READING IN A TECHNOLOGICAL WORLD: COMPARING THE IPAD TO PRINT

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A Thesis

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The key to improving reading education is to continually assess the most effective methods and strategies. Since the beginning of reading education, paper-based texts have been the focus of, and the tools used with, instruction. However, technological advances could possibly alter the world of reading instruction—and much more quickly than previously thought. In the past years, the electronic book has emerged and poses drastic changes to the paper-based text’s place in the school. In an ever-evolving technological world, more and more schools are choosing to adopt solely electronic texts. Instead of heavy textbooks and full classroom libraries students are now experiencing iPads and iBooks. Due to the fact many schools are moving toward an electronic curriculum, it is important to evaluate the effectiveness of these new literacies. Therefore, this study was developed to answer the following questions: Is a second grade student’s silent reading comprehension affected when using an electronic reader? Also, how do these students feel about the electronic reader and its use? Data was collected through a short experience survey and comprehension quizzes administered in a second grade classroom of 18 students. The results of this study demonstrated no significant statistical difference between the comprehension of students using the iPad and those reading from a printed text. However, surveys and observations demonstrated an increase in engagement when using the electronic reader in the classroom.
DEDICATION

The efforts of this thesis study are dedicated to the 2011-2012 Reading Graduate Students. May this study encourage the integration of technology into future classrooms across the globe.
ACKNOWLEDGMENTS

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CHAPTER I. INTRODUCTION

Reading is the foundation of instruction and classrooms across the nation. Reading opens doorways to learning, opportunity, and joy for students. Today, many classrooms have large libraries containing adventurous chapter books and boldly colored, enticing picture books. Students select books from these libraries and physically turn page to page as the story they are reading develops. However, throughout the course of history, these books have evolved drastically. From clay tablets to the simple stories of Dick and Jane in the early 1900s, the book itself has transformed (Haskins, 1998). The book in the 21st century has been no exception to this continual change. In an ever-advancing world of technology, the book (one with paper pages and front and back covers) seems almost obsolete. Technology is changing the way books are read—books are being transferred into electronic devices. Electronic shelves, similar to those in the local library, now contain electronic copies of the books students and adults read on a regular basis. There is no longer a need to purchase actual copies of textbooks and/or printed books. The introduction of the electronic reader might transform the way students read forever.

Statement of the Problem

To remain an effective teacher of reading, one must continually explore and assess the developments within the field. For years, reading was taught using a physical text and the turning of pages. However, with the push of technology in the classroom and a quickly-developing technology field, students and teachers will soon be faced with electronic libraries. A variety of options are available, including The Kindle, The Nook, The iPad, The Sony Reader, and simply text online. Schools districts nationwide are considering the elimination of textbooks and books and are researching the purchase of electronic readers. Although technology integration is considered both motivating and effective, the question remains if the electronic
book provides the best method of reading and comprehension for the student. Although the electronic book is quickly heading to the forefront, it has yet to be established as an effective tool in a student’s learning.

Research Questions

Students are surrounded by technology in a variety of ways in their daily lives. They interact and utilize technology multiple times a day both within and outside the classroom. There is no doubt the integration of the electronic reader would expose students to more technological advances and uses. This could also prove motivating for students who do not particularly enjoy reading. However, if schools and districts are going to fully implement the e-reader and spend the funds necessary to obtain them, it becomes necessary to determine whether students prefer these electronic books and if they perform as well comprehending these new versions of textbooks. An effective reader makes meaning from the words on a page. One who reads without comprehension is simply word-calling—not truly reading. To become an effective reader and to continue life as such, students must learn to pull meaning from all texts they encounter. The questions remain that if a student is facing an electronically based text, is comprehension altered by this technology? And once again, is this truly what the students want to see in their classrooms for the rest of their educational experience? Considering the students and their reading preferences and performances, this study was developed to answer the following questions: Are second grade students’ silent reading comprehension affected when using an electronic reader? Also, how do these students feel about the electronic reader and its use?
Rationale

The analysis of the e-reader (or more specifically, the iPad in this study) is necessary to understand its effectiveness in the classroom. Educators nationwide need to understand its effects on students’ motivation and comprehension to confidently integrate it into the teaching of reading. School districts and school boards push for the integration of technology into the curriculum and many are contemplating eliminating textbooks and purchasing electronic books or e-readers. When using school funding to purchase these items, which at times can be costly and high maintenance, the purchase needs to be made with full confidence. To establish the faith of both the district and the teacher of reading, more research into the validity and benefits of the electronic book and a student’s desire and ability to read from them is necessary.

Definition of Terms

The following list includes words that are relevant to the study and their definition. These terms will be referenced throughout the study. To fully comprehend the following study the understanding of these words is necessary.

Electronic Reader (E-reader): “A reading device that allows the consumer to read text on an electronic tablet” (Davis, 2009). An electronic reader is any electronic device, (i.e. iPad, Nook, Kindle, etc.), from which an individual can read an electronic book.

Printed Book: This term will refer to the actual paperback book that the students will be reading during the study. They will read the printed version of the book before reading the electronic version.

iPad: The iPad is an electronic device that will be utilized in this study as the e-reader. It is a creation of Apple Inc. and contains the iBook application, from which students can purchase and read books electronically.
iBook: An application on the iPad which allows the user to access and download a variety of books directly to the device. The iBook application will provide the electronic book in this study that will be read by the students.

Limitations

The actual number of participants proved a limitation to the results of the study. With a sample size of 18, the results might not be an accurate representation of the population of all second grade students. The students included in the study were from a middle- to upper-class school district in northwestern Ohio. Due to the location, the classroom of students was composed of little to no ethnic diversity. Because of this, once again, the results of this study may not be an accurate representation of all second grade students.

A final limitation of the study was the level of the book chosen. The text used on both paper and the iPad was a second grade level text. Due to the distinct different needs of all children, this could possibly alter the results. If the proper resources were available, each student would read a book at his/her independent level. The creation of the electronic book is a fairly recent occurrence. Because of this, there are a limited number of books available for purchase for the students to read—this places a constraint of the reading material. The student results are directly comparable as they will be reading an identical text on both the iPad and paper, but unfortunately the text was not necessarily at an appropriate level for the student.
CHAPTER II. REVIEW OF LITERATURE

In the past years, there have been a number of studies on the integration of technology into reading and reading instruction. However, there have been limited studies on the implementation of recent electronic readers in the classroom and their effects on comprehension and motivation. This study was designed to answer the questions: Are second grade students’ silent reading comprehension affected when using an electronic reader? Also, how do these students feel about the electronic reader and its use? The following chapter highlights theories, and historical and contemporary research surrounding the topic of electronic readers in the classroom and their effects on silent comprehension and student motivation.

Theoretical Orientation

Reading Comprehension

According to Lapp, Flood, and Farnan (1996), comprehension is the process by which a person is able to create meaning while reading written language. The RAND Reading Study Group stated that comprehension is “the process of simultaneously extracting and constructing meaning through interaction and involvement with written language” (as cited in Pardo, et al., p. 279). There are a variety of accepted explanations of reading comprehension, but nearly all agree that it includes the reader establishing meaning from a text. Comprehension occurs only when there is a transaction between the reader and text. Reading without comprehension is simply “word-calling” (Rosenblatt, 1978). For an individual to truly read a text, one must comprehend the information in the message being portrayed. Therefore, comprehension is a necessary aspect of reading. Gambrell, Block, and Pressley (2002) believe it is the most important element.
To develop an understanding of a text, each reader brings his/her prior knowledge to the reading. Pardo (2004) believes “the more background knowledge a reader has that connects with the text being read, the more likely the reader will be able to make sense of what is being read” (p. 1). The process of connecting previous knowledge and experiences to new situations and text takes place through a network of connections known as schema (Anderson & Pearson, 1984). According to Rumelhart (1980), a schema is the organized knowledge that one has about people, places, things, or events. In schema theory, comprehension primarily involves activating or constructing a schema that accounts for the elements in the text (Anderson & Pearson). It also involves the storage of information into long term memory (Pressley, 2003). Once the reader encounters an element of the text, (heading, title, etc.), he or she brings the corresponding information from long term to short term memory. This allows the reader to utilize prior knowledge (schema) to comprehend a text (Pardo). To develop comprehension skills, teachers must model and assist students with the activation of their prior knowledge and schema.

