). *Making thinking visible: How to promote engagement, understanding, and independence for all learners*. San Francisco, CA: Jossey-Bass.
- Ruwe, K., McLaughlin, T. F., Derby, K. M., & Johnson, J. (2011). The multiple effects of direct instruction flashcards on sight word acquisition, passage reading, and errors for three middle school students with intellectual disabilities. *Journal of Developmental and Physical Disabilities, 23*, 241-255.
- Salend, S. J. (2009). Technology-based classroom assessments. *Teaching Exceptional Children, 41*(6), 48-58.
- Schunk, D. H. (1983). Progress self-monitoring: Effects on children's self-efficacy and achievement. *Journal of Experimental Education, 51*, 89-93.
- Super Duper. WH Question cards: who, what, when, where, why (1.5) [Software application]. Retrieved from <https://itunes.apple.com/us/app/wh-question-cards-pro-who/id544870563?mt=8>
- Ventura Educational Systems. (2012). Reading skills 3A (2) [Software application]. Retrieved from <https://itunes.apple.com/us/app/reading-skills-3a/id534371813?mt=8>
- Walters, E. A., & Baum, M. (2012, August 8). Will the iPad revolutionize education? Retrieved from <http://www.iste.org/learn/publications/learning-leading/issues/may-2011/point-counterpoint-will-the-ipad-revolutionize-education->

Appendix A: Pre- and post-test Dolch sight words

Dolch Sight Words: Level: Primer

Pre-Test

Randomly Selected Set 1

Name: _____

Date: _____

Words	Assessment Right = + Wrong = -
all	
are	
ate	
black	
but	
did	
eat	
get	
have	
into	
must	
no	
on	
out	
pretty	
ride	
say	
so	
that	
they	
too	
want	
well	
what	
who	
with	
26 total	
Right:	
Wrong:	
Words Wrong:	

Dolch Sight Words: Level: Primer

Post-Test

Randomly Selected Set 1

Name: _____

Date: _____

Words	Assessment Right = + Wrong = -
all	
are	
ate	
black	
but	
did	
eat	
get	
have	
into	
must	
no	
on	
out	
pretty	
ride	
say	
so	
that	
they	
too	
want	
well	
what	
who	
with	
26 total	
Right:	
Wrong:	
Words Wrong:	

Pre-Test

Dolch Sight Words: Level: Primer

Randomly Selected Set 2

Name: _____

Date: _____

Words	Assessment Right = + Wrong = -
am	
at	
be	
brown	
came	
do	
four	
good	
he	
like	
new	
now	
our	
please	
ran	
saw	
she	
soon	
there	
this	
under	
was	
went	
white	
will	
you	
26 total	
Right:	
Wrong:	
Words Wrong:	

