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**FACILITATING COMPREHENSION AND MOTIVATION BY ENGAGING
ADOLESCENTS AS IPAD READERS**

by

Virginia M. Bauman

A Dissertation Submitted to the Faculty of
San Diego State University and the University of San Diego
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

Dissertation Committee:

Fred Galloway, Ph.D., University of San Diego
Jerome Ammer, Ph.D., University of San Diego
Cheryl Mason, Ph.D., San Diego State University

May 2014

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by

Virginia M. Bauman

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DEDICATION

This dissertation is dedicated to my daughter, Alisa, who inspired me to start a doctoral program and then, was there for me, through to the end. I am most grateful for the generous gift of your time for both the Proposal and the Defense. Your presence definitely made a difference and I was reminded once again, that God did spend a little more time on you! Now, it is your time for post-grad work, and I am very glad that I have been an inspiration to you.

The *new literacies* are not so much a space as an open landscape replete with potential for charting new paths toward learning and achievement.

—Bridget Dalton

ABSTRACT OF THE DISSERTATION

Facilitating Comprehension and Motivation by Engaging
Adolescents as iPad Readers

by

Virginia M. Bauman

Doctor of Education

San Diego State University and the University of San Diego, 2014

Technologies continue to transform the many ways that we read, write, and communicate, redefining what it means to be literate in the 21st century. For example, the explosive growth in tablet computers over the last few years has seemingly everyone embracing the new digital literacies without any real knowledge of the skills, strategies, and dispositions required to comprehend digital text. Given the newness of this technology, it's hardly surprising that little empirical research has been conducted to examine the extent to which e-books can actually improve comprehension as well as the motivation to read among students.

To help solve this problem, a randomized control trial was conducted in a Southern California middle school with four 6th grade classrooms—two that received a digital literacy intervention and two that did not. The 6-week intervention consisted of independent reading of an age-appropriate e-book along with instruction on how to use the technologies associated with the digital text; the non-intervention group read the same text in standard print format. All students participated in pre- and posttests that used the Qualitative Reading Inventory to measure comprehension proficiency and the Adolescent Motivation to Read Profile to measure the motivation to read. When analysis of variance techniques were used to compare the groups, results revealed that students that received the digital intervention improved significantly more ($p < .001$) in both comprehension and motivation than those that read the printed text. In addition, regression analysis revealed that neither race, gender, standardized state test scores, nor changes in motivation were significant predictors of the change in reading comprehension; instead the only significant predictor was whether or not the student received the digital intervention.

Taken together, the findings from this small sample study suggest that motivation and comprehension proficiency improved after students read an e-book on a tablet. Of course, these findings need to be replicated in larger samples, but if they are then schools clearly need to rethink resource allocation decisions in an effort to promote and integrate e-books into their curriculum, which may include either leasing tablets, using bookless libraries, or allowing students to bring their own devices to class.

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CHAPTER 1

INTRODUCTION AND OVERVIEW OF THE STUDY

Technologies continually transform the ways we read, write, and communicate, redefining what it means to be literate in the 21st century (Knobel & Lankshear, 2007). It is clear that to be fully literate, every student needs to develop the requisite digital literacy strategies (International Reading Association [IRA], 2002; National Council of Teachers of English [NCTE], 2007; Partnership for 21st Century Skills [PS21], 2007). Not surprisingly, as a result of this shift towards digital literacy, standard definitions of reading and reading instruction have been rapidly expanding to address the use of e-books and devices that provide new ways of reading (Castek, 2008; Hartman, 2000). The *new literacies* is a term that has come to mean many different things to many different scholars (Coiro, Knobel, Lankshear, & Leu, 2008; Jenkins, Purushotma, Clinton, Weigel, & Robison, 2006). In the context of this study, the *new literacies* refers to the literacies that are continually evolving as new technologies appear (Coiro & Dobler, 2007).

The purpose of this study was to investigate the effects on comprehension proficiency and motivation to read after students read e-books on iPads. Both comprehension and motivation were measured in this randomized control trial. After examining the extent to which reading e-books changed students' motivation and comprehension, the relationship between changes in comprehension and changes in the motivation to read was analyzed with a regression analysis. Evidence suggested that when students were motivated and engaged in their reading, comprehension increased (Guthrie & Cox, 2001; Taboada & Guthrie, 2006). This study extended the findings of Coiro and Dobler (2007) and examined the change in self-concept, the value held for reading, motivation to read, and comprehension proficiency after reading e-books on iPads. The study explored the following questions:

- Does reading e-books on iPads result in a change in comprehension?
- Does reading e-books on iPads result in a change in motivation to read?

