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The effects of technology-based graphic organizers to teach reading comprehension skills of students with learning disabilities

Meghan Gifford

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**THE EFFECTS OF TECHNOLOGY-BASED GRAPHIC ORGANIZERS TO
TEACH READING COMPREHENSION SKILLS OF STUDENTS WITH
LEARNING DISABILITIES**

by
Meghan Gifford

A Thesis

Submitted to the
Department of Special Education
College of Education
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Thesis Chair: Jiyeon Lee, Ph.D

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Dedication

I would like to dedicate this manuscript to my father, James McCauley and my husband,

Gregory Gifford, without whom none of this would have been possible

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I would like to express my appreciation to Dr. Joy Xin and Dr. Jiyeon Lee for their guidance and help throughout this research.

Abstract

Meghan Gifford

The Effects of Technology-Based Graphic Organizers to Teach Reading Comprehension Skills of Students with Learning Disabilities

2013/14

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Master of Arts in Special Education

The purpose of this study was to examine the effects of graphic organizers paired with technology on reading comprehension for students with learning disabilities in grade 8 ($n = 8$). The data was conducted for a total of 15 weeks including baseline, training, and intervention phases. Students were measured on their reading comprehension while reading an article from Scope Magazine and using the Popplet app on an iPad (Popplet only used during intervention phase). After the students completed the reading and Popplet activity, reading comprehension assessments were administered. The results indicated that students' reading comprehension scores were increased by using the graphic organizer paired with technology.

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CHAPTER I

Introduction

Statement of problems

Reading comprehension is how readers understand the meaning of the text (Van Keer & Vanderlinde, 2013). There are many factors impacting comprehension, such as, a reader's decoding skills, vocabulary knowledge, background knowledge related to the reading text, and ability to summarize the main idea.

Proficient readers require a full understanding of the text that they are reading, while this is very difficult for students with learning disabilities (LD). Students with LD have a significantly hard time to understand and comprehend text than their nondisabled peers (Douglas, Ayres, Langone, & Bramlett, 2011). They exhibit learning problems that can create barriers to gaining reading comprehension skills (Douglas, Ayres, Langone, & Bramlett, 2011). For example, these students lack attention to important details and have difficulty in connecting their reading text to their background knowledge (Douglas, Ayres, Langone, & Bramlett, 2011). Reading comprehension requires the reader to use working memory, background knowledge, summarizing, and finding main idea, and many students with LD have significant problems activating and accessing these skills (Douglas, Ayres, Langone, & Bramlett, 2011).

Proficient readers use one or more strategies during reading, while students with LD do not acquire strategic reading skills and need to be specifically taught when, where, and how consistently to use appropriate strategies (Swanson & De La Paz, 1998). As students move from one grade to the next, they are required to build more reading comprehension skills and to practice appropriate strategies to fully understand and

connect with the text they are reading. Students with LD lack the knowledge of reading skills, e.g. summarizing main ideas and vocabulary knowledge. They are not aware of when to apply a strategy or even which strategy should be used to understand the text (Senokossoff & Fine, 2013). In addition, these students have poor recall of textual ideas, ignoring extraneous details, difficulty identifying main ideas, drawing inferences, relating new information to prior knowledge, and to actively monitor their own comprehension (Gajria, Jitendra, Sood, & Sacks, 2007). As a result, they lag behind their non-disabled peers. As indicated in the National Assessment of Educational Progress (NAEP, 2009), the percentage of 8th graders with LD who scored below the basic level in reading achievement was substantially higher (63%) than their non-disabled peers (22%). This figure may mean that a majority of 8th graders with LD do not comprehend on their grade level (Jitendra & Gajria, 2011).

There are several strategies educators can teach these students to increase their reading comprehension skills. One is to pair a struggling reader with a partner who will read a story aloud. This strategy is called Shared Story Reading. During shared reading, the reading partner provides the struggling reader an opportunity to interact with the text being read aloud by using a variety of reading comprehension skills, such as background information and vocabulary knowledge to answer questions which will promote a discussion on the text for better understanding (Browder, Hudson, & Wakeman 2013). This shared reading may be good for students to help each other, but may not be practical in every classroom, especially a special education room. In such a setting, there may not be a strong reader to pair with a struggling reader or a strong reader who can assist another peer to understand the text because those placed in this environment are

struggling learners. Other strategies, for example, use visual aides and technology may be alternatives.

A graphic organizer is a visual aide to provide learners with meaningful framework for relating their existing knowledge to new information (Kim, Vaughn, Wanzek, & Wei, 2004). There are several types of graphic organizers including story maps, semantic maps, and concept maps (Clary & Wandersee, 2010). A story map is used with narrative stories to help the student focus on the key features, such as main characters and plot. Semantic maps also known as spider maps, are web organizers to help the reader visually represent words, ideas, or phrases that are linked from the text. Concept maps called cognitive maps are used with expository stories to help readers find the relationship between the key events and the cause and effect (Manoli & Papadopoulou, 2012). Different forms of graphic organizers serve as visual aides to help students with LD find important information in the text, and summarize the main ideas (Clary & Wandersee, 2010). It is found that these types of visual aides benefit these students to organize their reading, thus support their understanding of the text with easy and understandable ways. Another way to increase reading comprehension is the use of technology such as, iPads and Google Drive.

iPads have gained popularity in school and many teachers have begun to integrate them into their classrooms (Connell, Bayliss, & Farmer, 2012). An iPad has many of the same capabilities as standard computers but also has a touch screen and thousands of applications that make this technology unique for classroom learning (Hutchison, Beschoner, & Schmidt-Crawford, 2012). While there are not many studies focusing on reading comprehension using an iPad there is research focusing on literacy

skills paired with iPads. For example, Hutchison, Berchorner, and Schmidt-Crawfordin's study (2012) found that using an iPad for literacy instruction not only supported student learning, but also kept students highly engaged and able to demonstrate multiple ways of responding to the text.

Google Drive is another technology used in Literacy instruction. It is an online word processing program that needs collaboration between students and the teacher (Mcperson 2007). To date, little research is found in the use of Google Drive to enhance reading comprehension, though some studies indicated that this program may increase student enthusiasm during writing instruction (Demski, 2012).

To date, there is little research focused on graphic organizers paired with the use of iPads and Google Drive to teach reading comprehension skills for students with LD. This study attempts to find an alternative way to teach reading comprehension using graphic organizers paired with iPads and Google Drive to support students with LD.