Decoding skills, fluency, and vocabulary are all elements of a student’s comprehension (Pardo, 2004). Additionally, to fully understand a piece of writing, the student must also understand text structures. Text elements such as headings, italics, and punctuation play a crucial role in the reader’s portrayal and understanding. Comprehension is not a skill that always occurs naturally. It can be affected by a number of outside forces and is a skill that must be taught, developed, and practiced (Gunning, 2007).

**Motivation in Reading**

Motivation is an enormous factor in the process of reading for both adults and children. According to Guthrie and Wigfield (2000), “motivation is crucial to engagement because motivation is what activates behavior. A less motivated reader spends less time reading, exerts
lower cognitive effort, and is less dedicated to full comprehension than a more highly motivated reader” (p. 406). Motivation is key in the development of lifelong readers and learners and can be quite a hindrance if not handled effectively in the classroom.

Theories and conceptualizations of motivation have been revolutionized over the years. According to Weiner (1992), early theories characterized motivation as a one dimensional quality of which “more is better and less is worse” for learning and performing school tasks. Within the view, motivation is considered temporary and task-specific. However, in the past 30 years, researchers have found that motivation is multifaceted—especially with regard to reading.

Intrinsic reading motivation refers to an individual’s enjoyment of reading activities that are performed for their own sake (Deci, 1992) and pursued during free time. Intrinsic motivation can also be characterized by an inner disposition to perform activities. Deci suggested that intrinsically motivated activities consist of excitement, interest, and enjoyment within the participant. Wigfield and Guthrie (1997) further developed upon these consistencies and add that when reading, curiosity, and involvement are also present. Students who are intrinsically motivated to read will read more often than their peers and will not do so simply for an assignment or any other outside pressure.

Extrinsic motivation for reading is the “desire to receive external recognition, rewards, or incentives” (Guthrie & Wigfield, 2000, p. 68). Incentive programs within classrooms or schools, such as pizza parties, stickers, or any other prizes, drive students that are extrinsically motivated. These students are motivated based on outside circumstances. When teaching reading and molding lifelong readers, it is important to remember to reach each type of motivated student—as a variety will be present in the classroom.
According to Brozo and Flynt (2008), teachers must include a variety of texts within classroom libraries and provide an abundance of new opportunities and real life applications to motivate students to read. They must also foster a love for reading, modeling good reading behaviors in their own lives. Motivating students to read is half the battle—this battle can be fought, however, utilizing a variety of technological tools.

*Technology as a Motivational Tool*

Adults and children alike are immersed in a world of technology. Individuals spend hours utilizing computers, cellular telephones, and iPods on a daily basis. Technological advances have seemed to ease the daily living of people across the world and there is now a significant push for technology integration into the classroom (Pearman, 2008).

Many students have the outlook on the classroom as a “technology-free zone.” In many classrooms today, paper and pencil assessments are still administered following a lecture demonstrated on an old-fashioned chalkboard. But, the classroom does not have to be technology-free—advances such as the iPad, SmartBoard, and other classroom friendly tools have opened a window of opportunity for students worldwide. With the implementation of technology arrives a new student motivation, a change from the “norm” of old-fashioned classrooms (Pearman, 2008).

After conducting interviews and observations in classrooms, Leu, Leu, and Coiro (2004) stated that teachers around the world noted a change in their students after the implementation of technology. Teachers noted a greater enthusiasm and excitement for learning challenging material when utilizing technology. Leu et al. observed students arriving to class early and staying later simply to complete academic tasks with technology integration. Boles (2011) also discussed technology as a motivational tool in the classroom. During a science lesson she stated,
“They [the students] are much more motivated to do the investigating because using software is more interesting and more entertaining” (p. 42). Technology cannot solely provide outlets for more effective learning and multimodal pedagogy. It can also be utilized as a motivational tool to interest students in all areas of content learning.

Educational Factors Influencing Reading Performance

The use of various teaching methods, materials, and strategies has been the subject of debate for decades. From initial investigations regarding oral reading versus silent reading, and phonics versus whole language versus sight words, researchers have sought to determine what are the significant factors that impact performance in a reading classroom. The most notable of these studies was the First Grade Studies (Bond & Dykstra, 1997).

The First Grade Studies (Bond & Dykstra, 1997) was one of the first comprehensive studies of how young children begin to read. The main goal of these studies was to answer the question: “To what extent are various pupil, teacher, class, school, and community characteristics related to pupil achievement in first grade reading and spelling?” In other words, these studies sought to find what elements affect a student’s achievement in reading and writing (Bond & Dykstra). Bond and Dykstra implemented a number of reading and spelling instructional methods into a number of first grade classrooms. After further analysis, it was discovered that there was a distinct difference in the classrooms, but not necessarily amongst the methods (Bond & Dykstra).

Prior to The First Grade Studies (Bond & Dykstra, 1997), no studies had been conducted on the interaction between student and teacher. The analysis of the data found that “reading programs are not equally effective in all situations” (p. 33). The results also found that a combination of instructional methods is most effective when teaching reading—but most
importantly, they also demonstrated that the teacher is what matters most. Bond and Dykstra sought to discover the most effective instructional strategies for teaching reading. What they discovered was that regardless of the pedagogies and methods used, the interaction between the student and the teacher inevitably makes the biggest difference.

Chan (1994) also sought to identify factors that affect performance in the classroom by analyzing the relationship between reading motivation and achievement. To do so, she recruited 104 fifth grade students, 133 ninth grade students, and 101 ninth grade students for a five-week long study. Using four different scales, she measured motivation, metacognition, and reading achievement of each student. These assessments were administered over a two-week span. Student use of reading strategies and behaviors were also observed (Chan).

Several findings emerged from Chan’s (1994) study related to the correlation between student motivation and reading achievement. According to Chan, the results “provide empirical support for a close relationship between motivation and learning” (p. 319). In general terms, students who are motivated to read have higher reading achievement scores. Chan also found that the students in the elementary grades seemed to have less intrinsic motivation to read both in and out of the classroom.

Ahmad, Prevaiz, and Aleem (2010) delved even further into factors affecting a student’s overall academic performance. Their “study [was] conducted to identify the factors which are important for the effective learning of students and [to] enhance the quality of education” (p. 1). The researchers recruited a sample population of 250 students, 83 males and 167 females. At the beginning of the study, a questionnaire was distributed analyzing student attitude and performance toward academics as well as outside involvement. The participants’ GPA (grade point average) and performance in selected content areas were analyzed throughout and at the
conclusion of the study. Additionally, the teachers of the individuals were analyzed in regard to attendance and punctuality. At the end of the study, a number of overarching concepts were concluded.

From the results, Ahmad, Prevaiz, and Aleem (2010) concluded that a number of outside factors affect a student’s academic achievement. As in the First Grade Studies (Bond & Dystrka, 2007) the researchers discovered that the teacher made a significant difference in a student’s academic performance. The researchers noted:

The impact of the teachers' Regularity and Punctuality is found to be positively significant with the second highest coefficient 1.284. It provides the strong evidence that the students’ performance is highly affected by the regularity and punctuality of the teachers. (p. 3)

The researchers also concluded that participation in extracurricular activities and a mother’s education affects a student’s academic performance. In regard to participation in extracurricular activities, the affect is almost always positive—most students in the study that participated in an outside activity received the highest GPAs. The study demonstrated that a mother’s education can have both a positive and negative effect on academic performance. The more education a mother holds the more likely a student is to succeed academically. However, this remains a factor for mothers that have little to no education. In the study, the students of mothers with a lesser education performed at a lower level than that of their peers. Ahmad, Prevaiz, and Aleem demonstrated that throughout a student’s learning experience a number of outside, uncontrollable factors can hold both positive and negative effects on academic achievement. These factors are can influence any student regardless of innate ability or motivation.
White, Reynolds, Thomas, and Gitzlaff (1993) found that socioeconomic status is yet another contributor to achievement or failure of students in an academic setting. During their study conducted in 1993, White et al. compared individual student achievement to a pre-determined (SES) socioeconomic status. The data information on the student’s household income/SES was obtained through the attending school. The data were collected on approximately 300,000 students in 22 districts. The districts were of diverse backgrounds in regard to both race and funding. The selected students were also diverse in this nature. During this study, White et al., collected the necessary information and conducted an analysis comparing each student’s individual, as well as each districts overall, performance on two statewide math and reading standardized tests. An analysis of the date demonstrated that, although modest, knowledge of a student’s SES provides assistance in determining performance.

