8-1-2014

Using ipads in teaching vocabulary for students with learning disabilities

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USING IPADS IN TEACHING VOCABULARY FOR STUDENTS WITH LEARNING DISABILITIES

by
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A Thesis

Submitted to the
Department of Language, Literacy and Special Education
College of Education
In partial fulfillment of the requirement
For the degree of
Master of Arts in Special Education
at
Rowan University
May, 2014

Thesis Chair: Jiyeon Lee, Ph.D.

Dedication

I would like to give honor to God for allowing me to have mustard seed faith during this process. I thank my parents for their prayers, love, and support. Lastly, I like to thank my love AJ for his continuous support, understanding, and words of encouragement, "you make me better".

Acknowledgments

I would like to thank my professors Dr. Jiyeon Lee and Dr. Joy Xin for their assistance through this rigorous writing process. I'd also like to thank my students for their hard work and participation. You are all greatly appreciated!

Abstract

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LEARNING DISABILITIES
2013/2014
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The purpose of this study was to examine the effects of using iPad to improve vocabulary skills for students with learning disabilities. The participants were 2nd grade students placed in a learning disability resource room. Baseline data was collected using traditional methods during vocabulary intrusion for the first three weeks. During intervention, the iPad was integrated in vocabulary instruction by adapting iPad app, Vocabulary City. The findings indicate students understanding, recognition, and implementation of vocabulary words increased when iPad app technology was implemented.

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CHAPTER 1

Introduction

Statement of Problems

Vocabulary knowledge is defined as the ability to go from the printed form of a word to its meaning (Shanker & Cockrum, 2009). According to Crow (1986), productive and receptive vocabularies are two ways of evaluating vocabulary knowledge. Words that are generally understood when heard, read, or seen constitute as a person's receptive vocabulary. This kind of word makes up the greater portion of a person's vocabulary. Younger children are able to utilize receptive language, while being unable to verbally communicate (expressive vocabulary) (Bowen, 2013). As a result, older children perceive receptive language as words that are recognized instantly through reading and writing. Productive vocabulary is required in order to use a word in its appropriate context (Bowen, 2013). Knowing how to read the word (phonemic awareness) does not equate to the understanding of the meaning and applying the word in communication. The terms "productive" and "receptive" allow for a more accurate conceptualization because a person is very involved during both language performances (Crow, 1986). An individual needs to utilize higher order thinking skills when applying vocabulary words, while using productive vocabulary. Receptive tasks furthermore, do not require as much specified knowledge. For example, one can decode and comprehend a passage with an imprecise denotative knowledge, but to understand the language before it can be used correctly (Crow, 1986)

There are several important factors that contribute to vocabulary development for many urban students. One is most adults in urban areas are less educated. Some have a high school diploma, many do not complete high school (Schady, 2011). Thus, they do not have knowledge

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to guide their children to learn school readiness skills (Schady, 2011). Their children come to school without the necessary background knowledge or experiences to be successful. As reported by Heart of America (2013), a child from a low-income family enters kindergarten with a listening vocabulary of 3,000 words, while a child of a middle-income family has about 20,000 words. On average, children in economically depressed communities have 0-2 books at their age appropriate level in their homes, while those in middle-income communities have an average of 54 books (Heart of America, 2013). Many urban students' socio-economic condition does not afford them the exposure to a vocabulary rich environment.

The second factor that contributes negatively to vocabulary development is that urban students in a community environment where crime is high compared to suburban or rural areas (Mezzacappa, 1998). Some examples of the crimes that plague urban areas are substance abuse, rape, gun related violence, and homicide. As a result, many students who have to live in these environments suffer from post-traumatic stress syndrome (PTSD). An estimated one-third of children living in urban American communities have PTSD (Tucker, 2007). Symptoms of PTSD include outbursts of anger, trouble sleeping, inability to concentrate and heightened anxiety, all of which make these students have grave challenges to succeed academically in school (Tucker, 2007). Neuroscientists have found that this type of trauma changes the chromosomes form that hinders brain development, and may shorten a person's life expectancy by 7-10 years (Carlyle, 2012). It has been found that the number of urban students in special education is disproportionate to that of special education students in suburban school districts (U.S. Department of Education, 2014). This may reflect the consequences of the poverty that exists in urban communities.

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It also has been found that those who are classified with learning disabilities and placed in special education programs in many urban school districts may not be diagnosed correctly.

Language development starts during infancy. Some children have language difficulties, included many children later identified as having learning disabilities (LD). Children with LD have difficulties recognizing printed words as well as spelling and reading comprehension (Stojanovik, 2006). Difficulties with other aspects of language, such as phonology and grammar, memory and perception have also been reported (Stojanovik, 2006). Vocabulary is an important component in language performance in reading and writing. It inspires students to make connotations, which provide them with varied opportunities to practice, apply, and discuss their word knowledge in meaningful settings (Nichols, 2004). Vocabulary knowledge encompasses all the words students must know to access their background knowledge, express their ideas and communicate effectively, and learn about new concepts (Sedita, 2005). How to effectively improve reading skills of students with LD is the question asked by educators. Some think vocabulary words should be taught directly, which is that words should be targeted for the learner, while others ponder if vocabulary should be learned incidentally through natural reading and learner's desire to clarify concepts (Smith, 1997). This debate applies to how to teach urban students with LD (Spivak, 2012).