Significance of the Study

There are many ways to help struggling readers understand text. Graphic organizers serve as a visual aide to lay out key information of a reading text. This approach is considered as an effective strategy to supplement reading comprehension of students with LD (Kim, Vaughn, Wanzek, & Wei, 2004). Using technology, such as, Google Drive or iPads, may provide another way to support struggling readers. To date, there is little research about the use of technology paired with graphic organizers in teaching reading comprehension for students with LD. More studies are needed to determine if this paired strategy can assist these students in developing their reading comprehension skills. The present study is designed to examine the effectiveness of

pairing technology and graphic organizers to teach students with LD in learning reading comprehension skills.

Statement of Purpose

The purpose of this study is to evaluate the effectiveness of combining graphic organizers and technology to teach students with LD to increase their reading comprehension skills in order to gain a greater understanding of their reading. Specifically, it will examine the effects of using technology assisted graphic organizers on their reading scores of weekly quizzes.

Research Questions

1. Will students with LD increase their correct responses to weekly quizzes on reading comprehension using graphic organizers paired with an iPad?
2. Are these students satisfied with using graphic organizers and an iPad to learn reading comprehension skills?

CHAPTER II

Review of the Literature

Reading comprehension is one of the most important skills a student should learn in school to understand the constructing meaning of the reading text (Van Keer & Vnderlinde, 2013). Reading comprehension involves strategies, such as using background knowledge, understanding of vocabulary, and concepts in text, and creating inferences (Van Keer & Vnderlinde, 2013). When students learn how to comprehend what they are reading, it is as if they are developing their intellectual muscle (Senokossoff & Fine, 2013). Since 1980s, researchers have been finding ways to teach children reading comprehension and defining what reading comprehension is (Senokossoff & Fine, 2013). During the last three decades, many studies have been conducted pertaining to reading comprehension and how to teach reading comprehension skills to struggling readers. These include research on visible thinking routines (Senokossoff & Fine, 2013), graphic organizers (Manoli & Papadopoulou, 2012), use of electronic text (Douglas, Ayres, & Langone, 2011), as well as many others in teaching reading comprehension skills (Swanson & De La Paz, 1998).

Although, success in reading requires the reader to apply different reading strategies simultaneously (Van Keer & Vanderlinde, 2013), there are different ways to approach how to explicitly teach students reading comprehension skills. This chapter focuses on the strategies specifically used with struggling readers and students with LD. It also involves review of literature about the use of graphic organizers and technology to provide instruction to students with LD in learning reading comprehension skills.

Students with LD in Reading Comprehension

Students with LD often have difficulty comprehending reading text because they lack the knowledge of when to use reading strategies as well as which specific strategy they should be using to help their understanding of the text (Senokossoff & Fine, 2013). They have difficulty in connecting the text to their background knowledge and finding relevant details throughout their reading, thus hindering their comprehension (Douglas, Ayres, & Langone, 2011). According to Jitendra and Gajria (2011) these struggling readers lack skills of making inferences, summarizing the main idea, and monitoring their own reading. For example, these students may not look back through the text to find answers to respond to comprehension questions (Swanson & De La Paz, 1998). They may not understand how to distinguish the main idea from the irrelevant details. Thus, when asked questions about their reading, they are not sure what information should be referred to. This makes it more difficult for these students in reading comprehension (Gajria, Jitendra, Sood, & Sacks, 2007).

In addition, these students are identified as passive learners with low motivation in reading (Nelson & Manset-Williamson, 2006). Their motivation continues to decrease when they become secondary school students because of their previous experiences of failing in academic areas (Nelson & Manset-Williamson, 2006). Due to their low motivation, reading has become a difficult subject area, and they only read to follow their teacher's requirement. As a result, they are able to understand the text at a literal level but may not work towards comprehending the text at a more complex level (Senokossoff & Fine, 2013).

Instructional Approaches in Reading Comprehension

Teaching student with LD how to enhance their reading comprehension is an important area in school. However, teachers do not teach their students reading comprehension skills. In general, they are simply asked to read the passage and answer questions when completing the reading. Thus, Comprehension skills need to be taught reading to students, especially those with LD. Reviewing research, it has been found that reading instruction with Graphic organizers with technology is helpful for these students.

Graphic Organizers. Graphic organizers (GO) serve as a visual tool to help readers organize their ideas in reading (Manoli & Papadopoulou, 2012). This visual display links a relationship among key concepts from the text that help students understand what they are reading (Douglas, Ayres, & Langone, 2011). There are different types of GO, for example, story maps, concepts maps, and cognitive maps.

In Douglas, Ayres, and Langone's study, three middle school students with mild to severe LD participated. They were taught to use computerized pictorial GOs to help enhance their understanding of the reading text. All students were given a pretest and a posttest. Their scores were significantly higher than their pretest scores in favor of the group when GOs were provided. The students were able to answer questions about the text using the pictorial GO they created, and improved their scores of reading comprehension.

In addition, Kim, Vaughn, Wankez, and Wei (2004) compared student performance with and without GOs including 848 in grades K to 12. These students were divided into two groups, in the control and experimental groups. Both groups included regular education students and students with LD. Semantic organizers, cognitive maps,

both with and without mnemonic devices, and framed outlines were used to teach reading comprehension skills. During the intervention, both researchers and teachers delivered the lessons using graphic organizers. It is found that the experimental group using semantic maps performed slightly better than students without LD. Students who used cognitive maps with mnemonic devices outperformed those using regular reading comprehension materials. Students who used cognitive maps without mnemonic devices also performed better than those using traditional strategies without GOs. Lastly, students who used framed outlines scored significantly higher on the comprehension test than those in the control group. In sum, students in different grade levels performed better with the use of GOs than those using traditional reading strategies only (Kim, Vaughn, Wankez, & Wei, 2004).

Chang, Sung, and Chen's study (2007) also showed that students with LD benefit from GOs being used. A total of 126, 5th graders involved in 7 weeks' instruction where pre and posttests were used to demonstrate results. They were placed into one control group and three experimental groups, each experimental group received one of the following GOs: Map-correction where students received a cognitive map with correct and incorrect information. The 1st group of students was required to correct the information in the cognitive map. The 2nd group of students use Scaffold-fading GOs where the researchers completed the whole first GO and subsequent GOs are completed less and less by the researchers causing the 2nd group of students to complete more and more of the GO themselves. The 3rd experimental group used map generation which means that entire GO was completed by the students from the lesson meeting until the last. All groups read an expository text using a computer, and received training on how to create

cognitive maps before the intervention. The intervention lasted for four weeks at two sessions a week, with each session for 40 minutes. The results showed that students in the groups using cognitive map scored significantly higher than the control group in reading comprehension, while other groups did not.