Emergence of Technology in Reading Classrooms

The reading classroom has been developing dramatically throughout previous decades. New approaches, research, and strategies have emerged changing the look of reading instruction. Most recently, the development of technology has played its role in the evolution of the reading classroom. With evidence supporting the idea that technology is motivating and mainstream for students today, a significant push for technology integration into reading has emerged. Technology is now becoming mainstream in both a student’s educational and personal life. The road has been a long one, however, for technology to make its way into the classroom today.

Hane (2004) reports, “In 1971, Michael Hart typed the text of the US Declaration of Independence into a mainframe computer at the University of Illinois, creating the first electronic book” (p. 1). This was the start of Project Gutenberg, an effort to create a free public library of e-books. Named for Johannes Gutenberg, the inventor of movable type, Hart dreamed of having
millions of texts online and that were easily accessible to the public. From 1970 to 1997, 313 books were added to this library. The project’s popularity progressively grew, with 313 books added in the first 11 weeks of 2004 and its 10,000th book added in 2003 (Hane). Hane wrote, “Hart earnestly believes that public domain content and e-books are the best possible path for worldwide literacy” (p. 52). He also stated that electronic text was a “neo-industrial revolution” (p. 52). Lastly, Hart stated that he hoped to see the electronic library on all PDAs (personal digital assistants). Hart had a dream to bring electronic libraries to the masses; this project set the wheels in motion for electronic texts across the globe.

In 1985, Reinking and Schreiner completed a study which analyzed students’ reading comprehension when reading on a computer screen versus reading a printed text. The researchers compiled three treatment groups and one control group—104 fifth and sixth grade students composed the four groups. Group 1 read text offline. Group 2 read text online. Group 3 read text online but was able to utilize other functions on the computer to aide comprehension. Group 4 also read online and were forced to utilize functions on the computer. After the study was conducted, it was apparent that Group 4, (those who had utilized all functions of the computer), demonstrated greater comprehension of the text read than all other groups. The group that yielded the worst results was Group 1—the group that only had printed text to read. The researchers hypothesized that the computer would provide “a more interactive flow between the reader and the text”—in turn, increasing comprehension (p. 543).

Matthew (1997) sought to answer whether reading comprehension was affected by the actual reading of electronic text. In his study, students read from either a CD-ROM or print version of books. Students were then asked to retell the story as a means of measuring comprehension. Unlike other studies of this time, Matthew (1997) discovered that the use of the
electronic text actually increased the students’ comprehension. Matthew states, “CD-ROM storybooks provide a multisensory learning experience that enables students to literally interact with the text and illustration to actively process the text, both of which lead to personal understanding of the text” (p. 5). Students were more actively engaged when reading storybooks on the computer rather than the printed textbook versions.

This study (Matthew, 1997) demonstrates that the books read on the computer can provide a motivating and enriching reading experience, and in turn, provide a deeper interaction and understanding of the text. Matthew also discovered that, contrary to belief, the graphics and colors of the e-book were not distracting to the students (1997).

With the revolution of the World Wide Web came the discussion of reading hypertext (Altun, 2003). Any form of text read from an electronic device, such as computer screen, can be considered hypertext. More specifically, hypertext is a non-sequential (non-linear), electronic, textual, hypermedia, and interactive environment (Altun). In an era of efforts to “go green” and conserve resources, many schools and universities have made an effort to incorporate hypertext into the classroom and instruction. Because of this, many students were faced with an alternative form of reading—reading from the Internet. Many studies have been conducted on the effects of reading hypertext on a student’s performance and understanding. In 2003, Altun also examined the effects of hypertext on student performance. In this particular study, however, he focused on the effects of hypertext on English language learners.

This study was conducted in a reading and writing classroom at a mid-American university (Altun, 2003). According to Altun:

Since hypertext as an environment is a new way [at the time] of presenting text and is used to provide a real life context for academic reading and writing purposes, this study is
designed as an exploratory case study to approach the phenomenon within a real life context. (p. 2)

Six ESL volunteer students were selected to be a part of the case study—all were differing in gender, ethnicity, and English expertise. All participants, including the instructor, were given pseudonyms throughout the study. The students varied in age from 18 to 30-years-old and had been living in the United States for various amounts of time. Some students had many years of English language experience and others held hardly a few months. Each individual volunteered to be a part of the case study (Altun).

Altun’s (2003) data were collected over an 11-week span through observations, interviews, and questionnaires. Additionally, journal entries were requested of the students to provide further insight into the students’ opinions and abilities. The students were provided with 18 online web-based readings related to topics within the context of their concurrent reading/writing class. While reading these articles over the 11-week period, the students were asked to respond to the experience in their journals, while completing interviews, questionnaires, and being observed by the administrator of the survey. The overall purpose of the study was to determine how the undergraduates approach the reading of hypertext in an academic learning context. Also, the student comprehension of the hypertext was analyzed as well. The researchers wanted to examine the impact hypertext can have on a student academically reading for understanding (Altun). Altun further wrote:

The results showed that students' understanding varied depending on the presentation of hypertext readings. The findings suggested that students saw hypertext as a valuable bank of information when they were exposed to linear hypertext. When they encountered the non-linear hypertext, they perceived it as a maze and experienced disorientation. It is
concluded that neither computer nor text reading skills alone are an adequate basis to start using hypertext technology in language classrooms (p.1).

Altun’s study (2003) determined that although there have been many major advances toward technology integration in the classroom, that students need other skills outside basic reading skills to successfully read hypertext and other electronic texts. Students need training outside that of simply decoding words and deciphering meaning—there are a separate set of skills that are essential to reading hypertext. As an instructor, one must first teach the student how to use the device from which a text is being read. Without this direct instruction, the purpose of reading will be lost in translation (Altun).

In 2004, Maggie Bowden, entered the classrooms of two instructors, Jennifer Edge-Savage and Betty Lewing, to explore their uses of software to instruct and intervene in reading. Both teachers believe to have seen positive results from the use of these technological tools.

Ms. Edge-Savage utilizes a number of software tools to assist with reading instruction and activities in the classroom. To assist with spelling, Ms. Edge-Savage allows student to use a speaking spell check and speaking word processor to correct their own writing mistakes. The students speak into the technology and it transforms their speech into text—alleviating misspellings of words when writing. This word processor can also be used as an output for students when completing an assignment or test. Students that struggle with fine motor abilities and/or handwriting can use this technology tool as a method of answering extended response questions. This teacher also integrates digital books into her library. When using a digital book, the students are able to view an electronic version of the text on a computer or other hardware. This allows the students to familiarize themselves with hypertext as it becomes more
mainstream. Ms. Edge-Savage believes the use of these tools has had a positive effect on her students’ overall reading abilities and performance.

Betty Lewing uses technology in a similar fashion, but with students in grades 9-12. Ms. Lewing uses many commercial software products that allow her students to check spelling and models decoding words. Lewing also uses computer software as a comprehension tool. When using this feature, students are asked to use context clues and other skills to identify missing pieces of a paragraph, putting instruction and skills into practice.

Both teachers observed describe only positive effects on the integration of technology into the reading classroom. Both teachers have chosen to utilize the rapidly advancing technologies available to build upon one of the most crucial aspects of education—reading. As these technologies have been implemented in a variety of ways, the electronic reader has also been explored and integrated.

E-reader Research

With the introduction of mainstream e-readers such as the Kindle and Nook, many other current studies have emerged in regard to their place in the classroom. Similar to the previous studies, the following discusses the effectiveness and impact of the electronic reader on students across the nation and across the ages. As the technology advances, the studies continue, all focusing on this particular technology’s place in the academic world. The following focuses upon both benefits and risks of this implementation.

In 2008, librarians at Penn State created a partnership with Sony to assess the technology known as the Sony Reader (Behler, 2009). Sony, a large electronics company, donated 100 PRS-505 E-book Readers—their version of today’s electronic reader. The goal of the collaboration was to simply assess student attitudes and use of the electronic reader. The readers
were to be utilized in first year and graduate English courses but were also available for lending at the campus library (Behler). Some readers were also “tested in support of disability services, for students with visual and hearing impairments, but failed miserably in that setting” (p. 57).

Behler (2009) reports that after checking the e-reader out from the library, students were asked to complete a survey based on its usefulness and appeal. According to the results, the e-reader was “not a slam dunk” with the users (p. 57). Users reported a number of issues with the product, including unsatisfactory battery life, screen glare, slow refresh time when turning pages, and unreasonable price. The students did report the enjoyment of a wide library provided on the reader—but many only read one or two books during the lending period (Behler).