Dolch Sight Words: Level: Primer

Randomly Selected Set 2

Name: _____

Date: _____

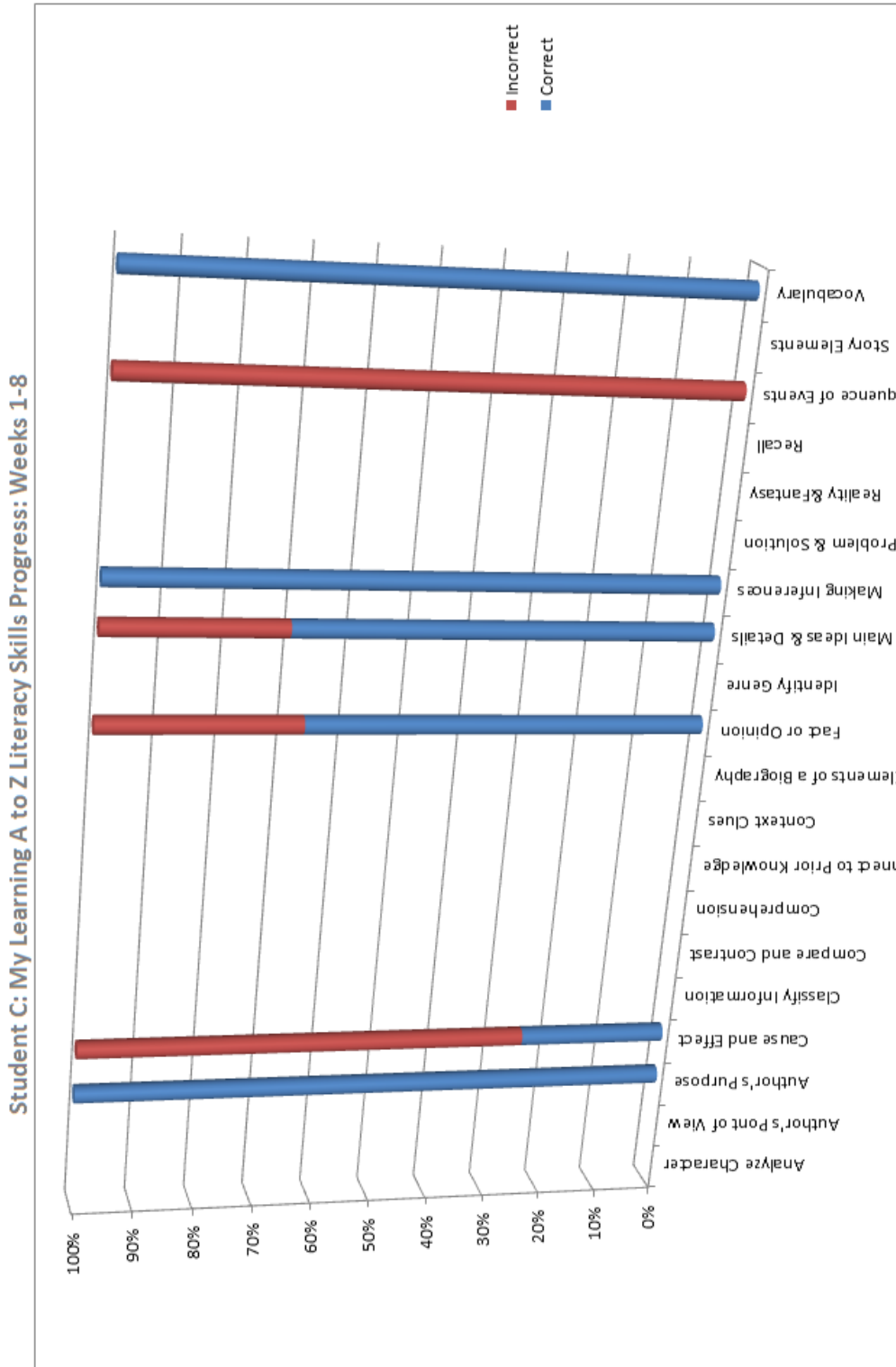
Words	Assessment Right = + Wrong = -
am	
at	
be	
brown	
came	
do	
four	
good	
he	
like	
new	
now	
our	
please	
ran	
saw	
she	
soon	
there	
this	
under	
was	
went	
white	
will	
you	
26 total	
Right:	
Wrong:	
Words Wrong:	

Post-Test

Appendix B: Dolch sight word Apps log

Dolch Sight Word Games: Apps Log	
Student: _____	
Dolch Sight Word Games: Choose one App per day. Mark down the date and the amount of time spent using the App.	
Sight Words & Games & Flash Cards for Reading and Spelling Success at School <div style="border: 1px solid black; padding: 5px; text-align: center;">APP ICON</div>	Date:
	Mins:
Ace Writer-Dolch Sight Words HD <div style="border: 1px solid black; padding: 5px; text-align: center;">APP ICON</div>	Mins:
	Mins:
Sight Words-Dolch <div style="border: 1px solid black; padding: 5px; text-align: center;">APP ICON</div>	Mins:
	Mins:
Total Mins. Each Day:	

Appendix D: Reading A to Z Literacy Skills Progress Graph



Appendix E: Student self-reflection goal sheet

Student Self-Reflection & Setting Goals
(Complete after Study B: Reflect on Weeks 1-8 Data Graph)

Name: _____

Which skill is the highest on your graph?

Why do you think it is the highest skill on your graph?

Which skill (if more than one, then pick one) is the lowest on your graph?

Why do you think that skill the lowest on your graph?

After reflecting, my personal reading skill goal for my next lesson will be:

I chose this goal because....

(Complete after Study C: Lesson 1)

Name: _____

Did you achieve your reading goal? Yes or No (circle your answer)

Why do you think you did or why do you think you didn't?

(Complete after 1st Lesson in Study C: Reflect on Data Graph (Weeks 1-8 & Study C: Lesson 1)

Name: _____

Which skill is the highest on your graph?

Why do you think it is the highest skill on your graph?

Which skill (if more than one, then pick one) is the lowest on your graph?

Why do you think that skill the lowest on your graph?

After reflecting, my personal reading skill goal for my next lesson will be:

I chose this goal because....

(Complete after Study C: Lesson 2)

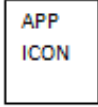


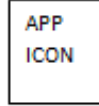

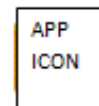
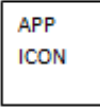
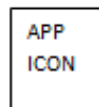

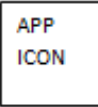
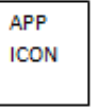
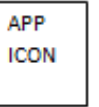
Name: _____

Did you achieve your reading goal? Yes or No (circle your answer)

Why do you think you did or why do you think you didn't?