In contrast, Senokossoff and Fine's study (2013) presented different findings. In their study, 5 adolescent students with LD and Asperger's Syndrome participated. Each was able to pick a text that he/she found interesting. They were tutored 12 sessions each using Visible Thinking Routines and GO. Baseline data was taken before the study, intervention data was taken during the study, and data was collected again at the end of the study. A Reading Inventory as a pre and posttest was used to evaluate student performance. The results showed no significant gains were found in the Reading Inventory. Students either stayed the same or improved slightly without a significant difference.

In the array of the previous studies, the evidence from all major studies seems to overwhelmingly support that GOs can be useful to enhance reading comprehension of students with LD. The findings consistently showed that teaching students how to use GOs enhanced their motivation and interests. In certain studies (e.g. Manoli & Papadopoulou, 2012), it would appear that GOs may be more useful with upper elementary and middle school students while cognitive maps may be more effective than other GOs (e.g. Chang, Sung, & Chen, 2007). Although the other studies reviewed did not prove these findings, using GOs can still be considered as a useful tool for student with LD in reading comprehension.

Technology based approach

Using Google Drive. It refers to a website where teachers and students can post their work and assignments (Goetza & Walker, 2004). This is a relatively new educational technology, thus, few studies were found to outline its strengths and weaknesses. These limited available studies showed promising results and indicated that Google Drive would be a growing field of popularity (Zhou, Simpson, & Domizi, 2012).

Studies using Google Drive were found in college instruction. For example, graduate students were taught to use Google Drive to create a website specifically designed to assess student learning (Denton, 2012). In this study, students were required to develop multiple pages using website resources including many different forms of assessments including multiple choices, constructed response, rubric, and performance based testing. During the course, they were required to develop weekly reflections about the process of using Google Drive and also completed a Class Inventory Survey at the end. Based on the weekly reflections and the end of the class survey, it is found that students have had a deeper understanding of the core concepts of the course content due to their use of Google Drive to create their assessments and assignments (Denton, 2012).

Another study (e.g. Zhou, Simpson, & Domizi, 2012) also used Google Drive to evaluate college student's learning. A total of 35 students, ages 18-22, 21 women and 4 men participated. They were required to complete 2 group assignments. The assignments were completed within 6 weeks. Each assignment required individual students listening to a lecture about a topic, reading the assigned material, and answering short questions. After each assignment, students completed a questionnaire about their collaborative experience. Then, they were asked to design an experiment to answer theoretical

questions, and apply knowledge to solve a problem based on the topic. The first assignment was completed without the use of Google Drive and the second assignment was required to use Google Drive. The results showed that 85% of the students rated their experience with Google Drive as positive or very positive; only 2 students had negative experiences while 4 indicated their experience was neither positive nor negative; 64% stated the Google Drive was a useful tool; 7% stated that it was not useful while 28% reported that it was neither useful nor not useful; 79% stated that Google Drive had a positive influence on a collaborative group project. A majority of students also stated that Google Drive enriched their learning experiences.

Studies have shown promising results to lead in enhanced learning with Google Drive for college students. Unfortunately, there is little research involving elementary and secondary students, especially those with LD.

Using E-books. E-books use electronic reading passages supported in a computer program to allow readers to view the text on the computer screen. It is a new path for reading and enjoyment. According to Connell, Bayliss, and Farmer (2012), E-books slowed reading pace and increased readers' motivation. In their study, 73 college students participated. These participants were randomly assigned to read E-books, tablets, or text printouts. They were given quizzes to evaluate their reading comprehension and completed a questionnaire at the end of the study. It is found that the text format did not change the reader's comprehension, but reading pace was slower when reading from an E-book. This might be that they want to spend more time reading on the computer screen during reading without printing text, and enjoy their reading. Their responses to the

questionnaire indicated that an E-book was easy to use, while printout version of the text was the most difficult (Connell, Bayliss, & Farmer, 2012).

Similar results were reported by Wright, Fugett, and Caputa (2011). Instead of college students, 3 female, 2nd graders, 7-9, participated to use both E-readers and traditional text. These students met 4 times over three weeks for 1 ½ to 2 hours each session. Of these, 2 sessions were E-books and 2 for traditional books. After each session, students completed a reading comprehension quiz consisting of eight questions. The results showed that there was no significant difference in reading comprehension between traditional books and E-Books. However, the study did indicate that students spent a longer time with the E-books and their motivation of reading was increased.

In Srivastan and Gray's study (2012), similar results were found. There was no significant difference between traditional paper text and electronic text. Instead of regular education students only in the previous study, 39, 8th graders of which 25 were in a regular education program and 14 in special education participated. Prior to the study, all students completed a Clinical Evaluation of Language Fundamentals to test their reading comprehension skills. All regular education students received an 85 or higher on this test while all special education students scored lower than 85. They were divided into two groups in which a mix of regular and special education students were included. One group was assigned to read traditional paper text and the other group for electronic text. Their posttest scores showed that both groups of students performed similarly. There was no significant difference between the groups when paper text or electronic text provided.

Further, a group of 5 high functioning autistic students in 2nd grade using an electronic or a traditional storybook were compared (Armstrong & Hughes, 2012). Prior

to the study, all participants were given the Story Comprehension Subset of the Diagnostic Achievement Battery. The intervention was given during 20 sessions and each child was required to read 10 traditional and 10 electronic storybooks. Each was required to answer 20 questions of a reading comprehension quiz and retell the story. It is found that there were no significant enhancements when students read electronic text versus traditional text. However, their reading comprehension scores were slightly higher when electronic storybooks were provided.

In contrast, different results were found in Cuevas, Russell, and Irving's study (2012). The electronic text did significantly enhance reading comprehension for high school students. A total of 145, 10th graders in college prep literacy classes participated. Of these, none was in special education or English as a Second Language (ESL) programs. These students were divided into 3 groups, 70 in control group, 45 in the first treatment, and 35 in the second treatment. They were given the Gates-MacGintie Reading Skills Test as a pre and posttest. In the first two weeks, pretest scores were recorded and posttest was in the final two weeks. During the 14-week intervention, all groups read a text passage silently in 60 minutes or less. After reading, students took a reading comprehension quiz with 20 questions based on their reading. The control group received no Independent Silent Reading (ISR) and no computer intervention. The first treatment group received a standard literacy textbook for ISR and the second treatment group received ISR paired with the electronic text. At the end of the study, students were asked to complete an Adult Motivation for Reading Survey. Students in both treatment groups scored significantly higher on the posttest than those in the control group. It is found that there was no significant difference between the two treatment groups on the motivation

survey, however, the quiz scores of the second treatment group were significantly higher than the first treatment and control group. It seems that electronic text enhanced student reading comprehension (Cuevas, Russell, & Irving, 2012).