Different instructional approaches are used to teach vocabulary to students with LD. These include Direct Instruction, semantic word mapping, logic prediction, and using technology. Direct Instruction (DI) refers to skill-oriented, and step by step teacher-directed instruction (Carnine, 2013). It emphasizes the use of small-group, face-to-face instruction using carefully articulated lessons in which cognitive skills are broken down into small units sequenced deliberately and taught explicitly (Carnine, 2013). DI can be implemented with

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different grades and modified for different classrooms. Semantic word mapping is a direct instructional approach that allows students to use categories to create a visual display of a new word or concept. Students use their known vocabulary to elaborate a definition. By comparing new words to the known words, students can fit new words into already existing conceptual networks (Carnine, 2013). This differs from the traditional method of having students look up words in the dictionary or relying solely on understanding new words through context clues (Carnie, 2013). Students using mapping are also asked to provide examples and non-examples of a new word or concept, which facilitates the brain's function to make mental pictures based on personal experiences (Rosenbaum, 2001). Semantic mapping allows students to think about and to recall new words, use new vocabulary in their writing, and understand the nuances of language (Rosenbaum, 2001). The process of semantic mapping begins in a whole group, and then the teacher leads a discussion-relating student's past reading experiences to the semantic map. Students are encouraged to think about connections between the target word and how it relates to prior background knowledge. Then, the students brainstorm, and write down as many words that are associated to the target word. The students will break into groups to discuss these words. After several minuets, the teacher will bring the class back together to compile their findings in sorted categories. It has been found that semantic word mapping encourages student discussion about the attributes of words by displaying visually the connections between the new word and existing concepts about the word (Nichols, 2004). Through the use of diagrams and mapping, students are able to make connections to new vocabulary words.

Logic and prediction approach allows students to ask questions, clarify thoughts, and use vocabulary in a conversation. It requires students to make predictions in isolation, and the context helps them use their logical problem solving skills to examine the roots or origins of

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words and find connotative and denotative meanings (Moates, 1999). Using a graphic organizer, students make their predictions independently on one side of the organizer. The teacher then asks students to reveal their definitions, and lead into a discussion about their predictions. Lastly, the teacher will have students to write the correct definition on the adjacent side of the graphic organizer. This open dialogue with students in discussion will help students understand the relation between each vocabulary word and their meaning (Phillips, 2008).

Technology in the United States is commonly accessible in school, however, many urban families cannot afford technology equipment at home. Thus, their children are only exposed to technology at school. Often, classes have to schedule the computer lab for students and many teachers lack of skills to incorporate technology in their lessons.

It has been found that the use of technology provides a new avenue in instruction (Lee, 2005). Technology based instruction moves learners from a print based model to one that engages through an interaction with the computer. There are studies on the effect of technology to teach students with LD (O'Connell, 2010). Recent findings show that using technology as an intervention is affective in teaching sight word vocabulary (Lee, 2005). Despite the lack of studies for the urban student with LD, the continuous increase of technology usage is making ways for more studies on the advancement and usage of technology for special education populations in school (Job & Zorigian, 2014).

An iPad is a tablet computer designed, developed, and marketed by Apple Inc (Wikipedia, 2013). It serves primarily as a platform for audio-visual media including books, news, movies, music, games, presentations and web content. This mobile device is equipped with sensors, including cameras, microphone, accelerometer and touchscreen, with finger or stylus gestures replacing computer mouse and keyboard (Wikipedia, 2013). This portable device may

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give students opportunities to learn vocabulary knowledge. It is found that this personal device can increase a learner's motivation, and improve their organizational skills, in order to become active, and self-directed learners (Harmon, 2011). As reported by Hutchinson (2012), using iPads during literacy instruction not only supported student learning, but also highly engaged them in class participation to increase reading comprehension. It seems creative to apply this new technology device in class, but there is limited data based evidence to demonstrate its effects in vocabulary instruction. This study attempts to use iPads in vocabulary instruction for urban students with LD to expand the previous study (Hutchinson, 2012).

Significance of Study

Developing vocabulary skills is very imperative to help students become better readers with comprehension skills. These skills are challenging for students with LD, especially those in urban areas. Reviewing previous studies, limited research has been found on using technology for urban students with LD. This study attempts to extend previous research to urban children with LD. It is my hope that these children will improve their vocabulary knowledge in word identification and application when iPads are used.

Purpose of the Study

The purpose of this study is to examine the effects on using iPads for students with LD in learning vocabulary words. Specifically, their quiz scores on vocabulary identification and application will be evaluated. The second purpose of this study is to determine if students will be satisfied with their performance on vocabulary test, when iPads are used in vocabulary instruction.

Research Questions

1. Are there differences between conditions (with and without using iPad app) for students

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with LD in vocabulary instruction?

2. Will students with LD be satisfied when iPads are used in learning vocabulary words?

CHAPTER 2

Review of Literature

Vocabulary knowledge is a fundamental process in reading comprehension. Vocabulary and word knowledge can contribute to improved comprehension, and provide a sound rationale for increased emphasis on vocabulary instruction (Jintedra, 2004). The National Reading Panel (2010) reported that vocabulary plays an important role in reading and comprehending reading text; because readers have difficulty understanding the text without knowing most of the words. Understanding of vocabulary is imperative to becoming a good reader.

Vocabulary words can be taught in many different ways. This chapter reviews research on vocabulary instructional approaches including Direct Instruction (DI), Sematic Word Mapping, and the use of technology.

Vocabulary Instruction

According to Kohii (2012), retention of unfamiliar words requires students to "need"(motivational), "search"(find meaning), and "evaluate"(comparison of a given word) words while reading. Direct Instruction, semantic word mapping, logic prediction and technology- based instruction are approaches that have been used in vocabulary instruction. Each approach offers a different way for teachers to select their vocabulary instruction strategies in order to benefit students, especially those with learning disabilities.