Appendix F: Literacy Skills App List Log

Literacy Skills App List Log

Analyze Character				Author's Point of View Author's Purpose				Cause and Effect			
Reading Skills 3A  Raz Kids 				Reading Skills 3A  Raz Kids 				Reading Skills 3A  Raz Kids 			
Date:				Date:				Date:			
Mins:				Mins:				Mins:			
Classify Information				Compare and Contrast				Comprehension			
WH Question Cards- Pro: Who, What, When, Where, Why  Raz Kids 				Reading Skills 3A  Raz Kids 				Reading Skills 3A  Raz Kids 			
Date:				Date:				Date:			
Mins:				Mins:				Mins:			

Literacy Skills App List Log



Connect to Prior Knowledge				Context Clues				Elements of Biography			
WH Question Cards- Pro: Who, What, When, Where, Why APP ICON Raz Kids APP ICON				WH Question Cards- Pro: Who, What, When, Where, Why APP ICON Raz Kids APP ICON				Reading Skills 3A APP ICON Raz Kids APP ICON			
Date:				Date:				Date:			
Mins:				Mins:				Mins:			
Fact or Opinion				Identify Genre				Main Ideas and Details			
Reading Skills 3A APP ICON Raz Kids APP ICON				Reading Skills 3A APP ICON Raz Kids APP ICON				Main Ideas/Sentences App APP ICON Main Ideas/short texts App: APP ICON Raz Kids APP ICON			
Date:				Date:				Date:			
Mins:				Mins:				Mins:			



Literacy skills App List Log:

Making Inferences				Problem and Solution				Reality and Fantasy			
Inference Ace: Identifying Inferences		APP ICON		WH Question Cards- Pro: Who, What, When, Where, Why		APP ICON		Reading Skills 3A		APP ICON	
Inference Clues: Identifying Inference Clues		APP ICON		Raz Kids		APP ICON		Raz Kids		APP ICON	
Date:				Date:				Date:			
Mins:				Mins:				Mins:			
Recall				Sequence of Events				Vocabulary			
Spelling City		APP ICON		WH Question Cards- Pro: Who, What, When, Where, Why		APP ICON		Spelling City		APP ICON	
WH Question Cards- Pro: Who, What, When, Where, Why		APP ICON		Kids' Vocab- MindSnacks		APP ICON		Kids' Vocab- MindSnacks		APP ICON	
Raz Kids		APP ICON		Raz Kids		APP ICON		Raz Kids		APP ICON	
Date:				Date:				Date:			
Mins:				Mins:				Mins:			

Appendix G: iPad Apps Used within Research Project

iPad Apps Used Within Research Project:			
App Title:	Picture:	Seller/Publisher:	Study Used In:
Ace Writer - Dolch Sight Words HD Free Lite	APP ICON	Seller: Hien Ton © 2011 BrainCounts	Study A
Kids' Vocab - MindSnacks	APP ICON	Seller: MindSnacks © 2013 MindSnacks inc	Study C
Inference Ace: Reading Comprehension Skills & Practice for Struggling Readers	APP ICON	Seller: Janine Toole © Happy Frog Apps	Study B Study C
Inference Clues: Reading Comprehension Skills & Practice for Kids Who Need Help: School Edition	APP ICON	Seller: Janine Toole © Happy Frog Apps	Study B Study C
Main Idea - Sentences: Reading Comprehension Skills & Practice Game for Kids - Common Core Aligned: School Edition	APP ICON	Seller: Janine Toole © 2015 Happy Frog Apps	Study B Study C
Main Idea - Short Texts: Reading Comprehension Skills Game for Kids: School Edition	APP ICON	Seller: Janine Toole © Happy Frog Apps	Study B Study C
Raz-Kids	APP ICON	Seller: Lazel, Inc. © Learning A-Z	Study B Study C
Reading Skills 3A	APP ICON	Seller: Ventura Educational Systems © 2012	Study C
Sight Words - Dolch	APP ICON	Seller: HAVOC, LLC © 2013, HAVOC, LLC	Study A
Sight Words Learning Games & Flash Cards for Reading and Spelling Success. + Learn to Read Educational Program with Word Bingo, Endless Gears, Alphabet Reader and more for Curious Kids in Preschool, Kindergarten and 1st Grade Children by Abby Monkey®	APP ICON	Seller: CFC S.L.O. © CFC S.L.O.	Study A
WH Question Cards: Who, What, When, Where, Why	APP ICON	Seller: Super Duper, Inc. © Super Duper Inc.	Study C