Using iPad. An iPad is a handheld electronic device developed by Apple Company. This device can be used to help enhance reading comprehension by using apps as well as increasing task motivation and on task behavior (Hutchison, Beschorner, & Schmidt-Crawford, 2012).

In their study, a teacher with 23, 4th graders was given the opportunity to integrate an iPad into her daily literacy lessons. Each student received an iPads to work individually, with partners, or in small groups on assignments in each lesson. Each iPad had several different “apps” downloaded for students, such as Popplet for sequencing stories, Sundry Notes for cause and effect analysis, Strip Designer for retelling, and Doodle Buddy for summarizing main idea. The results showed that students liked using the iPad and its apps, and they were more creative to use apps incorporated into their assignments. Students were motivated and control their own learning pace compared to the limited activities with paper and pens. It is found that the iPad and apps provide a different way to apply strategies that may enhance students’ skills in reading comprehension (Hutchison, Beschorner, & Schmidt-Crawford, 2012).

Similar results were found in Saine’s study (2012). In this study, iPads were used to enhance literacy instruction for 4th, 5th, and 6th graders in an urban elementary and middle school setting. A school teacher taught 2 lessons. One using Toontatsic, a digital story telling app, and the other using Brainpop, a student friendly movie playing app. Students worked in pairs in both lessons. In lesson one, students created a story focusing

on mood, theme, character traits, and story elements. While in lesson 2, students watched videos about Nobel Peace Prize winners and after researching 3 winners, they were required to develop their well-written paragraphs. In both lessons, all students were engaged and enthusiastic about what they were learning and eager to share their finished project with peers. When asked about their experience, the teacher stated that students had a deeper understanding of concepts and were more creative while using the iPads (Saine, 2012).

Although using E-books and electronic text seem to increase motivation and creativity of college students (e.g. Wright, Fugett, & Caputa, 2011). There seems limited difference of students' performance between reading electronic and traditional text (Srivastava & Gray, 2012) and little research was found for students with disabilities especially in learning reading comprehension skills.

Summary

The review of the literature summarized approaches used to enhance reading comprehension. Different approaches impact students on their performance in reading comprehension. For example, Graphic Organizers enhanced reading comprehension by allowing students to map the story and therefore making it easier to find key concepts and connections between text and student's background knowledge (e.g. Zhou, Simpson, & Domizi, 2012) Google Drive made collaboration easier and helped students understand the text that was given in an easier and more unique way (e.g. Zhou, Simpson, & Domizi, 2012) Lastly, E-books helped students become more motivated in their reading (e.g. Connell, Bayliss, & Farmer, 2012) and iPads offered many creative apps to support students in reading comprehension (e.g. Hutchison, Beschoner, & Schmidt-Crawford,

2012). Unfortunately, there is limited research on using technology for special education students in learning reading comprehension skills. More studies are needed in the area of reading comprehension using technology, especially the new device of iPads.

Chapter III

Methods

Participants

Eight students between the ages of 13-15 in a middle school in southern New Jersey participated in this study. All participants (3 boys and 5 girls) were diagnosed with a Specific Learning Disability (SLD) or Other Health Impaired (OHI) that entitled them to Special Education services and demonstrated a functional deficit in the targeted task and all of the participants struggle with reading comprehension and fact recall. Most of participants took the NJASK, which is the state assessment in New Jersey. Scores on the NJASK range from 150-300. A score of 150-199 is considered partially proficient, 200-249 is proficient and 250-300 is advanced proficient. The participants' scores on the NJASK range from 150-202 with a majority receiving partially proficient scores on the reading comprehension section of the assessment.

Participant 1 is a 14-year-old Hispanic male who was diagnosed with ADHD. On the 7th grade NJASK he received a score of 150, partially proficient, in the language arts portion of the assessment and 2 grade levels below on reading comprehension based on Fountas and Pinell Benchmark Assessment System 2nd edition (Heinman 2014). For 6th and 7th grade he was placed in an Emotionally Disturbed (ED) self contained classroom. This is his first time in a resource room setting for language arts since 5th grade. He also struggles with number sense and other math skills causing him to be in a math resource room as well. All other subjects he attends in a regular classroom with no in class support. Last year this student had violent outbursts (e.g. throwing chairs, hitting other students, punching walls, etc.) but this year there has been no such behavior. Participant 1

is frequently absent, late, or leaves early causing him to miss at least one language arts class a week.

Participant 2 is a 14-year-old Caucasian female. She received a 173, partially proficient; on the 7th grade NJASK and on the Fountas and Pinell Benchmark Assessment System she tested 2 grade levels below in reading comprehension and fluency. She struggles with answering multiple-choice questions pertaining to specific details, understanding the main idea of reading passages and shows poor writing ability. Her IEP states that she has Specific Learning Disability (SLD). She has been in a resource room for language arts and math since 4th grade, but remains in regular education classes that have highly modified assignments in all other subjects.

Participant 3 is a 14-year-old African American female. She transferred into this middle school in September of 2013 from a cyber charter school based in Pennsylvania and therefore has no NJASK on record. Fountas and Pinell Benchmark Assessment System showed that she is 1 and ½ grade levels below in reading comprehension, but she does have a strong command of the written language. Prior to the cyber school, participant 3 was placed in a Language Arts Resource Room for 4th and 5th grade. She struggles with number sense and math skills based on former school records, so she was placed in a Math Resource Room as well. However, based on recent tests she no longer qualifies for a Math Resource Room and will be moved into a co-taught setting for math next year.

Participant 4 is a 14-year-old Caucasian male and is listed as SLD in his IEP and has recently been tested for ADHD and Oppositional Defiance. On the NJASK he received a 202, proficient, and on Fountas and Pinell Benchmark Assessment System he

was one grade level below in reading comprehension. This qualifies him for a Language Arts Resource Room. He is much stronger in his other subjects and is therefore in regular education classes throughout the day. He has been in the resource room setting for language arts for approximately 1 year. Before this placement participant 4 was in an Emotionally Disturbed (ED) classroom for 6th grade and half of 7th grade, but due to teacher recommendations, he is no longer in the ED classroom. He does struggle with disruptive behavior such as, throwing objects, making noises at inappropriate times, and oppositional tendencies.

Participant 5 is a 15-year-old African American male and is classified as OHI. He scored a 200, proficient, on the NJASK and is 2 grade levels below based on the Fountas and Pinell Benchmark Assessment System. He has been in a resource room for language arts since 5th grade, but all other subjects are in regular education classrooms. Participant 5 was recommended for either the ED classroom or a classroom designed for disaffected students, but neither of the recommendations were approved by his parents. He cares for multiple elderly family members at home and is often more concerned with what is happening in his home life than what is happened in his classes. This causes many assignments to go incomplete in all of his class leading to poor grades and motivation.