Direct Instruction Approach. Direct Instruction (DI) refers to a skill-oriented and teacher-directed approach. It emphasizes the use of small-group, face-to-face instruction by teachers using carefully articulated lessons in which cognitive skills are broken down into small units, sequenced deliberately, and taught explicitly. It is skills-oriented, and the teaching practices it implies are teacher-directed (Carninel, Silbert, Kame'enui, & Tarve, 2013).

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A number of studies on DI have demonstrated that vocabulary words can be taught effectively in classroom settings. For example, Beck, Perfeiti, and Mc Keowen's study (1982) examined the relationship between knowledge of word meanings and semantic processes. A total of 27, 4th-grade children were taught 104 words over a 5-month period. Students learned an average of 85 of 104 words taught in 75, 30-minute lessons for a total of 2,250 minutes for 26 minutes per word. As a result, participating children performed at a significantly higher level than those in the control group. Thus, children received DI showed evidence on both of learning word meanings and being able to process instructed words efficiently in reading comprehension (Beck, Perfeiti, & Mc Keowen, 1982).

Furthermore, Adams and Carnine (2003) based their meta-analysis specifically on the use of research-based DI programs for students with learning disabilities. These students ranged from kindergarten-12th grade. All students were taught reading or math using a research-based curriculum. Each lesson lasted an average of 35-45 minutes. The findings of the study indicated that DI was an effective instructional method for teaching both math and reading skills to students with LD. In addition, DI intervention lasting a longer period of time, would be more effective than shorter time instruction for less than a year. Students appeared to respond better to DI delivered by their regular classroom teacher than by those trained by researchers specifically for a research study (Adams & Carnine, 2003). DI had positive effects on student performance in controlled laboratory conditions as well as in real-world classroom settings (Adams & Carnine, 2003). The authors indicated that Direct Instruction programs provide the maximum benefit to schools that are flexible in the way the instruction was organized, allowing students to move between groups based on the rate at which they progress, and providing an infrastructure of training and support to ensure fidelity of implementation (Adams & Carnine, 2003).

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In a study by Vitale and Romance (2008) a series of research-based criteria were used to teach vocabulary words directly-through an explicit teaching strategy. The effectiveness of a semantically oriented strategy was examined in a regular classroom setting in a 4th grade classroom as an enhancement to an ongoing Scott-Foresman basal reading. Six basal reading stories were identified, and three key vocabulary words embedded within the story were selected for each lesson. Each key word was formed into "semantic word families" by identifying four additional words that have similar meanings using a computer-based word-processing thesaurus complemented by "WordNet," a software tool accessible through the Internet. Results showed that the semantic-oriented strategy provided a practical means for applying word families in a regular classroom setting by school practitioners. An important perspective for planning of such an approach to vocabulary instruction was to include the four-part strategy that would require teachers to approach vocabulary from the standpoint of teaching "semantic word families "rather than just teaching the words only. The four-part strategy included as follows. Part 1, teacher taught keywords using DI. Students were queried when key words are found as story was read. Part 2, teacher taught new related word for each key word using DI model. Students read three sentences in story, one with the original key word but substituting two new related words. Students were queried after each set of three sentences was read with substitution. Part 3, students read three sentences in story, one with the original key word but substituting two new related words. Students were queried after each set of three sentences was read with substitution. Part 4, as a vocabulary expansion task, students generated oral sentences to tell something they experienced using either the original key words in the story or one of the new semantically related words or other semantically related words that were not used in instruction. Results of the study showed that experimental students receiving the semantically oriented strategy

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significantly outperformed comparable control students on 3 researcher-developed vocabulary performance measures of vocabulary fluency and transfer (Vital & Romance, 2008). The report indicates that DI is an effective and simple strategy that can be used to teach students in learning vocabulary words (Vital & Romance, 2008).

Semantic Word Mapping

Semantic mapping is a visual strategy for expansion and extension of vocabulary knowledge by displaying words in categories related to one another. Semantic mapping is an adaptation of concept definition mapping but builds on student's prior knowledge or schema (Boxley, 2013). In Jones' study (1984), 67, 5th grade, African-American, inner city students participated. Semantic mapping and a conventional basal approach was provided to teach vocabulary words for 45 minuets each. The findings revealed that semantic mapping together with a direct instruction strategy that capitalizes on the categorization of concepts and students' prior knowledge, positively affected these students' vocabulary acquisition and comprehension of expository passages (Jones,1984).

In addition, Condus, Marshall, and Miller's study (1986) was designed to examine the effect of using an imposed keyword strategy by teaching 50 word meanings. A total of 64 12-year-old students with LD participated. Based on their performance of their receptive language, 32 students with "high" and 32 students with "low" receptive vocabulary were randomly assigned to one of four groups: keyword-image, picture context, sentence-experience context, and control. Special education teachers were divided up for instructing all groups. Prior to instruction, a pretest with 5 words was administered. The 50 words were divided into 5 groups with 10 to teach students in small group instruction for 20 minutes, 3 days per week, over 5 weeks. In the keyword-image condition, participants were instructed to learn word meanings

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using three steps. Step 1, students learned a keyword for each vocabulary word using an index card provided by the instructor with a vocabulary word on one side and the keyword on the other side. Step 2 required students to study and remember a lined drawing of the keyword interacting with the definition for 20 seconds. Step 3, students were presented the 10 vocabulary words to verbally recall the keyword of each word and its drawing. In the sentence-experience context group, students learned the word meanings using two steps. Step 1, students listened and reread a three-sentence passage written on paper and read by the instructor. Step 2, students read and answered a question relating the meaning to a personal experience. Students in the control group were provided the option of choosing their own method to study and learn vocabulary word meanings. Students in this group were only provided a list of words, meanings, paper and pencils. The results indicated that students in the keyword group significantly outperformed those in other conditions. Students that were taught the keyword mnemonic method recalled significantly more word meanings during the initial time and maintained significantly higher levels of vocabulary achievement after 10 weeks of treatment (Condus, Marshall, & Miller, 1986).