- What part of the change in comprehension can be explained by the change in motivation to read?

These questions were examined by comparing outcomes from pretest and posttest data from a comprehension measure and a motivation to read measure. The experimental group (e-book group) and control group (t-book group) were analyzed and compared. The third question was answered after using a hierarchical regression analysis to determine which variable was the predictor of the change in comprehension. This study contributes to literacy practice and literacy research. In the area of literacy research, the study provides information about the changes in comprehension and motivation to read after reading e-books on iPads. In the area of literacy practice, the findings indicate that reading an e-book on a tablet, such as the iPads, facilitates comprehension proficiency and motivation to read that is well beyond the norm.

STATEMENT OF THE PROBLEM

The problem this study addressed was that very few adolescents choose to read on their own (Strommen & Mates, 2004). This decline in reading motivation for adolescents has been blamed on poor matching of students' interests with what they are assigned to read in school. Students often reject reading literature that lacks interest or purpose to them. Strommen and Mates (2004) suggested that literacy competence could be attained if there was a better match to interests the student's value. When students judge reading and literacy activities to be unrewarding, too difficult, or not worth the effort, it is often because these readings are peripheral to their interests and they then become nonreaders (Strommen & Mates, 2004). This study took a look at a very *new literacy*, reading e-books on iPads, and determined what effects this *new literacy* would have on comprehension and motivation to read.

BACKGROUND OF THE STUDY

Improving reading comprehension has become a central goal in schools throughout the country (No Child Left Behind Act [NCLB], 2001). Legislation such as *Reading First* and *No Child Left Behind* (NCLB, 2001) have positioned reading comprehension at the center of attention along with efforts to increase comprehension test scores. The ability to understand what has been read is crucial and the adolescent years need to be a time when

comprehension skills show steady growth and improvement. The ability to succeed in higher education at all levels depends on a firm foundation of comprehension abilities. The more adolescents choose to read, the greater the likelihood that they will become proficient readers. Reading e-books on tablets is of interest to 21st century students. Since 2010, when the iPads were first introduced, there has been an explosion of e-books available. The research on this *new literacy* is scant and there definitely is a need for evidence based research that can clarify the effects this new way of reading has on comprehension.

The iPad is still the most popular tablet computer; more than 100 million iPads have been sold since their debut in 2010. iPads have captured the attention of educators, parents, and students around the world as they present a multitude of possibilities for enhancing learning. Tablets are both a computer and an e-book reader and they are quite different from: smartphones, laptops, and desktop computers. In fact, tablets have come to be seen not as an extension of other types of computing devices, but rather, as a technology of their own with their high resolution screens, startlingly clear displays, and advanced cameras that allow easy sharing of presentations, images, videos, and content, and most importantly, the ability to tap into a multitude of applications such as iBooks, iLearn, and iWork.

Tablets like the iPad are relatively unexplored as tools that might enhance literacy learning. The curling page as it is turned on an iPad is aesthetically appealing. There are many features of the e-book and tablet combination that promote comprehension. The number of e-books available has led to the development of “bookless libraries.” At the university level, both Stanford and the University of Texas have made the shift to “bookless libraries.” This type of library has tablets and e-books available 24/7 for the students. The ability of tablets to hold a multitude of e-books is almost unfathomable. As a result, educators are very interested in the new e-books on tablets combination and research that supports the use of this *new literacy* will facilitate the means needed to provide these tools to students at all levels. Adolescents, in particular, stand to benefit from this new way of reading (Coiro & Dobler, 2007).

As such, this study provides research-based evidence that supports the use of e-books on iPads in order to promote more rapid growth in comprehension proficiency and motivation to read. This study used a randomized control trial design in a southern California middle school to accomplish this purpose. To provide some context for this research, this

chapter will first present an overview of reading comprehension, motivation to read, the comprehension and motivation relationship, and the *new literacy* trends in education. The chapter concludes with a look at the significance of the study, and a brief summary