Participant 6 is a 13-year-old African American female and is classified as being communication impaired. She scored a 189, partially proficient, on the 7th grade NJASK and has a reading comprehension 1 and ½ grade levels below based on Fountas and Pinell Benchmark Assessment System. She has been in a Language Arts Resource Room since 7th grade against parent request. She is a proficient writer although she does struggle with

organizing her ideas in a timely manner. However, she is stronger in other subjects and receives no modifications in all other regular education classrooms.

Participant 7 is a 14-year-old Caucasian male and is classified as having a SLD. On the NJASK he scored a 168, partially proficient, and was 2 grade levels below in reading comprehension and fluency based on the Fountas and Pinell Benchmark Assessment System. Participant 7 also struggles with written language ability, number sense and math skills. He has been in a resource room for language arts and math since 6th grade. All other subjects are in regular education classrooms, but all assignments are modified to his ability level in reading and writing.

Participant 8 is a 14-year-old Russian male and classified as having a SLD. On the 7th grade NJASK he scored a 159, partially proficient, and was 2 grade levels below in reading comprehension and fluency on the Foutnas and Pinell Benchmark Assessment System. He has been in a resource room for language arts and math since 4th grade. All other subjects are modified in regular education classrooms. He struggles heavily with written language and understanding complex texts. Participant 8 was born in Russia and immigrated when he was 4 years old. He was enrolled in an ESL program from 1st to 5th grade. From 5th grade to the present, he has been enrolled in a one-on-one speech therapy program that meets once a week for 45 minutes.

Variables and Instruments

The effectiveness of graphic organizers to improve reading comprehension for students with SLD, OHI, and CI was measured using the Popplet Lite App. The app allows students to create their own graphic organizers based on how they feel comfortable organizing information. Students were required to find at least one piece of

information per section of each article and required to upload this information using the app.

Instructional Materials. The Popplet Lite App is a free iPad app that allows students to create graphic organizers. The app allows students to create as many boxes for information as they would like. Boxes can be typed in, manually written in (using a stylus), or can even have a picture uploaded into the box. All boxes and type can be color-coded and moved up, down, left or right to help students create their own unique graphic organizer to best help them keep track of important information. As it is a lite version of the app, it does not allow students to save their completed graphic organizers directly to the Popplet Lite App. To counter this, students were able to save a picture of the graphic organizer to the iPad photo reel. After the participants saved a picture to the iPad they were using, they uploaded the picture of the graphic organizer to Google Drive App. This is where they shared their graphic organizer with the class and the teacher. The teacher provided 160 minutes of training on how to use an iPad correctly, how to create a graphic organizer using the Popplet Lite App and how to upload and share their graphic organizer to the Google Drive App. Scope Magazine (Scholastic 2014) has articles ranging from a 6th-8th grade reading level and has a wide variety of high interest nonfiction and fiction text in each issue. Each article in the magazine aligns with the Common Core Standards and has specific standards that students should be able to achieve after reading the article and completing activities listed. These goals include finding the main and key ideas, comprehension and integrating knowledge and ideas.

Measurement materials. This study used two measurement materials, a 10-question quiz and a student survey. The 10-question quiz is created by Scope Magazine

(Scholastic 2014) to be used in conjunction with the text. The quiz contains a variety of questions that are based upon key concepts in the common core such as the main idea, the author's message, and critical thinking skills about the text read. The quiz was given during the baseline and intervention stages after each student read the text assigned. Each quiz had 10 questions, with 8 multiple-choice questions and 2 short answer questions.

The teacher created the student survey that is utilized in this study. The survey includes 10 questions designed to determine student's satisfaction in using the graphic organizer app Popplet Lite, iPads and the Google Drive app to enhance reading comprehension. The survey questions use a scale of 1-5 with 1 being not satisfied and 5 being highly satisfied. The survey was read aloud to all participants after the completion of the study. This survey will help the teacher decipher if the use of these materials was satisfying and worth continuing in future classes.

Research design

This study used A-B phases in a single subject research design. During phase A, students were given an article to read. Once students finished reading the article they were instructed to complete a 10-question quiz. Students were given the option to look back through the article in order to help locate the correct answers for each quiz questions. Scores from these quizzes were collected as Baseline data. This phase lasted 5 weeks. One article and quiz were given at the beginning of the designated language arts period on Friday of each week. Phase B lasted 8 weeks. Students were instructed to use the iPad and apps to create a graphic organizer while they were reading an article. After reading was completed they received a 10-question quiz. For this quiz, they could use their graphic organizer as well as look back through the article to help find the correct

answer to the questions. Student quiz scores at the end of phase B were compared to the baseline data in order to measure growth in reading comprehension.

Procedures

This study took place over 15 weeks. The classroom teacher in a language arts resource room setting conducted the study.

Instructional Procedures. Throughout the study students were split into two groups of four and met on alternating days. During the first five weeks of this study, students received a Scope article and a quiz once a week. During these first five weeks, the teacher collected baseline data on each student using their quiz scores. Students were instructed to read the article and complete the quiz while completing the quiz students were instructed to look back through the article to find the correct answers.

During weeks 6 and 7, the teacher modeled how to use an iPad responsibly and efficiently as well as how to access and use the Popplet Lite App and Google Drive Apps. Students were shown how to find important information while reading the Scope Magazine and different ways to create a graphic organizer using the Popplet Lite App and the specific information. Students were also shown how to upload their saved graphic organizers to Google Drive and how to share it with their classmates and teacher. During weeks 6 and 7 groups met twice a week for a total of four times before starting Phase B of the study.

Phase B lasted 8 weeks (weeks 8-15) and students continued to use iPads and interventions shown during the modeling phase. Students were instructed to use the graphic organizer they created to assist them in answering questions on the quiz as well as being able to go back through the article to find the correct answers. During phase B,

the teacher provided minimal support as students read an article and created a graphic organizer using Popplet Lite about the text. Once they completed the quiz, students uploaded their graphic organizers to Google Drive.

Measurement Procedures. Comprehension quizzes were given after each article was read. Students were able to look back through the article to find answers during the first stage, weeks 1-5, and while during the modeling and intervention stages, weeks 6-15, they were able to look back through the article as well as use the graphic organizer they had created. There was no time restriction given on completing the quiz.

A student survey was given shortly after the end of the study to determine student satisfaction with using graphic organizers, iPads and apps to enhance reading comprehension. No time restriction was given while completing the survey.

Data analysis

Scores were recorded after each reading comprehension quiz. All scores were entered into a spreadsheet and were later entered into a graph. The scores from the baseline phase were then compared to the scores from the intervention phase. Comparing the scores from the two phases helped to determine if graphic organizers paired with technology succeeded in enhancing reading comprehension among the special education population.