Further research examined whether phonological or semantic encoding cues improved their learning performance of typical preschoolers and those with specific language impairments (Gray, 2011). A total of 42 preschoolers with specific language impairment were compared with 42 typical developing children at the same age. On day 1, children completed the fast mapping task with their 1st set of words. Day 2-4 the children completed the word-learning task. Day 5 was the completion of comprehension and production posttests. These procedures were followed over a course of 15 consecutive school days with 5 words each day. Results yielded that encoding cues had no effect on fast mapping performance for any group on the number of words

children learned to comprehend. Encoding cues appeared to be effective on word production for typical children (Gray, 2011). It seems that Semantic Word Mapping can be applied in the facilitation of teaching vocabulary to students with LD, while findings were mixed.

Logic Prediction

Making predictions can help readers define vocabulary words within the text by reviewing the context connection and meaning. Zelinke's study (2011) investigated the effects of discussion on vocabulary learning with reading expository text aloud. The purpose of the study was to compare the effects of two styles of expository text by reading aloud on students' vocabulary knowledge. Participants were 50 2nd graders attending a small rural school in Mid-Atlantic region of the United States. In the 1st study, teachers read aloud a story 3 times over the course of 10 days. For the 1st and 2nd readings, teachers did not discuss target words at all but instead discussed the title and main characters. For the 3rd reading, teachers allowed students to comment and make predictions. The students were shown the cover of a text and required to use prior knowledge to make predictions. As a result, students who predicted word meanings before reading with an approach called Possible Sentences, in which students discussed their predications and changed sentences using targeted words as needed based on the reading, scored higher on all measures of vocabulary and recall than other students without using this prediction approach (Zelinke, 2011). It appears that prediction strategy is not only helpful for reading comprehension of the text, but also beneficial for learning vocabulary words. However, in reviewing the research, only this article was found to focus on the prediction strategy in learning vocabulary. The others were focused on reading comprehension.

Technology

Using technology in vocabulary instruction allows students to be engaged in different levels of learning process, and the use of technology affords students an interaction with computer programs through screen reading and responses. Digital tools and media are available in most schools that teachers could harness to improve vocabulary learning, tools that capture the interest of students and that provide scaffolds and contexts in which to learn with, and about, words more profitably (Dalton & Grisham, 2011). For example, one technology program available is online called *Study Stack*. In Grillo and Dieker 's study (2005), the separated 25 students with LD into two groups, one used *Study Stack* and another used paper flashcards were compared. They spent 5 minutes per day using flashcards developed through *Study Stack,* then independently manipulated targeted vocabulary on a computer. Biology 1 vocabulary words were programmed: the word to be learned (question), the textbook definition (answer), and a helper word or mnemonic (anchor). Students in the paper group used flashcards that contained the same prompts, the word to be learned (question), the textbook definition (answer), and a helper word or mnemonic (anchor) to support memory integration. Students used their assigned cards daily to study targeted vocabulary words. Their scores of 2-week delayed posttest revealed that both conditions, paper and digital, led to significant student learning gains (Grillo & Dieker, 2005). Both groups showed gains in vocabulary knowledge, however, students that used technology agreed that they had more fun. It seems that technology motivated students to learn vocabulary, but had no different impacts on their learning performance (Grillo & Dieker, 2005).

Technology is an ongoing tool, utilized in many classrooms. According to Emerson (2013), the Apple iPad as an assistive technology device could be used to support students with autism spectrum disorders (ASD) in their acquisition of sight words. In the study, participants

were two 2nd and two 3rd graders diagnosed with ASD. Student progress of sight word acquisition was evaluated at the end of each week for three weeks as a baseline data. During Intervention, the iPad was integrated into instruction for approximately 20 minutes every other day utilizing the app *Phonics Genius*. Lessons were divided into two 10-minute segments. During Part I, a random word was flashed on the screen and the student attempted to sound out the word. When the student was satisfied with his/her attempt, he/she would touch the screen and the word would be pronounced. During Part II, random words were set on a time delay to decrease the opportunities of presentation. The Students' acquisition of sight words was assessed at the end of each week for six weeks. Student satisfaction was evaluated by a brief survey. The findings indicated that the iPad can be successfully implemented as a computer-based sight word reading intervention for students with ASD (Emerson, 2013).

Phillips (2013) conducted a study in a 3rd grade inclusion classroom in a regional Catholic School for 10 weeks. There were 25 students in the class. Of these, 15 were females and 10 were males. Students learned 6 to 7 vocabulary words weekly in reading and 8 to 9 in Social Studies. The students were taught using traditional instructional strategies in Reading and Social Studies vocabulary lessons during the baseline. During the intervention, weekly instruction was provided with a Smart Board presentation to demonstrate each vocabulary word with the Keyword Method presented on a Smart Board, such as a mnemonic "catch word", and a visual picture to demonstrate the meaning followed by practice and review in order to reinforce their learning. All students showed an increase in their quiz scores of vocabulary acquisition in both Reading and Social Studies when Smart Board and Keyword Method were provided (Phillips, 2013). The above studies reviewed demonstrated that using technology was beneficial in keep students engaged as well as scoring better on retention and understanding of vocabulary words.

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However, findings are mixed. Most studies, such as the one conducted by Phillips (2013), showed that using technology engaged students in learning, but no difference on their learning performance as compared with students without using technology. However, there were some that showed that technology impacted student performance (Emerson, 2013). Therefore, more studies are needed to evaluate the effect of technology -based instruction on student learning performance, especially for those with LD.