COMPREHENSION AND MOTIVATION

The process of reading requires the construction of meaning from text. As argued by Rosenblatt (1978), comprehension is a complex process that must involve an interaction between the reader and the text; additionally, the knowledge possessed by the reader and the information embedded in the text are needed in order to construct meaning. In the decades following Rosenblatt, similar definitions have been put forth by the RAND Reading Study Group (RRSG, 2002) National Reading Panel (NRP, 2000), and the No Child Left Behind Act (NCLB, 2001). In 1999, the Office of Educational Research and Improvement of the U.S. Department of Education asked the RRSG to develop a research agenda that would address the core problems that existed in reading education. At that time, the decision was made to focus on comprehension due to the need for high school graduates to comprehend complex texts. The group began its work by defining the term reading comprehension as a relationship between a reader, the text, and the activity. The process involves extracting and constructing meaning through interaction and involvement with written language. The reader has all the knowledge and experiences that a person brings to the act of reading. The text includes both printed and electronic material, and the activity encompasses purposes (why readers read), processes (what mental activities are occurring while reading), and consequences. Of course, the three elements are dynamic and exist within a sociocultural context that extends beyond the classroom (RRSG, 2002).

In addition, the NRP (2000) report stated that reading comprehension was critical to the development of reading skills and the ability to obtain an education. The NRP defined the term reading comprehension as a complex, cognitive, and active process that requires intentional and thoughtful thinking between the reader and the text. The NRP perspective on comprehension underlined the importance of developing the critical reading skills needed so that the interaction between the reader and the text can allow the reader to engage in problem-solving thinking processes.

Finally, the NCLB Act of 2001 positioned reading instruction at the center of efforts to raise standardized test scores and improve academic achievement across the United States. The pressure that is imposed by both the federal and state legislation not only demands that reading comprehension improve, but also requires schools to help every student cross the digital divide and become technologically literate prior to finishing the 8th grade.

According to Guthrie, Wigfield, and Klauda (2012), motivation is defined in terms of the needs, goals, beliefs, and values of individuals. Thus, the closer that literacy activities and tasks match the values, needs, and goals of students, the greater the likelihood that the students will expend effort and become engaged in their reading. Some adolescents judge reading and literacy activities to be unrewarding, too difficult, or not worth the effort because what is offered to them in school is peripheral to their interests and needs (Strommen & Mates, 2004). To understand why many adolescents feel this way, researchers have offered two lines of thinking on adolescents' motivation to read. First, some researchers view adolescents as victims of positioning by schools that have devalued literacy activities at which students are literate and competent—such as media-text, electronic games, electronic messaging, and visual productions—and instead have valued primarily print-based, content-area texts that students have difficulty comprehending. The second line of research views adolescents as meaning-makers in out-of-school contexts that meet their competency needs (Strommen & Mates, 2004). Although school reading is based on traditional textbooks, out-of-school reading involves a range of multi-media.

Traditional texts, according to the New London Group (1996), are page-bound, official, standard forms of the national language. A 21st century concept of “text” needs to transcend print-based texts to also include various electronic media in order to engage adolescents in both reading and writing. The existing research on motivation to read clearly needs to be supplemented with research on the newest devices as adolescents value this. As such, digital technology can become a means of enhancing curricular goals and supporting student learning in new and transformative ways. Recent research on the use of iPads in the classroom showed that the iPads supported student learning and enabled students to become highly engaged using a technology tool that offers unique opportunities (Hutchison, Beschoner, & Schmidt-Crawford, 2012).

Reading instructional programs increasingly focus on comprehension skills as students matriculate through school. Given its importance to children's academic success, researchers have investigated what predicts the growth of reading comprehension skills. Motivation researchers have discussed how motivational and cognitive processes interact, and how each affects achievement outcomes (Pintrich, 2003; Pintrich, Marx, & Boyle, 1993). Studies have shown that motivational variables do predict reading comprehension. One construct of reading motivation indicated that there are five motivational dimensions: (a) perceived control, (b) interest, (c) self-efficacy, (d) involvement, and (e) social collaboration (Taboada & Guthrie, 2006). These variables were found to have correlations among all of them. The moderate correlations indicated that some dimensions of motivation were independent, while still related. In particular, research has focused on how motivation provides an activating, energizing role for cognitive processes, which in turn can impact achievement (Pintrich, 2003; Taboada & Guthrie, 2006). Researchers have found relationships between children's reading self-concept and reading comprehension skills (Chapman, Tunmer, & Prochnow, 2000). Late-elementary school students' intrinsic motivation has been associated with reading comprehension (Taboada & Guthrie, 2006). In addition, research has established that specific dimensions of reading motivation (such as involvement and curiosity) were correlated with reading comprehension (Taboada, 2004).