Behler’s (2009) study provided the students in both of the English classes with e-readers previously loaded with classroom content. After the duration of the class, the students, like the library patrons, were also asked to evaluate their experience with the e-reader. Much of their feedback mirrored that of the library patrons, revisiting issues such as battery life. However, the students were also interviewed by researchers and were videotaped (Behler). After analyzing the videotapes and responses, the researchers arrived at the conclusion that the students “read differently when using their Sony Readers instead of books: They felt more immersed in the text…” when not using the e-reader (p. 58). Many students stated that they would not “buy the product in the near future” and would “not use it outside of assignments” (p. 59). Another argument against the e-reader was that it does not seem applicable across all content areas. Although the students agreed to its benefit in reading, they believed it would be difficult to integrate this form of technology into math and science classes (Behler).

Although the student responses analyzed in this study were those of college students, the aspects of the e-reader itself are relevant across all grades. With this study, the researchers
looked at the practicality of the e-reader in the classroom and its effects on learning. This study discovered that although some student might have demonstrated excitement to utilities the e-reader, its place in the classroom has not yet been determined.

In 2010, Wines and Bianchi began a year-long study of e-readers. Unlike other studies that focus on sustainability and costliness of the e-reader, this study focused on how the devices impact learning. Forty students from two separate English 111 courses were provided e-readers from the California Lutheran University. These students were provided the Amazon version of the e-reader, the Kindle. Students were asked to download materials throughout the semester onto the device and course content was also pre-loaded for use (Wines & Bianchi). The ultimate goal of the study was to identify the role of the e-reader into reaching class objectives. For the English classes in the study, Wines and Bianchi identified the objectives as follows:

1. Learn to identify and write for varied audiences.
2. Learn and integrate at least 100 new vocabulary words.
3. Engage in deep reading.
4. Develop the ability to write original, well written academic essays. (p. 1)

At the end of the semester, each student user of the e-reader was asked to write an essay about his or her experience with the e-reader (Wines & Bianchi, 2009). After analysis of the essays, the researchers found that the “tying of e-reader functions to the course objectives had helped support and expand the most successful pedagogies” (p. 1). Many students met the course objectives by the end of the semester and were able to construct analytical essays involving the objectives as well. The instructors contribute much of the students’ success to the e-reader (Wines & Bianchi). Once again, the subjects of this study were of college age. Still, these results represent a different perspective and argument in regard to e-readers and their
effects on learning. Regardless of age or grade, there is opportunity to integrate the e-reader into the classroom as this study demonstrates.

According to Gable and Thompson (2011), e-readers have more educational value than previously thought by other researchers and teachers. Instead of utilizing full text in this study, Gable and Thompson compared information retention on text versus electronic readers using an article. The Apple iPad and Kindle, two e-readers currently on the market today, were used and analyzed during this study. The results demonstrated that the e-reader did not reduce the time necessary to read an eight to ten page article, but it did improve short-term memory retention. The results also demonstrated there was no significant difference in long-term memory retention than if the students were reading from a printed text (Gable & Thompson).

Although this may not seem much of a positive finding for education (due to the lack of difference in long-term memory), it does contradict previous findings which suggested the e-reader was a detriment to the classroom. However, Gable and Thompson (2011) did find that individuals are still faster using printed text than using electronic text. Gable and Thompson responded to this finding with “individual reading speeds will increase with more familiarity with the product” (p. 1)—noting that students that had previously used the device were much quicker when reading or using it.

Although this study provides a more positive outlook on the e-reader in the classroom, Gable and Thompson still believe it does not belong in elementary, middle, or even high schools. According to the authors, “I would recommend these most for collegiate use. They’re getting there, but they’re not there yet” (p. 2). Once again, this study yields results of both positive and negative aspects. This study demonstrates that student’s short-term retention might be enhanced
at the time of reading; however, the comprehension and retention becomes lost in the shuffle as time progresses.

Many individuals believe electronic readers hold the key to reading in the future. In 2010, Nielsen conducted a study on the reading of long form text of reading on electronic devices and in print. This was a within-subject study in which the subject’s reading speed was tested under four different reading conditions: iPad, Kindle, PC, and text. A total of 32 participants were used. On each device, the individual was asked to read a short text by Ernest Hemingway. Hemingway was a deliberate choice due to this engaging and understandable work. As the individual read the text, (whether in print or electronically), he/she was timed. On average, the text took each individual 17 minutes and 20 seconds to read (Nielsen).

After users read the story, they were asked to complete a brief questionnaire to test overall comprehension. According to the results, each individual scored about the same regardless of the device. This was a surprise to Nielsen (2010). The only major difference noted in the reading in print versus electronically was the time utilized to complete the reading. After analysis of the results, researchers discovered that the iPad measured at a 6.2% lower reading speed than print while the Kindle measured at a 10.7%. The main result of this study is the evidence that it takes individuals more time to read a text electronically than when reading in print (Nielsen).

After the entire study was completed and comprehension questions answered, the participants were asked to complete an interest survey based on each device (Nielsen, 2010). The users were asked to rate the devices on a scale of 1-7—7 being the highest score. The iPad scored a 5.8, the Kindle 5.7, and the printed book 5.6. The PC seemed to be the worst method of
reading amongst the participants—scoring a 3.6. Although users seemed to enjoy the e-books the most, the printed book was not far behind.

Many comments from the participants were expected, such as heaviness and unclear lettering (Nielsen, 2010). Also, individuals did not like that the Kindle did not demonstrate pagination; they wanted to know what page they were currently reading and what remained of the book. Also, the participants claimed that reading a printed book was simply more relaxing than having to deal with the changing technology of the electronic readers (Nielsen). Although the satisfaction scores were higher, it would seem from this study and user comments that the world simply is not quite ready for a print-free book.

According to Jones and Brown (2011), the movement toward instruction supported by computer-based technology is taking place in a midst of a major shift in the publishing industry toward that of electronic books. They devised a study to assess the effectiveness of the e-reader in the classroom. For this study, 33 third grade students completed satisfaction surveys and comprehension quizzes on three separate reading sessions: one traditional print book and two e-book titles. The main focus of the study was on the students’ engagement, as this plays a crucial role in the students’ involvement and comprehension of the text (Jones & Brown).

Jones’ and Brown’s study (2011) was composed of three phases. During Phase I of the study, students read a traditional print version of the *The Yellow House Mystery*—a book from the Boxcar Children series, one known very well to students. The teacher chose this book and the others used in the study due to the fact the children expressed great interest in mysteries. As the students were split into four leveled reading groups, they read the text aloud to one another within these groupings. A researcher or graduate assistant supervised the reading. The students
utilized a strategy called “bump reading”—one student reads until he/she called on another student to read. This continued until the passage was completed (Jones & Brown).

Once the text was completed, the students were asked to complete a comprehension activity (Jones & Brown, 2011). They completed a chart containing three categories—questions posed by the teacher, context clues, and predictions. This chart was completed after the reading of the first two chapters of the book. After the charts were completed and discussed, the students were asked to read chapter three silently. Once they had finished reading chapter three, they were then provided with a comprehension assessment and enjoyment survey (Jones & Brown).

In Phase II of the study (Jones & Brown, 2011), students were provided with a laptop. Students were then asked to utilize the website RazKids.com—an online library of children’s books. Once the students were logged in and ready to read, they were provided with options for the reading of the book. They could listen to a computerized read aloud of the text or view pages in a similar fashion to the e-book. The students were asked to read *They Mystery Wind* by Cheryl Ryan and Hough Armstrong. Once again, the students were asked to rejoin their leveled groups and complete a comprehension activity designed by their instructor. Similar to the fashion of Phase I, the students also completed comprehension assessments and enjoyment surveys based on the experience of Phase II (Jones & Brown).

Phase III, the final phase of the study (Jones & Brown 2011), the students used RazKids.com once again. However, they utilized the tool on the website which presented the book in an “e-reader fashion”. Following suit with the other phases, students were asked to return to their groups, complete an activity, comprehension assessment, and enjoyment survey. After these were completed, a fourth survey was administered to gauge their enjoyment of electronic books overall (Jones & Brown).
The mean scores of the assessments yielded no significant difference between comprehension test one and three (Jones & Brown, 2011). Test one assessed comprehension of a printed book while test three assessed that of an electronic book. Test two results were slightly lower, but not drastically. Unlike the comprehension assessments, the surveys were simply administered to assess the students’ level of enjoyment of each situational reading. According to the survey results, the students showed no particular preference for reading either type of book. Conversely, the survey did indicate the students would continue to use RazKids.com as a means of reading at home (Jones & Brown). The results contradict those that indicate comprehension and motivation are affected by the integration of electronic books in the classroom.