Summary

Understanding a word's meaning and applying it properly is a skill that students with LD should learn. They should be able to connect meaning with words, recall specific details, and draw inferences and conclusion from the text (Vargas, 2011). Teachers need to provide different instructional approaches to help these students become successful in learning vocabulary. There are effective research-based methods such as DI (Adams and Carnine, 2003), semantic mapping (Condus, Marshall, & Miller, 1986), logical prediction (Zelinke, 2011), and using technology (Grillo & Dieker, 2005) .The selection of approaches should be based upon the learners' needs and how these approaches promote their vocabulary development and retention.

Asking students to predict the meaning of words in isolation and again in context helps them to use their logical, problem-solving skills to examine the roots or origins of words and find connotative and denotative meanings (Phillips, 2008). The highlighted strategies identified are needed for students to have increased opportunities for learning vocabulary words. The use of vocabulary words in different contexts with multi-media experiences will provide visual aides to depict meanings, decode words and apply in their sentences and conversations with peers. The instruction by using iPad may offer students with LD another opportunity to learn vocabulary words to meet their individual needs. According to Jitendra (2004) there is a lack of studies for

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the special education population on learning vocabulary. New technology in vocabulary

instruction may provide a path for students with LD, and more studies are needed to examine the

effect of using iPads on vocabulary development for these students.

CHAPTER 3

Methodology

Participants

A total of 6 students (7-8 years old) in the k-2 self-contained class participated in this study. Three are African American and three are Latino. There are three boys and three girls that participated. Summary of participants are presented in Table 1. All of the students were classified with Specific Learning Disability (SLD). Two students were classified with Autism Spectrum Syndrome (ASD). Two students are classified as having Attention Deficit Disorder/Hyperactivity Disorder (ADD/ADHD). Each student has an Individual Education Plan (IEP). All participants were in an urban kindergarten self-contained special education classroom in Southern New Jersey. In the school, 95% of students qualify for free or reduced lunch. All students received instruction in the academic areas within the classroom and there was one teacher, one paraprofessional, and a student teacher that came twice a week. Daily specials, lunch, and related services were done outside of the classroom.

Table 1

General Information of Participating Students

Student	Age	Classification(s)	Ethnicity	Gender
A	8yr 1mo	SLD, ADD	African American	Male
B	7yr 8mo	SLD	African American	Female
C	7yr 7mo	SLD, ASD	Latino	Male
D	7yr 9mo	SLD, ASD, AD/HD	African American	Female
E	7yr 10mo	SLD	Latino	Male
F	7yr 8mo	SLD	Latino	Female

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Student A is an eight-year-old African American male, classified as SLD and ADD. According to the Developmental Reading Assessment (DRA) he is currently reading on a level 18, 2nd grade level. Student A can become disconnected from reality. He has an obsession with Spider Man and at times believes he is him. He can easily go off on a tangent about non-related topics. He has to be constantly redirected to stay on task and focus. He is capable of doing and completing work once he is redirected and focused.

Student B is an African American female, classified as SLD. She is currently reading on DRA level 3, end of kindergarten reading level. She struggles with comprehension, writing, and grammar. Math concepts are also difficult for her to grasp. She tries her best and is a pleasant student.

Student C is a Latino male, classified as SLD and ASD. He is reading on DRA level 22, 2nd grade. During his recent IEP re-evaluation meeting he scored high enough to be declassified of SLD. However, his mother was concerned about him going into general education. He will be moved into a co-teaching class for the following school year. He has issues with short-term memory. For example, he easily forgets directions or information given, however, he has remarkable long-term memory and can recall things from years ago. He is functioning on grade-level in all subjects.

Student D is an African American female, classified as SLD, ASD, and AD/HD. She is reading on DRA level 8, first grade level. She has very poor attendance. To date she has missed 72 days of school. She has strengths in comprehension, retelling, and context clues. Math is her strong point. Her poor attendance, however, makes it difficult to properly assess her growth and complete understanding of given skills and task.

Student E is a Latino male, classified as SLD. He is reading on DRA level 3, early

kindergarten. He has issues with processing information, comprehension, decoding, and word blending skills. Information, directions, and questions have to be given to him one step at a time, because he has difficulty with multiple-steps. He is also well below level with mathematics. He enjoys cleaning the classroom and assisting the teacher.

Student F is a Latino female, classified as SLD. At the start of the year she was reading on DRA level A, primer level. She was very determined to move up in reading levels and practices high frequency words daily. As a result, she is currently on DRA level 3, early first grade. She has strengths in phonemic awareness and sentence structure. She sometimes lacks confidence, making her second guess her work. Her math instructional level is 3rd grade.

Materials

The Independent Reading Level Assessment (IRLA) provides proficiency levels for each student and applicable for students in pre-k to12th grade. The IRLA is a component of the 100 Book Challenge reading curriculum. The IRLA features words leveled by colors.

Vocabulary City app is an interactive program that is visually appealing and stimulating to children. Students are able to type their vocabulary words study, practice, or review them via the different games the app provides. The program has games, such as *Audio Word Match, Missing Letter, Test-N-*Teach*, Word Unscramble, Word Search, and Hang Mouse*, and *Alphabetize*. The app also allows students to take their spelling test directly on the app, scoring the test immediately. These activities are free, however, there is a premium membership that cost. The premium membership does offer more activities, however, they are geared more toward vocabulary instruction.