THE NEW LITERACIES

The digital transformation of literacy is obvious in all areas of our society: work, personal, finances, and across all levels of education. The changes associated with this transformation are truly profound and classroom teachers—as well as educational researchers—have been highly challenged to keep up with such rapid change (Leu, 2000; Wallace, 2004). This is especially important because current federal law requires that students be able to read digitally by the end of the 8th grade (NCLB, 2001). To make this happen, students must be provided with multiple opportunities to learn and use digital literacies (Henry, 2007; Leu et al., 2008), but with an undeveloped research base, many schools are unsure of how best to accomplish this federal mandate. This has been especially problematic when it comes to the ways in which digital texts either enhance or impede both the motivation to read and overall comprehension. Reports such as *Reading Next* (Biancarosa

& Snow, 2004) and *Adolescents and Literacy: Reading for the 21st Century* (Kamil, 2003) underscore the urgent need for research on how motivation affects digital reading and comprehension.

To help understand this new digital world, there are a number of terms being used to describe the *new literacies* associated with digital texts: the *new literacies*, digital literacies, 21st century literacies, new media literacies, information literacies, ICT literacies, and computer literacy. In this study, the *new literacies* perspective will be used. This perspective assumes that: (a) new information and communication technologies (ICTs) require a unique set of skills, strategies, and dispositions; (b) as new technologies emerge, the literacy skills required to use them are transformed; (c) new literacy skills are necessary for success in daily life and in an increasingly global economy; and (d) *new literacies* are multiple, multimodal, and multifaceted (Coiro et al., 2008).

Commonly recognized examples of *new literacies* include such practices as texting, blogging, maintaining a website, participating in online social networking, creating and sharing music videos, podcasting, photo sharing, shopping online, participating in online discussion, emailing, using online chat, conducting and collating online searches, reading, writing and commenting on literature, and processing and evaluating online information (Lankshear & Knobel, 2006; Leu, Kinzer, Coiro, & Cammack, 2004). Of course, all of these practices have been made significantly easier by the introduction of tablet computing, which singlehandedly has freed users from the need to sit in front of a computer in a laboratory setting (Brand & Kinash, 2010). Not surprisingly, the iPad has dominated this market since its inception.

The iPad provides a user-friendly platform for a variety of media applications: video player, photo viewer, camera, and a digital reader for e-books, magazines, and newspapers. Importantly, the number of e-books available for digital reading is unbounded. For example, Google has already digitized more than 6 million e-books and they plan to continue searching libraries globally for more books to digitize. This combination of features is of real interest to universities, colleges, and K-12 educators because these e-books may not only be more engaging but they may also prove to be more cost-effective than printed materials. For these and other reasons, the iPad appears to be a very good choice for promoting 21st century learning skills such as collaboration, communication, creativity, innovation, and problem

solving both in groups and in individual learning pursuits. There are several new literacy trends that are affecting schools and how schools are adapting and incorporating these changes.

NEW LITERACY TRENDS

A new trend in education has been entitled BYOD which means Bring Your Own Device. Students can bring mobile devices to school and use them as learning tools throughout the day. This is especially helpful for budget-strapped schools that cannot afford to purchase devices for each student. In fact, the state of California recently voted to allow BYOD in school districts that are interested in the policy since many schools already provide a Wi-Fi environment that allows students to use the web for inquiries, definitions, and research. As a result of this policy directive, select schools now have the ability to save money through fewer purchases, learners are more confident and competent using their own devices, and self-directed learning is more likely, thus enabling learners to build connections between school and home.

Many mobile devices and especially tablet computers are now designed with the Applications (App) Model firmly in place. Apps are pieces of software that can run on the Internet, on a computer, or on a phone or other electronic device. Advances in digital publishing, search technology, and location awareness have contributed to the demand for apps. The result is that app development has become a hotbed of high energy and these small, simple, low-cost software extensions have developed into a major new world market. Apps are relatively inexpensive in comparison to software and they are easy to add to devices using online stores. Many new apps sell for as little as 99 cents and they can be downloaded for no cost at all. Important apps for iPads that educators can start with include: Pages (for word documents), Keynote (for presentations), and Numbers (for mathematics).