With the growing popularity of electronic readers, many institutions outside the average academic school building are considering their purchase— but for very different reasons (Patient Education Management, 2011). In the beginning of 2011, Hekemian Medical Library at Hackensack (NJ) University Medical Center began a piloting program of electronic readers. With donations from the medical staff, the medical center purchased five iPads and five Nooks, two types of electronic readers currently available. The reason for the purchase of these particular e-readers is for educating, but not necessarily the educating of students in a classroom (Patient…, 2011). Patient Education Management (2011) further explains:

As a Planetree facility, the medical center embraces patient-centered care and therefore tries to have educational resources available in a variety of formats to meet the needs of patients and family members. For example, there are books, short web site articles on computers, and materials for children and Spanish speakers. (p. 1)

The staff of Hackensack hopes to utilize the newly purchased electronic readers as a means to educate both patients and families of patients in regards to illness or any other ailments
that might possibly cause an extended hospital stay (Patient…, 2011). Using the information
provided through electronic books and the World Wide Web of the iPad, the staff hopes to
provide more in-depth answers and assist in a more educated support unit of a patient.
According to the authors, “Promoting informed decision-making in health care is a goal of the
consumer health service, and the content on the iPads and Nooks will help” (p. 1). In this
situation, the e-readers are being used as an educational tool, but in a real world perspective.

The Cancer Institute in Brunswick, New Jersey is following a similar path. In January,
four adult iPads, two pediatric iPads, and two color Nooks were purchased and made available
for check out for patients and families of patients. In this setting, the electronic readers became
vastly popular (Patient…, 2011). However, another useful element of the e-reader was
described:

Although there are some educational books and videos on the electronic devices, they are
primarily used for entertainment to divert patients’ attention from their cancer diagnosis
and treatment. Therefore, the devices also offer movies, games, and music. Patients and
family members see the signs and flyers posted at the cancer institute to advertise the
availability of iPads and Nooks at the Resource and Learning Center, so they go to check
one out and see all the other educational materials available. (p. 2)

In both hospitals, the electronic reader is being utilized for indescribably important
reasons (Patient…, 2011). Instead of the e-reader being used to read Junie B. Jones or Harry
Potter, it has evolved into a more authentic tool. It is now being used to inform families of
diseases and ailments of loved ones and also as distractions from the pain of each day for cancer
patients. In these situations, the e-reader is being used for more practical, but equally important,
reasons and is moving beyond the academic classroom. Because of its integration into the
outside world, its integration into classrooms might be more important than previously thought (Patient…).

Many of the previously mentioned studies revolved around adolescent or adult users of the electronic book. Korat’s (2010) study “investigated the extent to which a considerate e-book can support kindergarten and first grade children’s language (vocabulary and story comprehension) and word reading compared to a paper-based text” (p. 26). In this study, the “e-book” being used was not an iPad or Kindle, but an electronic book presented on a personal computer.

In Korat’s study (2010), the students were randomly divided into two groups—one group read an electronic book five times while the other read paper-based text in accordance with the regular school curriculum. Pre- and post-tests were administered to both groups. Pre-tests included vocabulary and word reading measures. The post-tests included these features as well but also included comprehension questions based on the electronic or paper-based reading.

After assessments and observation, the results of Korat’s study (2010) demonstrated that there was no significant difference in the comprehension of the students using the electronic book and the students using the paper-based text. However, Korat stated that “children who read the e-book exhibited significant progress in word meaning and word reading compared to the control group” (p. 27). This study takes yet again another view on the use of the e-reader in the classroom. Although it has its benefits, the price is still an important factor. Korat concludes that “more research and future education” are necessary to implement these devices into the classroom.
Summary

A number of overarching themes have risen over the past years in regards to research on the electronic book and electronic readers in particular. Research lends contradicting concepts, with some, like Matthew (1997) and Nielsen (2010) yielding increases in motivation and comprehension due to the use of the electronic books. On the other hand, researchers such as Jones and Brown (2011) and Korat (2010) have demonstrated no significant increase in comprehension when using the electronic book and/or reader.

Many believe it simply is too soon to incorporate something this technologically advanced into the classroom. Teachers and researchers are continually searching for the newest and best methodologies for the instruction of reading. With the push for technology in the classroom, it only makes sense to incorporate an electronic reader into instruction. Nonetheless, many believe it is only costly, inoperable, and high maintenance for the user and instructor. Some believe students are only distracted by the applications and features provided for e-books and e-readers. Many also dislike the loss of page numbers and the feel of an authentic book in hand. The final argument is that electronic readers negatively affect comprehension—a crucial building block of reading. For every naysayer, however, a supporter of the electronic book exists.

Many individuals, such as the aforementioned researchers, are supporters of the integration of the electronic reader into the classroom. The previously mentioned studies report findings highlighting increased comprehension and motivation amongst its users. This increase in comprehension occurred due to the involvement with the text. The e-book was a motivational tool as well. As with the desire of a digital age classroom, it would seem the e-book just might have a place within our schools and classrooms. With such mixed reviews it seems that more
research is necessary into the risks and benefits of the electronic reader in the classroom. Before implementing something into the classroom, it is necessary to know what effects it will have on the students.
CHAPTER III. METHODS AND PROCEDURES

To become an effective teacher of reading, one must continually utilize the most recently developed strategies within the field. In a digital age, the call for technology implementation in the classroom has risen—the field of reading is no exception to this rule. Instead of solely in-print texts, classrooms now have the opportunity to adopt electronic readers for everyday reading. E-readers, such as the Apple iPad, have developed libraries containing books for students of all ages. However, if these devices are going to be adopted into the classroom, research on their effectiveness must be conducted. Many studies have examined the role of the e-reader in the classroom and its effects on instruction, students, and reading. This study was designed to answer the following questions: Are second grade students’ silent reading comprehension affected when using an electronic reader? Also, how do these students feel about the electronic reader and its use?

Methods

Research Design

This study followed the switching replications research design. Within this design, one group is the control group while the other is treatment group. After the initial study has been conducted, the groups switch roles. The study is then replicated within these new groups (Trochim, 2006). In this study, a group of the students (n = 8) in a second grade classroom were the treatment group initially. The other half (n = 10) of the students were the control group. The groups were determined randomly. After completing the initial session of the study, the student groups switched roles. The treatment group became the control group and vice versa.
Participants

Participants of this study were a classroom of 18 second grade students at an elementary school in northwest Ohio. The students were seven to eight years of age and of varying ability. The students were from the classroom of a teacher familiar with the researcher. Because of this, the participants were considered a convenience sample. Both the participants in the study as well as parents/guardians of the participants were asked to sign a consent form for permission to participate.

Instrumentation

This investigation required a variety of tools for completion. The researcher used the book *A to Z Mysteries: The White Wolf* by Ron Roy. This developmentally appropriate book is both adventurous and mysterious. It is a chapter book containing language appropriate for students in the second grade. To keep student attention, it also contains vivid imagery to further develop comprehension. This book was obtained in both print and electronic formats. The electronic version was purchased from the iBooks store application found on all Apple iPads. The researcher obtained 10 in-print copies of the book and 10 electronic copies of the book.

To view the electronic copies of the book, 10 iPads were needed. An iPad is an electronic device (similar to the personal computer) that enables the user to explore a number of applications. Applications are small programs that can be run on an iPad, such as iBooks and iTunes that allow the user to complete a variety of tasks. During this study, the students were using the iBook application, which allowed the students to read the text electronically.

The researcher also needed an experience survey (see Appendix A) and comprehension quizzes (see Appendices B and C) for student completion after each session of reading the book. Enough copies of each of these documents were obtained so that each student could have a
personal copy. The comprehension quizzes were used to compare student understanding of the reading on an iPad versus an in-print book. The survey was administered after the students completed both sessions with the in-print and electronic book. The survey was used to determine student attitude toward the use of the electronic reader.

Procedures

Before beginning the study, parental and student consent was obtained for participation (see Appendices D and E). Once permission was obtained for each student, the study began. A book was selected for use prior to the entrance into the classroom. The book must be developmentally and topically appropriate for the age level chosen and should contain an interesting plot. The appropriate number of books was then obtained both electronically and in-print. A device also had to be chosen for the electronic reader as well. For this study, the iPad was utilized. Once these steps were completed, the researcher was able to enter the classroom.