Instruction Procedures

Baseline. Baseline data was collected over the course of three weeks. During the 90-minute literacy block vocabulary was focused on for 20-minuets, each day. Table 2 presents the

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break down of baseline data. During the baseline weeks, students were taught using traditional direct instruction with pencil and paper. All students were given the same 10 words from the IRLA, level 2 Blue (2B). Level 2B words consist of end of 1st grade beginning of 2nd. During the first week the students were only assigned hand written vocabulary assignments. Day 1 vocabulary words were introduced to students by displaying them individually on the dry erase board. Students received a 10-minute introduction lesson on how to pronounce and use each word in a sentence. Students then wrote vocabulary words 5x each on a lined piece of paper. Day 2 students wrote words in alphabetical order on lined paper. Day 3 students completed a word search using paper and pencil. Day 4 students made rainbow words, by first writing out each word and then tracing over them 4x each with a different colored crayon. Day 5 students wrote vocabulary words in a sentence. On day 5 students were administered a vocabulary test after they completed their assignment.

Intervention. The intervention was done during the 90-minute literacy block vocabulary was focused on for 20-minutes. Table 3 represents the break down of intervention data. During this week, students incorporated Vocabulary City iPad app to complete assignments. Day 1 vocabulary words were introduced to students by displaying them individually on the Smart Board. Students were given a 10-minute introduction lesson on how to pronounce and use each word in a sentence. Students used *Test-N-Teach,* which provided students the opportunity to practice vocabulary words and to hear them used in context-rich sentences. Day 2 students played *Hang Mouse,* a traditional hangman game that provides students with the opportunity to name each word by filling in letters one at a time. Day 3 students used *Missing Letter,* a letter recognition game that offers students the opportunity to figure out which letter is missing from each word. Day 4 students used *Audio Word Match,* which is similar to traditional memory

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match game. It increases familiarity with terms by allowing students to match words they both see and hear read aloud. Day 5 students used *Word Unscramble,* students rearrange letters to correctly spell words on their lists. Day 5 students took their vocabulary test via Vocabulary City app.

Table 2

Teaching Vocabulary Words During the Baseline

Vocabulary Words	Lesson/ Activity	Activity	Activity	Activity	Activity/Test Administered
Week 1	Monday-Introduced, vocabulary words, via dry erase board. Wrote them 5xeach.	Tuesday-Wrote words in alphabetical order.	Wed.-Finished a word search worksheet.	Thursday-Wrote rainbow words.	Friday-Wrote vocabulary sentences. Took vocabulary test.
Week 2	Monday-Introduced, vocabulary words, via dry erase board. Wrote them 5xeach.	Tuesday-Wrote words in alphabetical order.	Wed.-Finished a word search worksheet.	Thursday-Wrote rainbow words.	Friday-Wrote vocabulary sentences. Took vocabulary test.
Week 3	Monday-Introduced, vocabulary words, via dry erase board. Wrote them 5xeach.	Tuesday-Wrote words in alphabetical order.	Wed.-Finished a word search worksheet	Thursday-Wrote rainbow words.	Friday-Wrote vocabulary sentences. Took vocabulary test.

Table 3

Teaching Vocabulary Words During the Intervention

Vocab. Words	Lesson/ Activity	Activity	Activity	Activity	Activity/Test Administered
Week 1	Monday- Introduced, vocabulary words, via Smart Board. Test-N-Teach game	Tuesday- Hang Mouse game.	Wednesday- Missing letter game.	Thursday- Audio Word Match game.	Friday- Word Unscramble. Took vocabulary test.
Week 2	Monday- Introduced, vocabulary words, via Smart Board. Test-N-Teach game	Tuesday- Hang Mouse game	Wednesday- Missing letter game.	Thursday- Audio Word Match game.	Friday- Word Unscramble. Took vocabulary test.
Week 3	Monday- Introduced, vocabulary words, via Smart Board. Test-N-Teach game	Tuesday- Reviewed vocabulary words before quiz. Introduced and read 8 new vocabulary words from Social Studies textbook. Tuesday- Hang Mouse game.	Wednesday- Missing letter game. matching with definitions.	Thursday- Audio Word Match game.	Thursday- Tuesday- Definition quiz was given using Word Unscramble. Took vocabulary test.

Measurement Procedures

During the baseline and intervention, students were given a test at the end of each week, for a total of six tests. While testing during the baseline week the teacher gave each student lined paper and explained how to head it properly. The teacher said each word one at a time and gave a corresponding sentence. During the intervention week, tests were taken on the app. The app said each word and sentence similar to the teacher. Students had to type in their response. Their testing scores were calculated and converted into percentages.

Research Design

A baseline design of AB was used to compare student performance in baseline and

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intervention. The AB design was used to determine if the independent variable, Vocabulary City iPad app would increase students' vocabulary scores versus using the traditional method of pencil and paper.

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Results

The results indicated that the students improved each week through the use of Vocabulary City app. The student's baseline average for three weeks was 71.3%. The student's intervention three-week average was 96.62% (see Table 4). The survey results indicated the positive outcomes of using the iPad app in vocabulary instruction.

Student A scored 50% during week one, 50% during week 2, and 60% during week three. The mean during the baseline was 53.3%. During the intervention weeks, the student scored 70% during week four, 80% during week 5, and 80% during week 6. Giving a mean of 76.6%. Results demonstrate that Student A's understanding of vocabulary words during the week of using the iPad intervention app increased comparing to that of the baseline (see Figure 1).

Student B scored 60% during week one, 70% during week two, and 60% during week three of baseline data collection. Giving student B a mean score of 63.3% during the baseline week. Throughout the intervention weeks student B scored 80% during week four, 100% in week five, and 90% during week 6. Intervention week mean for student B was 90%. Results indicate Student B's vocabulary score increased compared to that of the baseline data (see Figure 2).