The Cloud is a relatively new phenomenon and it refers to the servers that are used to store and back up all information. Devices can be connected through the Cloud and information can be transferred to several devices when they are synced with the Cloud. This can be quite advantageous and allows for better transfer of information between devices—something critical for use within schools. Proponents claim that Cloud computing allows enterprises, such as schools, to get their applications up and running faster. The ubiquitous

availability of high-capacity networks, low-cost computers, and additional storage devices has led to tremendous growth in Cloud computing. True mobility in this digital age means having access to the critical information that is needed regardless of where the devices are, whether on a desktop, laptop, tablet, or mobile hand-held device. When more than one device is being used, there is a syncing solution or strategy used via the Cloud that allows access to all of the most recent files as changes made to files from one device automatically get updated on the others. This ability allows ease in file-sharing and shared use of apps. Of course, the ability to synchronize and share apps is most important when working with an entire class, and as will be shown in the next few sections, especially when working with students to improve their reading comprehension and overall motivation to read (www.apple.com).

RESEARCH QUESTIONS

This quantitative study will answer the following three research questions:

- **RQ1:** Does using e-books on an iPad change comprehension, as measured by the QRI subscales of Independence and Instruction?
- **RQ2:** Does using e-books on an iPad change motivation to read, as measured by the AMRP subscales of Self-Concept and Value of Reading?
- **RQ3:** Can the change in reading comprehension be explained by the change in motivation to read after controlling for race, gender, state comprehension tests, and use of e-books as measured by the QRI scale after controlling for gender, ethnicity, established reading comprehension as measured by state testing, and motivation of subscales of Self-Concept and Value of Reading?

METHODS AND PROCEDURES

This study took place when four 6th grade reading classes were randomly assigned to two treatments, an e-books group and a t-books group. The classes were kept intact and assigned as “randomized blocks.” The number of students in the study was 100, with 48 students in the t-book group and 52 in the e-book group.

Using a pretest posttest design, change scores were analyzed for both comprehension proficiency and motivation to read. All students read the same book in two different versions, *The Lightning Thief* by Rick Riordan (2005). The e-book group read the e-book version on an iPad and the t-book group read the same book in traditional printed text. Students were measured for comprehension proficiency using the Qualitative Reading Inventory-5 ([QRI-

5]; Leslie & Caldwell, 2011), and motivation to read was measured by the Adolescent Motivation to Read Profile ([AMRP]; Pitcher et al., 2007).

Prior to running analyses, all data were inspected for assumptions of normality. Comprehension scores from the CA STAR testing were used as a baseline in determining equivalence between the two groups. Once normality and equivalence were determined, data was uploaded into SPSS-20. An ANOVA 2x2 study design analysis was used for Research Questions 1 & 2 and a subsequent Hierarchical Linear Regression analysis was used for RQ 3.

SIGNIFICANCE OF THE STUDY

The significance of this relatively small study is that it will be adding evidence-based research that showed a causal relationship between reading e-books on iPads and gains in comprehension proficiency and motivation to read. This research will add to the expansion of *New Literacies* Theory.

CHAPTER SUMMARY

This chapter has outlined the importance of understanding one of the *new literacies*, reading e-books on iPads, and the effect this new way of reading had on comprehension and motivation to read within a classroom context. This quasi-experimental study took place in a middle school environment with a focus on 6th grade students. A pretest posttest design was used to compare the comprehension proficiency and motivation change of students who read an e-book on an iPad and students who read the same book in traditional printed text.

DEFINITIONS OF KEY TERMS

- **Applications:** An app is a type of software that allows you to perform specific tasks. Applications for desktop or laptop computers are sometimes called desktop applications, and those for mobile devices are called mobile apps.
- **BYOD:** Bring your own device is a concept being used in schools where students are allowed to bring their own tablets, smart phones, laptops, and eReaders to school.
- **e-books:** In this study, this term is used for electronic books.
- **Motivation to read:** Involves the needs, goals, beliefs, and values of an individual whether the text is printed or electronic.
- **New literacies:** Refers to the literacies that continually evolve as new technologies appear. They include texting, blogging, maintaining a website, participating in online

social networking, creating and sharing music videos, podcasting, photo sharing, shopping online, participating in online discussion, emailing, using online chat, conducting and collating online searches, reading, writing, and commenting on literature, and processing and evaluating online information.