This study was conducted over a three day period. The first day, the researcher entered the classroom to explain the study, obtain consent from the students, and present the iPad. The researcher demonstrated the iPad and its uses, focusing mostly on the iBooks application. The students learned how to use the iBooks application to read the text the following days. The researcher demonstrated how to turn on the iPad, how to open the iBooks application, and how to open the electronic books and turns its pages. The researcher did not demonstrate tools of the iBooks application, such as notes, highlighting, and dictionary. The students were encouraged to ask questions and explore the applications of the iPad during this session.

On the first day of the actual study, one group of students (8 selected at random) read chapters 1 and 2 of *The White Wolf* by Ron Roy using the iBooks application on the iPad. The remaining students (*n* = 10) read the same selection but from an in-print version of the text. The
students were asked to read the selection silently during their classroom sustained silent reading time previously established by their teacher. After both groups completed their reading assignment, both completed a comprehension quiz. The comprehension quizzes were identical, regardless of the device used to read.

During the second day of the study, the student groups switched assignments. The group that received the opportunity to use the iPads read the in-print version of the text. Those who read the in-print version on the previous day switched to read using the iPad. Similar to the previous day, the students read the selection silently and completed a comprehension quiz. The students were reading chapters 3 and 4 during this session. Lastly, during this final session, the students were asked to complete a survey based on their experiences. The survey asked the students to discuss their experience and attitude toward the use of the iPad for reading versus the use of the in-print text. After the third session was completed, the researcher analyzed the data from both comprehension quizzes and survey.

Data Collection

A researcher-developed survey and comprehension quizzes were used to collect data. The students completed the comprehension quizzes after both reading experiences. The survey was completed after the entire study was completed. Both comprehension quizzes and survey contained multiple choice as well as short answer questions. The comprehension quizzes were used to assess student understanding of the text after each reading experience. The survey was used to determine student’s overall attitude toward the use of an electronic reader versus an in-print text. After the initial data were collected, the researcher compared individual student performance utilizing a data table.
Data Analysis

The researcher analyzed the scores of both comprehension quizzes by comparing individual student comprehension scores on the e-reader to the scores on the in print quiz. The researcher compared the overall performance scores. These results were displayed in a chart that compares the scores adjacently. From these results, the researcher determined whether there were significant differences with comprehension when reading on an electronic reader such as the iPad.

Summary

To remain an effective teacher of reading, one must continually explore and assess the developments within the field. For years, reading was taught using a physical text and the turning of pages. However, with the push of technology in the classroom and a quickly-developing technology field, students and teachers will soon be faced with electronic libraries. A variety of options are available, including The Kindle, The Nook, The iPad, The Sony Reader, and simply text online. Schools districts nationwide are considering the elimination of textbooks and books and are researching the purchase of electronic readers. Although technology integration is considered both motivating and effective, the question remains if the electronic book provides the best method of reading and comprehension for the student. Although the electronic book is quickly heading to the forefront, it has yet to be established as an effective tool in a student’s learning. This chapter discussed the participants, procedures, and methods of data analysis used to complete this study. This study was conducted accordingly, evaluating the effects of the electronic reader on silent comprehension.
CHAPTER IV. DATA ANALYSIS AND DISCUSSION OF RESULTS

Reading is the core foundation of student education. Its presence occurs across the curriculum and extends far beyond the classroom. In a society in which technology is ever-advancing, it is important to question and evaluate standard reading tools and instruction. Since the beginning of structured schooling, reading instruction has been based upon the printed text. Students have been reading from textbooks, picture books, and chapter books printed with black ink on white paper. In recent years, the development of the electronic reader has revolutionized the experience of reading for students and adults alike. Many schools are moving toward an electronic-based curriculum. However, much research has not explored the evaluation or effects of this newly-developed tool in the elementary classroom. Because of this, this study has been designed to answer the following questions: Are second grade students’ silent reading comprehension affected when using an electronic reader? Also, how do these students feel about the electronic reader and its use?

Data Analysis

Quantitative data were collected over the span of the two-day study. A third day was included in the study; however, no data were collected from the initial visit. The purpose of the initial visit was to demonstrate the use of the iPad to the students. On the first day of the actual study, eight students used the iPad to read the book, *The White Wolf* by Ron Roy. Ten other students used a printed version of the text to read. On day one, both groups of children read chapters one and two of the book. After this session, each student completed the same comprehension quiz consisting of five questions. On day two, both groups of children read chapters three and four of the book. The students using the iPad on day one used the printed book for day two. The students using the printed book on day one then used the iPad on day
After this session, each student completed a second comprehension quiz consisting of another five questions. The student scores were recorded and documented using percentage correct out of five.

The qualitative element of this study was conducted using a survey administered on the final day of the study and through researcher observation. Students completed a survey in which they indicated their preference of reading media and attitude toward electronic books. It is important to note that only 18 student results have been reported. Throughout the duration of the study, there were multiple absences or students removed from the classroom for intervention services.

Day 1 of Study

During Day 1 of the study, 18 students participated. All of the participants read chapters 1 and 2 of *A to Z Mysteries: The White Wolf* by Ron Roy. Student reading tools were assigned randomly through drawing. On the initial day of the study, only eight iPads were available for use to the researcher. Because of this, eight students read the chapters from an iPad while ten read from a printed copy of the text. Students who used the iPad to read on Day 1 received an average score of 4.4/5 (87.5%) on the post reading comprehension quiz. The 10 students who used the printed version of the text received an average score of 4.1/5 (82%) on the post reading comprehension quiz. Raw scores can be found for both groups of participants in Appendix F.

Day 2 of Study

During Day 2 of the study, 18 students participated. All participants read chapters three and four of *A to Z Mysteries: The White Wolf* by Ron Roy. Students who used the iPad during the first session were required to read from the printed version of the text and vice versa. During this session, 10 students used the iPad for reading while 8 students used a printed version of the text.
The eight students who used the printed version of the text for reading received an average score of 3.75/5 (75%) on the post reading comprehension quiz. The 10 students who used the iPad to read the chapters received an average score of 4.3/5 (86%). Raw scores for both groups of participants on day two can be found in Appendix G.

**Overall Performance**

During both Day 1 and Day 2, 18 students participated. Each student received the opportunity to read from both the iPad and the printed version of the book. According to collected data, 7/18 (39%) participants received a higher score on the post reading comprehension quiz when using the iPad. Three out of the 18 (16%) participants received a higher score on the post reading comprehension quiz when using the printed version of the book. However, 8/18 (44%) students showed no difference in performance from using either the iPad or printed version of the book. Individual student performance analysis can be found in Table 1.

**Survey**

After the completion of the post reading comprehension quiz on Day 2 of the study, participants completed a survey based on the experience (see Appendix A). When asked which tool was enjoyed more, 14/18 students chose the iPad while 4/18 chose the actual book. When asked which tool from which it was easier to read, 14/18 students chose the iPad while 4/18 chose the actual book. The students were asked to demonstrate their feelings toward two questions by circling facial expressions representing happy, fair, and sad. When asked *How did you feel when you read on the iPad?*, 15/18 students responded with “happy”, 1/18 responded with “fair”, and 2/18 responded with “sad”. The following question was asked in a similar
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manner. When asked *How did you feel when you read the actual book?*, 5/18 students responded with “happy”, 10/18 responded with “fair”, and 3/18 responded with “sad”. The fifth question of the survey allowed the students to describe their feelings if all classroom books were replaced with electronic books. Although answers varied, 15/18 responses were categorized as “positive” and 3/18 were categorized as “negative”. Finally, students were asked to fill in the blank of *I understood the reading better when I used the __________ to read.* Twelve students filled in the blank with *iPad* and 6 filled in the blank with *Book.*

*Observation*

Throughout the duration of the study, the researcher observed each group when before and during reading. Qualitative data were collected through observational field notes taken on both days. The observational notes demonstrated results similar to that of the survey. As the students indicated on the survey, reactions to the use of the iPad were positive. The researcher noted students seemed eager to receive the reading opportunity on the iPad. The researcher also noted a sense of motivation from the students as they were beginning to read. The students demonstrated excitement upon the arrival of the researcher. In turn, the students became more motivated to read through the use of the iPad.

*Discussion of Results*

The purpose of this investigation was to answer two questions: Are second grade students’ silent reading comprehension affected when using an electronic reader? Also, how do these students feel about the electronic reader and its use? After analysis of the results of post reading comprehension quizzes, it seems there is no statistical significance between the means of the two groups. These results demonstrate that students’ silent comprehension scores are not affected by the use of an electronic reader. Overall, students do not perform better using one
form versus another. This does not, however, mean an electronic reader should not be used in the classroom. The possibilities and uses of the results of this study will be discussed in depth in Chapter V.