Student C scored 80% during week one, 80% in week two, and 90% during the final week of baseline data collection. Student C's mean during the intervention week was 88.3%. During the intervention weeks student C scored a 100% in week four, 90% during week five, and 100% in week six. The mean score for the intervention week was 96.6%. Results indicated that Student C's vocabulary score increased compared to that of the baseline data (see Figure 3).

Student D was absent during week one of the intervention, scored 40% during week two (absent three days in that week), and 60% during week three (absent two days of school).

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Earning a mean of 33.3% during baseline. During the intervention week four student D scored 70%(absent two days), was absent during week 5, and scored 70% during weeks six (absent one day). Scoring a mean of 46.6% during intervention. Although student D had a significant amount of absences; results indicated that Student D's vocabulary score increased compared to that of the baseline data (see Figure 4).

Student E scored 50% during week one, 60% during week two, and 60% during week three of baseline data collection. Giving student E a mean score of 56.6% during the baseline week. Throughout the intervention weeks student E scored 70% during week four, 80% in week five, and 80% during week 6. Intervention week mean for student E was 76.6%. Results indicated that Student E's vocabulary score increased compared to that of the baseline data (see Figure 5).

Student F scored 70% during week one, 60% during week two, and 70% during week three of baseline data collection. Giving student F a mean score of 66.7% during the baseline week. Throughout the intervention weeks student F scored 90% during week four, 100% in week five, and 100% during week 6. Intervention week mean for student F was 96.7%. Results indicated that Student F's vocabulary score increased compared to that of the baseline data (see Figure 6).

Table 4

Mean Comparison Among Participants

Students	Baseline				Intervention			
	1	2	3	M	4	5	6	M
A	50	50	60	53.3	70	80	80	76.6
B	60	70	60	63.3	80	100	90	90
C	80	80	90	88.3	100	90	100	96.6
D	N/A	40	60	33.3	70	N/A	70	46.6
E	50	60	60	56.6	70	80	80	76.6
F	70	60	70	66.7	90	100	100	96.7
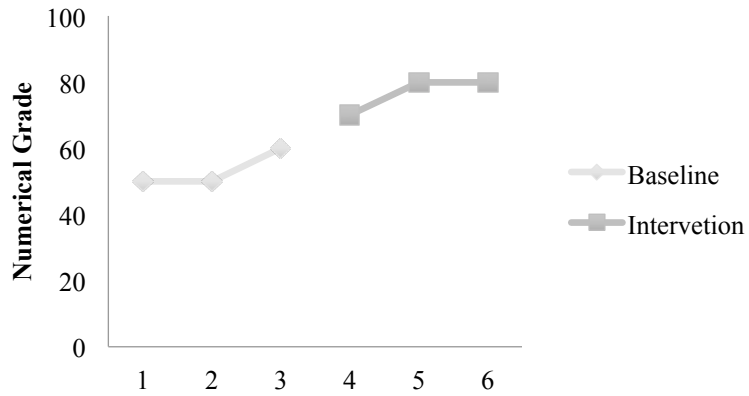
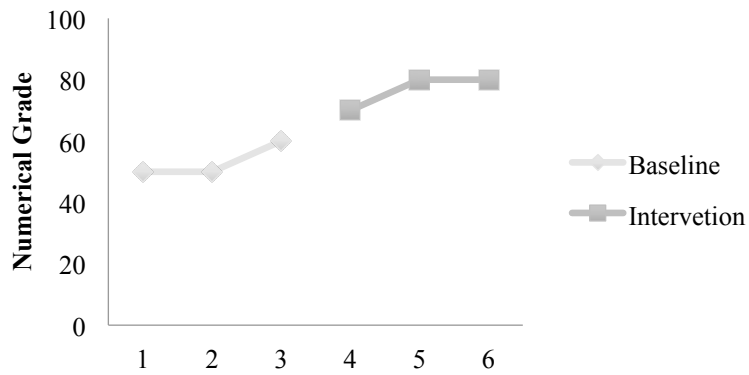*Figure 1.* Student A baseline and intervention results

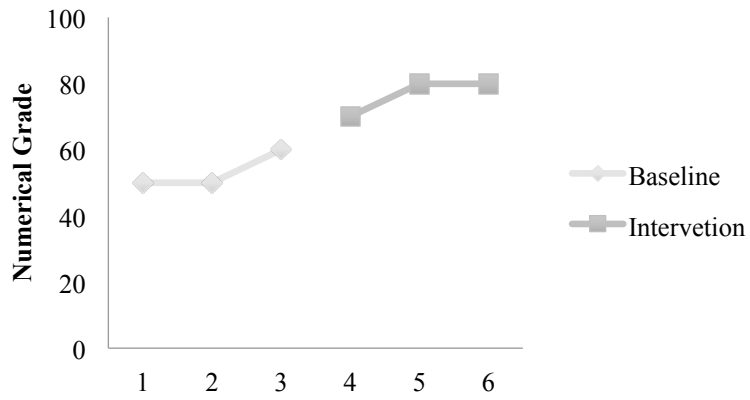*Figure 2.* Student B baseline and intervention results
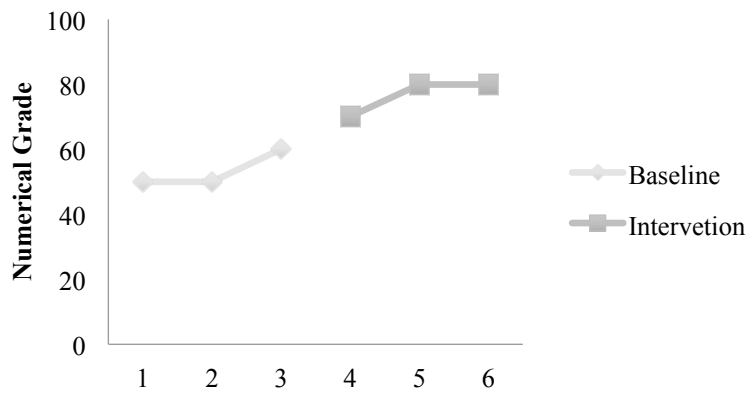
Figure 3. Student C baseline and intervention results