Chapter IV

Results

All participants showed an increase in their mean scores. The use of graphic organizers paired with technology helped to improve all scores.

Participant 1. Results for participant 1 are shown in Figure 1. The mean of reading comprehension questions answered correctly was 2.6 questions out of 10 for baseline data. During the intervention, participant 1 had an increased mean of 5.75 questions correctly with a range of 5-9.

Participant 2. During the baseline phase, participant 2 received a mean score of 2.6 questions answered correctly. With an increased range of 6-9, participant 2 had a mean of 7.375 during intervention phase. Results for participant 2 are shown in Figure 2.

Participant 3. Participant 3 had a mean score of 4 during the baseline phase. During the intervention phase, participant 3 increased her mean score to 8.125 and had a range from 6 to 10. Figure 3 shows participant 3's results.

Participant 4. During the baseline phase, participant 4 had a mean score of 4.2 while during intervention phase he earned a mean score of 7.875. His scores ranged from 6-10, which led him to have an increased mean score during the intervention phase. Participant 4's results are shown in Figure 4.

Participant 5. Participant 5 had a mean score 5 throughout the baseline phase. His mean increased to 8.25 during the intervention phase. He had a range of 6-10 and his results can be found in Figure 5.

Participant 6. Participant 6 scored a mean score of 5 during the baseline phase and earned an increased mean score of 7.625 with a range of 6-9. Results for participant 6 are found in Figure 6.

Participant 7. During the baseline phase, participant 7 had a mean score of 4.2 correctly answered questions. His score increased to a mean of 8 during the intervention phase with a range of 6-10. Results for participant 7 are shown in Figure 7.

Participant 8. Participant 8 had a mean score of 2.8 throughout the baseline phase. During the intervention phase his mean score increased to 7.375 with a range of 6-10. Participant 8's results are found in Figure 8.