The exploratory portion of this study focused upon student feelings toward the electronic reader and its use in the classroom. The analysis of the results demonstrates that a majority of students enjoyed using the electronic reader and were highly motivated when it was being used for reading. Fourteen participants identified the iPad as the most enjoyable tool used for reading. When asked about an all-electronic curriculum, 15/18 students identified some sort of positive reaction. Since iPads or other electronic readers can be highly motivating, their implications in the future classroom can prove highly important. This will also be discussed in further detail in Chapter V.

Summary

This chapter is an analysis of data collected during this study to answer the research questions: Are second grade students’ silent reading comprehension affected when using an electronic reader? Also, how do these students feel about the electronic reader and its use?

The results from the post reading comprehension assessments compared the students’ comprehension scores while reading on the iPad as opposed to paper-based text. Both groups of students’ scores on the comprehension assessments were not significantly different when compared to each other. This indicates that electronic text on the iPad did not impact second grade students’ silent reading comprehension positively or negatively in comparison with paper-based text.

A survey was administered to determine student attitude toward the adoption of the electronic reader into the curriculum. Upon analysis of the student responses, almost all of the
students noted a positive reaction to the use of the iPad in the classroom. A majority of the students even identified the iPad as the more enjoyable tool used for reading during the study.
CHAPTER V, SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In an ever-advancing world of technology, reading instruction can seem almost archaic. Teachers and researchers focus yearly on the latest advancements in the field, but many overlook the need for technology in the reading classroom. Recently, the electronic book has been developed and is slowly finding its way into classrooms across the globe. Because of this recent development, this study was designed to answer the following questions: Are second grade students’ silent reading comprehension affected when using an electronic reader? Also, how do these students feel about the electronic reader and its use? This chapter includes a summary of the completed study, conclusions formulated by the data and results collected throughout the study, recommendations for teachers and administrators, and thoughts for further research.

Summary of Study

This study was designed to evaluate the impact electronic readers have on the silent comprehension of second graders. This study also evaluated second grade student beliefs in regard to the use of an electronic reader in the classroom. The study took place in a second grade classroom with 18 participants. The students were asked to read four chapters of the book *A to Z Mysteries: The White Wolf* by Ron Roy. Two chapters of the book were read using an electronic reader. Two other chapters were read using a printed version of the text. After each reading session, the participants took post reading comprehension quizzes and the scores of these quizzes were compared. The students also completed a post-study survey, demonstrating their attitude and beliefs toward the use of electronic readers in the classroom.

Research surrounding the topic has provided a variety of results. Researchers such as Matthew (1997) and Reinking and Schreiner (1985) developed studies comparing comprehension using electronic devices. These researchers found that electronic devices
positively affected comprehension as the reader became engaged with the technology. However, researchers such as Gable and Thompson (2011) have found no significant positive affects stemming from the use of an electronic reader in an elementary classroom.

Conclusions

The results of this study demonstrated no significant difference in the second grade student comprehension of reading on an iPad versus a printed version of a text. These findings are similar to those by Korat (2010). In Korat’s study, the students were randomly divided into two groups—one group read an electronic book five times while the other read paper-based text in accordance with the regular school curriculum. Pre- and post-tests were administered to both group demonstrated no significant difference in the comprehension of the students using the electronic book and the students using the paper-based text.

Although this study did not demonstrate a significant positive impact on comprehension, it did demonstrate the value of electronic readers in the classroom. Students using the iPad received slightly higher scores overall on the comprehension quizzes. It seems, although comprehension was not significantly impacted by the e-reader, there was also no negative impact. Student performance on assessments of comprehension after reading with the iPad did not decrease with the implementation of the e-reader. Jones and Brown (2011) yielded similar results with their e-reader research: little to no difference in scores when comparing electronic versus printed text. However, the researchers demonstrated no negative effects of the use of electronic text. Although this research did not demonstrate significantly positive effects on reading comprehension, it does not demonstrate any negative results either. It seems the e-reader could find itself as commonplace in the classroom as the printed book—this study suggests
reading comprehension would remain unaffected. The most significant reasoning for the electronic reader in the classroom lies elsewhere—within student motivation.

Upon analysis of the surveys administered at the end of the study, it is clear these devices are highly motivating for students in the elementary classroom. Through survey and observational field notes, the researcher concluded that the students seemed eager and excited to read using the iPad. The students were excited to receive the opportunity, motivating them to read the selected text. Students appear highly motivated by the integration of technology into the classroom, as demonstrated by the research of Leu, Leu, and Coiro (2004), Boles (2011), and Pearman (2008). This study demonstrates the electronic reader can be used as another motivational tool for teaching. Therefore, students may be more prone to practice and continue reading. If the electronic reader is not introduced into the reading curriculum, an opportunity to create life-long readers just might be missed.

Recommendations

For Teachers

Although the results of this study did not demonstrate a positive or negative effect on comprehension through utilization of an electronic reader, they do demonstrate benefits of its inclusion in the classroom. Motivation can prove to be a difficult battle for teachers day to day in an elementary classroom. Reading can most especially prove to be a difficult subject to teach to unmotivated students. The results of this research suggest that electronic readers are very motivating to second grade students, and most likely, a number of elementary-aged students. Using something such as this for reading instruction can improve student performance through motivation. Students in the study were excited and engaged when using the electronic reader. Because they were engaged, they remained focused longer and demonstrated a greater joy in
reading through the overall survey. Although this particular study does not show an increase in comprehension when using e-readers, they can be used to motivate students and impose excitement into the reading classroom.

*For Administrators*

Generally, administrators play an integral role in the development and spending of school budgets. Since these electronic devices can be expensive, it is important to express the motivational element of them. These devices can be used for a multitude of reasons and have proven in this study to motivate students to read. This may prove more beneficial to teaching than purchasing printed books year after year.

Once the electronic readers have been purchased, it is also important to educate teachers on their use and capabilities. To aide in this transition, a teacher in-service focusing solely on the use of the electronic reader in the classroom could be held. Oftentimes, new technology or software is implemented in classrooms across a district without appropriate guidance. Unfortunately, some teachers do not use available technology because they do not feel comfortable enough to do so. Professional development could be utilized to alleviate this problem.

*For Teacher Educators*

Oftentimes, the best method of reaching the most children stems from implementing new technologies into teacher education courses. As a teacher educator, an individual is responsible for molding and preparing new educators. Introducing the electronic reader into a teacher education course could benefit teacher candidates and students alike. As previously mentioned, reading is a core subject in every curriculum and can be the most difficult to teach at times. By introducing new teachers to capabilities of the electronic reader and its motivational aspects an
exponential amount of students will be influenced. Also, as technology becomes more readily available and more apparent in schools country-wide, it is important teachers know how to properly use it in the classroom. If teacher candidates are informed of the various electronic readers and their appropriate uses they will be more likely to use them in their classroom, motivating students across the globe.

For Further Research

During this study, a text was chosen based on the approximate reading level of the students in the classroom. Because all students had to read the same text due to funding and need for direct comparison, the students may have been reading a text that was not at their exact reading ability. For further research, it would prove beneficial to provide each student with a text that is appropriate for his/her particular reading level. This would provide a more accurate depiction of student performance on comprehension quizzes.

During the study, the use of the tools provided on the iPad was not focused upon. For further study, the use of the e-reader tools such as the dictionary, post-its, or highlighters might be documented. These tools could have direct influence on the comprehension of the text for the students. This could be analyzed through observation or post reading survey.

Finally, the results of the study may have developed differently had a different electronic reader been used. For further study, a comparison of the electronic readers should occur. The type of electronic reader may affect elements of student reading performance and without this analysis the influences are unknown.

Summary

This chapter reviewed the current study, revisited relevant past research, suggested recommendations for teachers, administrators, and even for future study. Overall, more research
is needed to firmly demonstrate how the electronic reader affects comprehension. Although this study showed no significant effects, it is important to note it demonstrated that e-readers can be highly motivating for students when using them for reading. In a society that moves deeper and deeper into technology each and every day it is important to consider the possibilities of the electronic reader. Technology is the key to our developing curriculum and the electronic reader may hold much more relevance than previously thought.
REFERENCES


APPENDIX A.