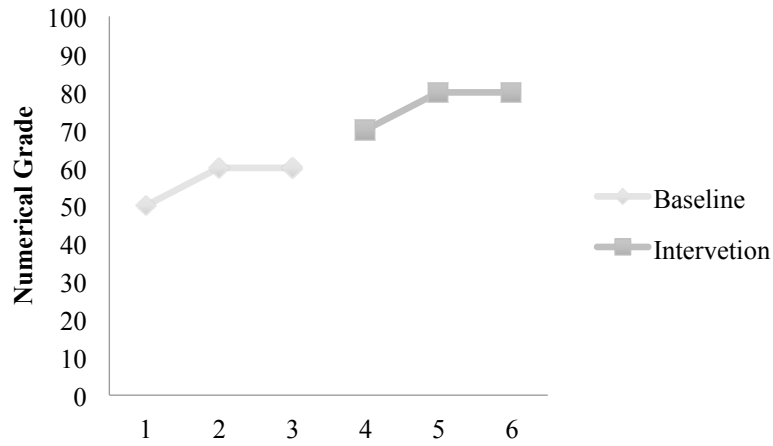*Figure 4.* Student D baseline and intervention results

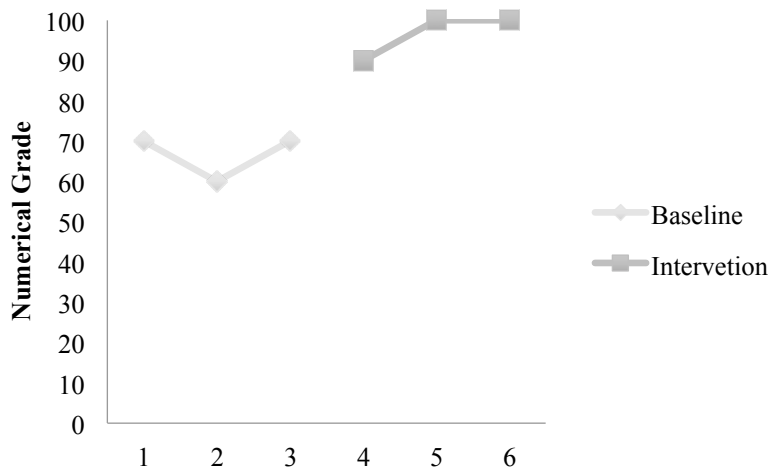*Figure 5.* Student E baseline and intervention results

Figure 6. Student F baseline and intervention results

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CHAPTER 5

Discussion

Summary

The purpose of this study was to examine the effects of using an iPad app to improve student's vocabulary knowledge. The first research question addressed student's increasing their scores of vocabulary identification when an iPad app was used in instruction. The findings indicate that the iPad app can be successfully implemented supporting students in developing their vocabulary skills. Thus, it is note worthy that the average gain in scores after the third week with iPad intervention yielded higher positive outcomes as compared to the baseline data.

The findings in this study are similar with research done by special education teachers Feegel and Mclachlan (2014) who conducted a study with and without the iPads and found the positive effects on learning and decreased negative behaviors. This current study is consistent the finding of Feegel and Mclachlan (2014) and examined the effects of using the iPad to benefit students with LD, while incidentally keeping undesirable behavior to a minimal.

Implications of the Study

Using the iPad app created a way to engage and assist students with LD during vocabulary instruction. The use of the iPad app was effective because the students were still learning while "playing" interactive vocabulary games. The results demonstrate that after using Vocabulary City apps for instruction, the accuracy of the student's vocabulary knowledge increased. The findings in this study indicate that the iPad app, Vocabulary City, can be utilized in a classroom to help maximize student's vocabulary knowledge. In addition, one benefit of using the iPad is its versatility, which allows for easy access and usage. Students can work virtually anywhere in a classroom or school setting. Essentially, students were excited to use the

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iPads. The iPads then became a behavior modification tool for some, and were added as an incentive.

Limitations and Future Directions

The limitations of this study are the sample size consisted of a small amount of participants, six. Therefore, the findings may not be applicable to other students with LD because of the diversity of the population of students with LD. Students can have other special needs, such as ADHD or ASD, in addition to being classified LD. An additional limitation was the Independent Reading Level Assessment (IRLA), which the vocabulary words were chosen from. The vocabulary words were selected based upon the middle reading level. Thus, some of the vocabulary words were too difficult or too easy for some of the students. Students did not receive individual vocabulary list based upon their specific DRA score. The study's time frame did not permit enough time to specifically assign students vocabulary words based on individual reading levels. Lastly, student D missed three days of class during the baseline and two days of class during the intervention week.

Although the results of this study did yield a positive outcome, additional studies need to be done to understand the affects iPad app usage has on LD students. Future research should expand the sample size to authenticate the findings of this study. Furthermore, future studies should also allow for more time during the baseline and intervention process to get a more accurate conclusion. Vocabulary words should also be given at the student's current reading level to ensure students are able to process words appropriately. According to Dalton and Grisham (2011), vocabulary knowledge is an important component to reading. In order to improve vocabulary learning and address the gap many urban students struggle with in education, an actively and systematically teaching approach of vocabulary in multiple exposures is required.

Incorporating technology, such as iPad apps helps students become more engaged. As a result of this studies findings students will continue to use iPad apps across all content areas to produce similar outcomes.

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