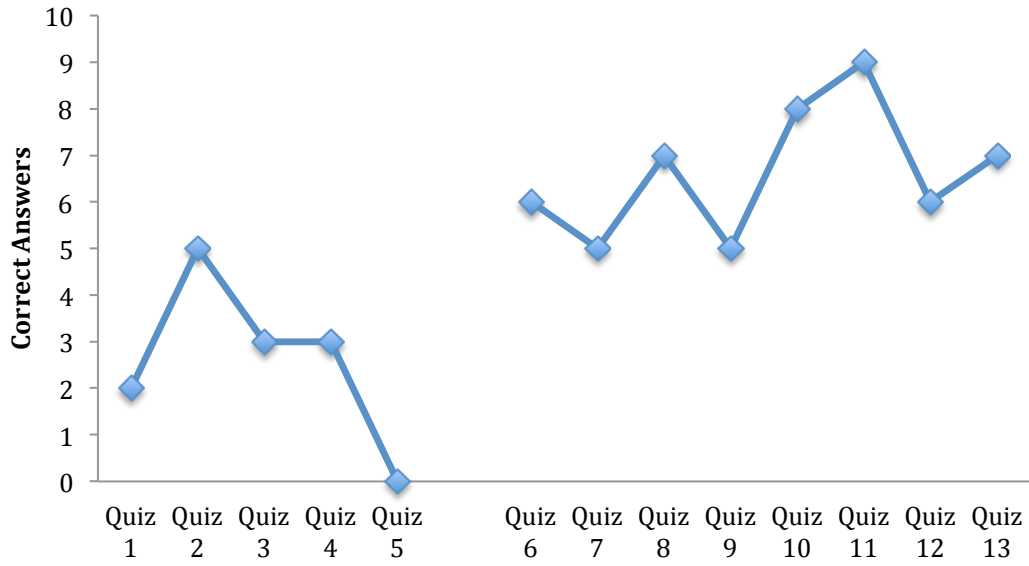


Figure 1. Participant 1 baseline and intervention comparison

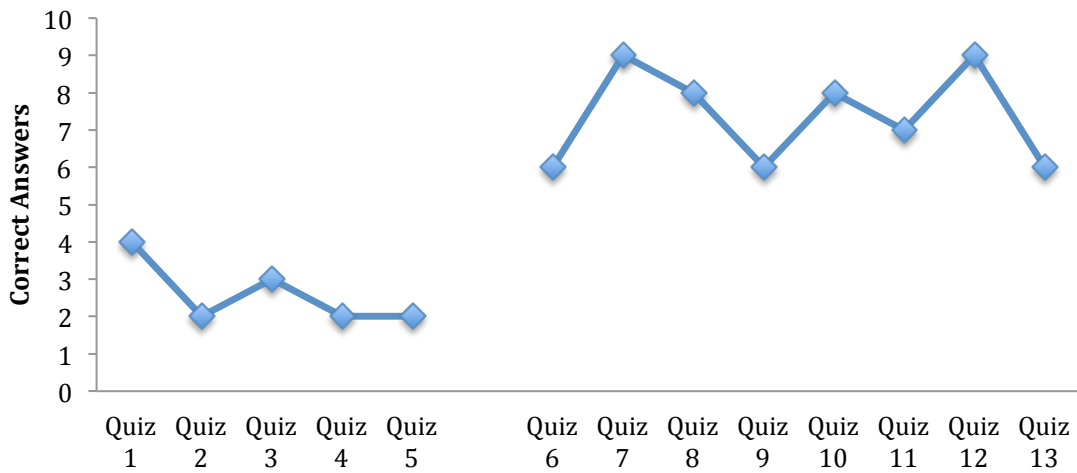


Figure 2. Participant 2 baseline and intervention comparison

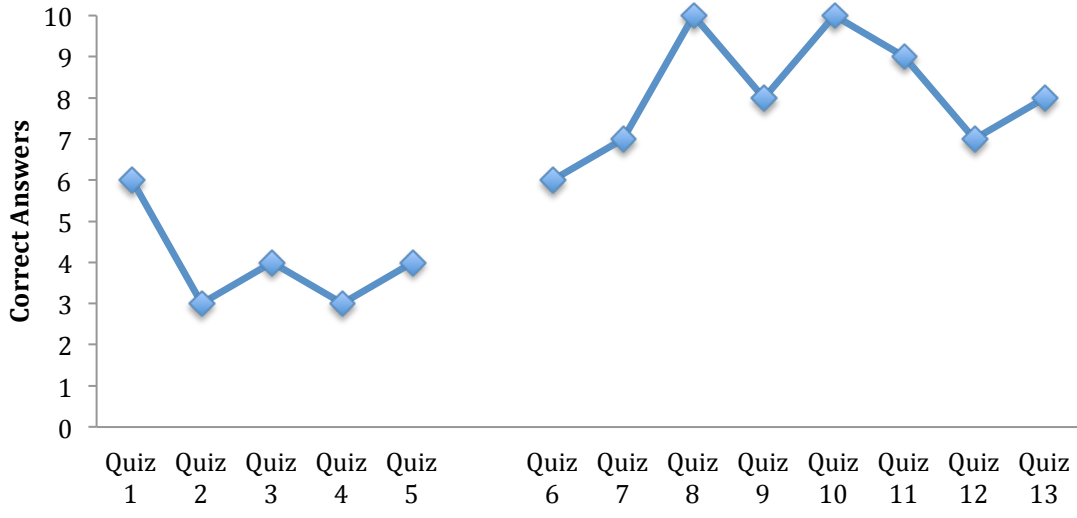


Figure 3. Participant 3 baseline and intervention comparison

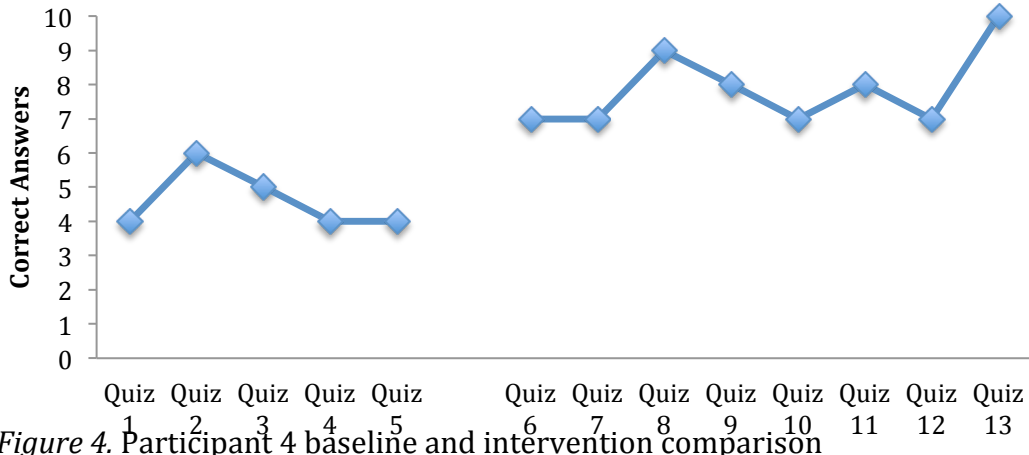


Figure 4. Participant 4 baseline and intervention comparison

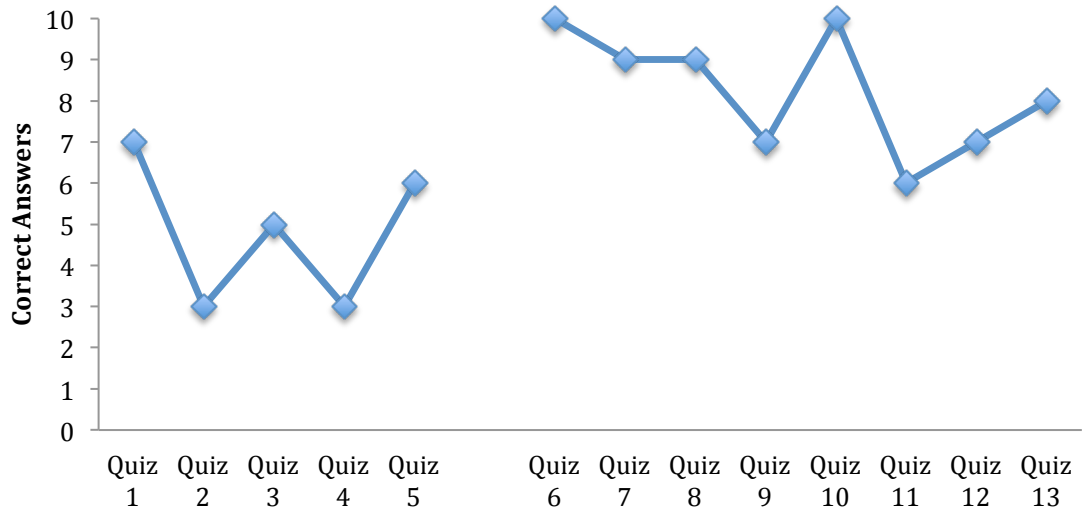


Figure 5. Participant 5 baseline and intervention comparison

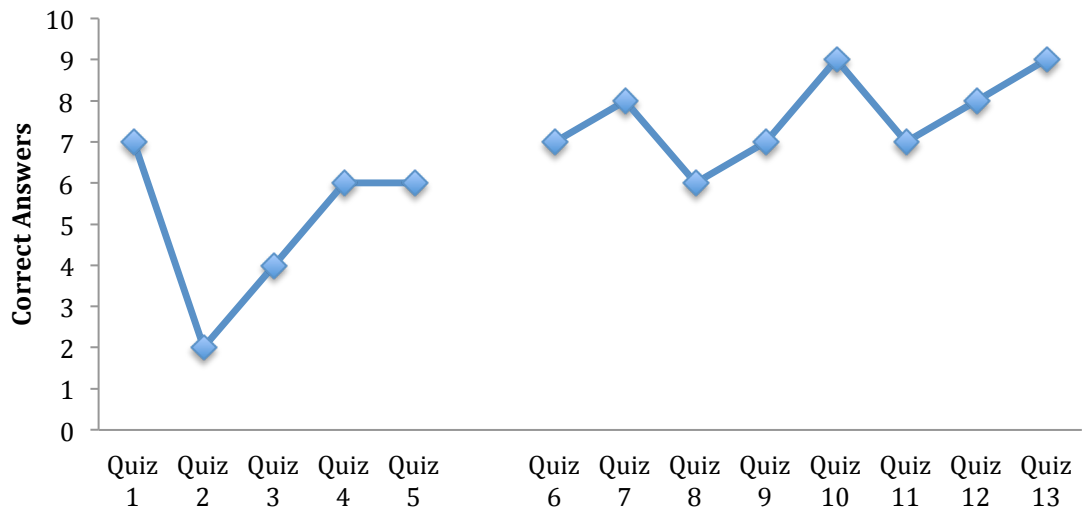


Figure 6. Participant 6 baseline and intervention comparison

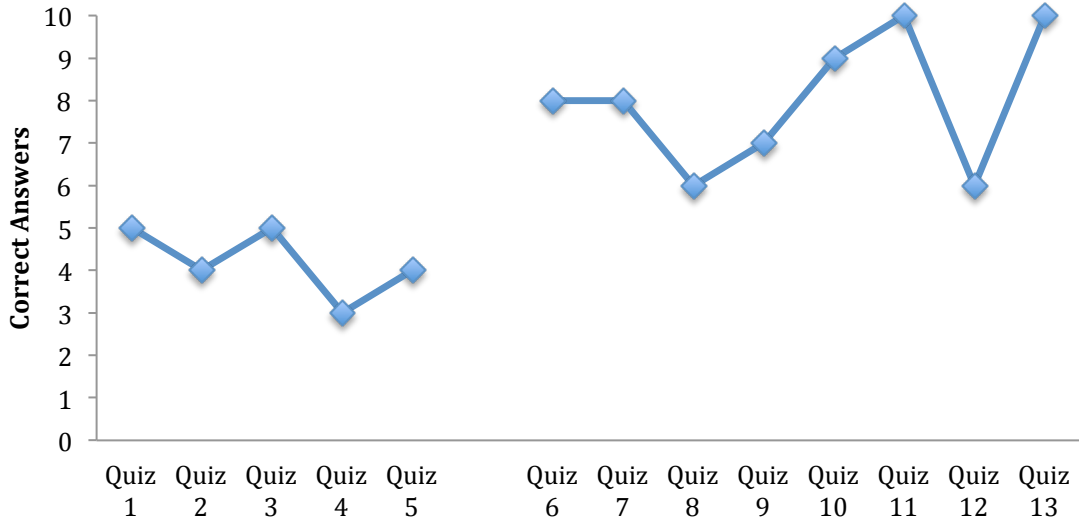


Figure 7. Participant 7 baseline and intervention comparison

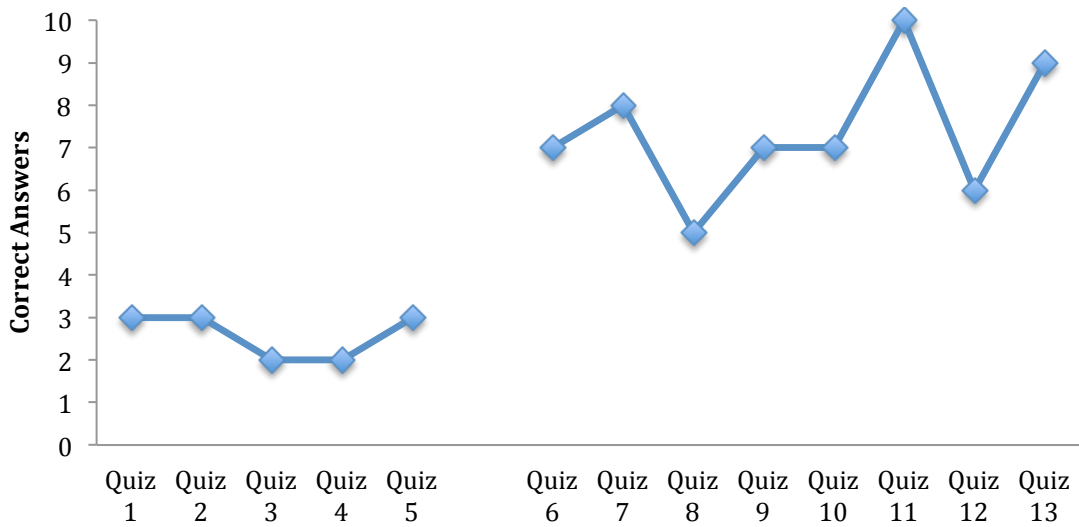


Figure 8. Participant 8 baseline and intervention comparison

Chapter V

Discussion

The purpose of this study was show that using graphic organizers paired with technology could enhance student reading comprehension. The eight 8th grade participants were given an article from Scope Magazine and a 10-question baseline quiz once a week for 5 weeks to measure reading comprehension. After baseline data was collected students were split into two four person groups and groups met on different days due to limited iPads. For two weeks the teacher worked with the students to show how to use an iPad correctly and how to use the Popplet Lite and Google Drive Apps. For the following 8 weeks, each group read the same high interest non-fiction article from Scope Magazine and completed the 10 questions comprehension quiz.

When comparing the baseline data to the intervention data for all students, the results showed that graphic organizers paired with technology did enhance student reading comprehension. On average, students answered 3.622 more questions correctly during the intervention phase than during the baseline phase. Participant 6 made the least amount of growth with an increase of only 1.625 more questions answered correctly. However, participant 6 is one of the most proficient readers in the class and during baseline data scored on average answered 5 or more questions correctly.

All other participants answered 3.15 more questions correctly when comparing the intervention data to the baseline data. Participant 2 gained the most from the intervention with 4.775 more questions answered correctly compared to the baseline data. During data collection of the baseline, participant 2 answered on average 2.6 questions

correctly while during the intervention phase she answered on average 7.375 questions correctly.