CHAPTERS 1 AND 2 COMPREHENSION QUIZ
A-Z Mysteries: The White Wolf

By: Ron Roy

Chapters One & Two

1. In what season does the story take place?
   a. Fall
   b. Summer
   c. Winter

2. How do the characters get to the island?
   a. car
   b. plane
   c. train

3. Where are the characters staying on the island?
   a. In a tent.
   b. In an apartment.
   c. In a cabin.

4. What does Seal Harbor look like from the seaplane?

5. What do the characters use to see the wolves?
APPENDIX B.

CHAPTERS 3 AND 4 COMPREHENSION QUIZ
A-Z Mysteries: The White Wolf

By: Ron Roy

Chapters Three & Four

1. Why couldn’t Dink see the wolf at first?
   a. She wasn’t there.
   b. She blended in.
   c. She was hiding.

2. What was Abbi’s hobby?
   a. collecting rocks
   b. recording animal sounds
   c. bird watching

3. How does Abbi know the white wolf is a girl?
   a. She’s wearing a pink collar.
   b. She has three puppies.
   c. She has long eyelashes.

4. Why did Wallis buy that particular cabin?

5. What is the mystery in the story?
APPENDIX C.

POST READING SURVEY
Survey

1. Which did you enjoy more? Circle One.
   iPad            Actual Book

2. Which was easier to read? Circle One.
   iPad            Actual Book

3. How did you feel when reading on the iPad?
   ![Emojis for happy, neutral, and sad faces]

4. How did you feel when you read the actual book?
   ![Emojis for happy, neutral, and sad faces]

5. How would you feel if all of the classroom books were on an iPad?
   __________________________________________
   __________________________________________.

6. I understood the reading better when I used the ________to read.
APPENDIX D.

PARENT CONSENT TO PARTICIPATE
November 29, 2011

Dear Parent or Guardian:

My name is Shannon Stewart and I am a graduate student in the reading program at Bowling Green State University. I am conducting a study to determine if reading electronic text affects a second grade student’s comprehension. I am also exploring student attitudes toward the electronic and printed text. To complete this study, I will be using the iPad and a printed version of the book *A to Z Mysteries: The White Wolf* by Ron Roy, a selection from a popular children’s book series. I believe this information will be beneficial to educators as technology is becoming more common in the classroom.

To conduct the study, I will be entering your child’s classroom for three sessions for approximately one hour. The class will be split in half at random. During the first session, I will simply explain the study and proper use of the iPad. During the second session, one half will be reading an electronic version of the text while the other will be reading a printed version. The students will switch roles during the third session. After each reading experience, the students will be asked to complete a brief comprehension quiz about the selection. On the third day, the students will also be asked to complete a survey regarding their attitude toward the iPad and printed book experience. The quizzes and surveys will only take about 15 minutes for completion. Upon completion, all papers will be collected and used solely for my personal study. The papers will be stored in a confidential place. The results of the study will not affect your child’s grade.

I am writing to ask for permission for your child to participate in this study. Due to the fact it is volunteer in nature, only students who sign an assent form stating their willingness to participate AND who have a signed consent form from a parent or guardian, will be able to participate. If you or your child does not wish for participation in this study, an alternative activity will be available during this time. It is important to note, no matter the decision, your child’s grade or class standing will not be altered. Also, your child’s real name and school will NOT be used during any aspect of the study or reporting.

If you have any questions about procedures or goals of the study please do not hesitate to contact me. Additionally, if you have any other concerns, you may contact the Chair of the BGSU Human Subject’s Review Board at (419) 372-7716 (hsrb@bgsu.edu) or my thesis advisor, Dr. Hendricks at (419) 372-7341 (cindyg@bgsu.edu).

Sincerely,

Shannon Stewart
BGSU Graduate Reading Program
shastew@bgsu.edu
Consent for my Student to Participate in a BGSU Reading Study

I have been informed that Shannon Stewart, Masters in Education candidate, will be conducting a research study in my child's classroom. I have also been informed the research study is a part of a thesis project and only students with permission for participation will be included.

I have been informed that my child will be reading *A to Z Mysteries: The White Wolf* by Ron Roy and will complete a 5 question comprehension quiz and attitude survey afterward. I am aware that my child's name and school will not be identified at any time during the study. Additionally, I am aware that my child's results will be analyzed by Shannon Stewart to compose a research report.

I am aware that this study does not contain risks greater than in everyday life and participation will not affect my child's grade or class standing. I am also aware that students not participating in the study will be provided an outside reading activity. Like the study, this activity will not affect grades or class standing. Finally, I am aware that my child or I may choose to stop participation within the study at any given time and my decision to participate in the study will have no impact on my/my child's relationship with BGSU.

I am aware if I have any questions regarding my child's rights as a research participant I can contact the Chair of the Human Subjects Review Board (419-372-7716, hsrb@bgsu.edu) or thesis advisor, Cindy Hendricks (419-372-7341, cindyg@bgsu.edu). I am also aware the researcher, Shannon Stewart, will be entering my child's classroom for three sessions, approximately one hour. Finally, I am aware that the included surveys and quizzes will only take about 15 minutes to complete and no extrinsic rewards will be provided.

I hereby give my permission for my child to participate in the study comparing the iPad to paper-based books and that any information gained through the study will not contain any identifiable reference to my child. I am aware my child's confidentiality will be protected through pseudonym.

_________________________  ________________________
Signature                        Date

_________________________  ________________________
Parent/Guardian Printed Name     Student's Printed Name

Please return this form to your child's classroom teacher within one week of its receipt.
APPENDIX E.

STUDENT ASSENT TO PARTICIPATE
Student Assent to Participate

Participating in this study is voluntary. This means you may choose not to participate in the study. This study will not affect your grades. In this study, you will be reading a book on an iPad and in print, taking a short quiz about the book, and then telling me how you liked it by completing a survey. This study will take three days to complete—about one hour each day. You may choose to stop participating in the study at any time. If you have questions, ask the researcher, Shannon Stewart.

1. I want to read using the iPad and the paperback version of *The White Wolf* by Ron Roy.

2. I will take a quiz after I read from the iPad and after I read from the paperback book.

3. I will take a short survey that tells how I feel about each reading experience.

4. I will let Shannon Stewart use my results without using my name to complete a research study about the effects of technology on comprehension.

5. I want to be a part of this study.

________________________________________  ________________
Signature                                      Date

________________________________________
Printed Name
APPENDIX F.

RAW SCORES DAY 1
Table 1

Day 1 Raw Scores

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<th>Condition</th>
<th>Raw Score</th>
<th>Percentage</th>
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<tbody>
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<td>4</td>
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<tr>
<td>6</td>
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</tr>
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<td>iPad</td>
<td>5</td>
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</tr>
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<td>11</td>
<td>iPad</td>
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<td>iPad</td>
<td>4</td>
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</tr>
<tr>
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<td>4</td>
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</tr>
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APPENDIX G.

RAW SCORES DAY 2
Table 2

Day 2 Raw Scores

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<th>Percentage</th>
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<tr>
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<td>iPad</td>
<td>5</td>
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</table>
APPENDIX H.
HUMAN SUBJECTS REVIEW BOARD APPROVAL
DATE: February 20, 2012

TO: Shannon Stewart

FROM: Bowling Green State University Human Subjects Review Board

PROJECT TITLE: [291158-2] Reading in a Technological World: Comparing the iPad to Print

SUBMISSION TYPE: Revision

ACTION: APPROVED

APPROVAL DATE: February 20, 2012

EXPIRATION DATE: January 18, 2013

REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Exempt review category #1

Thank you for your submission of Revision materials for this project. The Bowling Green State University Human Subjects Review Board has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

The final approved version of the consent document(s) is available as a published Board Document in the Review Details page. You must use the approved version of the consent document when obtaining consent from participants. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please note that you are responsible to conduct the study as approved by the HSRB. If you seek to make any changes in your project activities or procedures, those modifications must be approved by this committee prior to initiation. Please use the modification request form for this procedure.

You have been approved to enroll 24 participants. If you wish to enroll additional participants you must seek approval from the HSRB.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. All NON-COMPLIANCE issues or COMPLAINTS regarding this project must also be reported promptly to this office.

This approval expires on January 18, 2013. You will receive a continuing review notice before your project expires. If you wish to continue your work after the expiration date, your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date.

Good luck with your work. If you have any questions, please contact the Office of Research Compliance at 419-372-7716 or hrsb@bgsu.edu. Please include your project title and reference number in all correspondence regarding this project.