Exposure to graphic organizers paired with technology enhanced student reading comprehension. This study supports the adaption of technology in a classroom setting based on the findings. In addition to these encouraging results, participants stated that they enjoyed working with iPads instead of traditional laptop and desktop computers. Participants liked being able to use a form of technology that was more similar to those that they have at home. Participants also stated that they enjoyed being able to move around the room more freely with the iPads compared to staying relatively stationary with desktop or laptop computers. This may further enhance a student's desire to use graphic organizers when the process is more enjoyable.

One limitation of this study was that there were only 8 participants whom were all in 8th grade. To fully show that graphic organizers paired technology can enhance reading comprehension; the study should be conducted with more participants. These participants could be across multiple grades to ensure that the results can be duplicated in any grade level.

Another limitation of this study was the amount of time that student took to type on the iPads. Even though all participants were accustomed to using iPads, participants were not accustomed to typing on them. The Popplet app did give users a choice on typing or drawing/uploading a picture but all participants found it difficult to draw a picture without a stylus and that the upload speeds were very low and the picture did not fit inside the box correctly. Therefore, all participants typed their notes. Some suggestions would be to specifically practice typing on the iPads before starting the

intervention phase, purchase keyboards for the iPads as participants are more accustomed to a standard keyboard, or to purchase a stylus to allow students to draw pictures instead of typing their notes.

Lastly, the cost of an iPad is very high and being able to have enough for a group of students is very difficult. There are other tablets that may be comparable to an iPad such as a Kindle Fire or Google Nexus. These tablets cost significantly less than an iPad and may be a better option based solely on cost.

Further research is needed to find other Applications using different tablet devices. For example, this study used an iPad application called Popplet however this application is not available on Android devices. Therefore further research is needed to find a graphic organizer application on other devices that can also enhance the student reading comprehension.

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