- ***New literacies' perspective:*** Assumes that new technologies will require new skills and strategies.
- **Reading comprehension:** The term reading comprehension is a complex, cognitive, and active process that requires intentional and thoughtful thinking between the reader and the text.
- **Self-efficacy:** Belief in one's ability to succeed in specific situations.
- **Tablet:** A mobile computer with display, circuitry, and battery in a single unit.
- **t-books:** Traditional texts using standard print; paperback books in this study.
- **21st century learning skills:** Include collaboration, communication, creativity, innovation, and problem solving.

CHAPTER 2

REVIEW OF THE LITERATURE

One of the most important issues in literacy today is that few adolescents choose to read on their own (Pintrich & Marx, 2007). Literacy researchers and educators continue to search for effective ways to change the adolescent perspective on the value of reading. Three theoretical lenses frame this study: reading comprehension, motivation to read, and New Literacy Theory. This review of the literature begins with an in-depth look at comprehension, motivation to read, and the *new literacies* with a focus on reading e-books on iPads.

COMPREHENSION

Comprehension deserves rapt and collective attention as it is truly the heart of reading. This section of Chapter 2 is organized to reflect what is currently known about comprehension of both printed and electronic text.

Theories

There are several theories that have been influential in promoting a deep understanding of comprehension. *Schema Theory* provides an explanation of how human knowledge is represented in memory (Anderson & Pearson, 1984). The metaphor associated with this theory is that the “reader is a builder,” an active constructor of meaning that is then stored (Anderson, 1977). Although the reader and the text are both considered important, emphasis in *Schema Theory* is given to the reader as the more dominant variable. This theory explains how information is stored in *schemata*, small containers into which the reader deposits experiences and ideas so that knowledge can be built upon and stored. *Schema Theory* became popular in the field of reading in the late 1970s with a model which suggests that comprehension occurs at the intersection of the reader, the text, and the context. Another enduring concept derived from *Schema Theory* is that of *prior knowledge*, which is knowledge that has been stored within compartments in the brain. This knowledge is available and ready to act as a foundational prerequisite to build upon for new information and experiences (Anderson, 1977). Spiro developed *cognitive flexibility* theory with the

argument that *schema theory* compartmentalized knowledge and did not allow for multiple perspectives. Spiro (2004) believed that comprehension and learning occur when multiple and even contradictory perspectives occur. *Situated cognition* emerged from the work of Brown, Collins, and Duguid (1989) who argued that teaching approaches meant to nurture cognitive development were abstract and separated from what is authentic, and that this does not promote comprehension. They argued for the value of “situated” cognition which situates a student in a context that is not abstract. Situated cognition is similar to the concept proposed by Rosenblatt in 1978. She described the context as a “zone” where the reader, the text, and the context come together and create new meaning. Theories on *metacognitive* thinking refer to the strategic reader as a “fixer,” capable of repairing comprehension failures by developing an arsenal of comprehension strategies (Paris, Lipson, & Wixson, 1983).

In 2002, the RAND Reading Study Group (RRSG) was charged with developing a research framework to address the most pressing issues in literacy. Comprehension was chosen as the focus and it was defined as a process involving extraction and construction of meaning. The focus on reading comprehension led to the development of three priorities for comprehension research:

1. Instruction: How can we best promote the development of reading comprehension?
2. How can we prepare teachers to deliver effective comprehension instruction?
3. Assessment: How can we develop an assessment system for reading comprehension?

The RAND report summarized a long list of research on comprehension as an active, constructive, meaning-making process in which the reader, the text, and the activity play a central role (Kintsch & Kintsch, 2005; National Institute of Child Health and Human Development [NICHD], 2000; RRSG, 2002). It is from this perspective that I will specifically refer to the reader, the text, and the activity as the major elements of comprehension and they are part of the larger socio-cultural context, which includes classrooms, homes, and neighborhoods (RRSG, 2002)

Traits of the Reader

The three specific traits of a reader that affect comprehension are *disposition* toward reading, *prior knowledge*, and *cognitive ability* (Coiro & Dobler, 2007).

The first trait is the readers' disposition toward reading. While some students are inclined to pursue and enjoy reading at an early age, others do not share that inclination. This predisposition can be accelerated and promoted by parents and teachers who instill beliefs in the value of reading. Success with reading at an early age fosters self-efficacy in that it develops a sense of competence that is perpetuating. How competent students feel about their reading ability affects how well they read.

Psychologist Albert Bandura (1982) defined self-efficacy as one's belief in one's ability to succeed in specific situations, with reading ability being a prime example. Self-efficacy affects every area of human endeavor, by determining the beliefs a person holds regarding his or her power to affect situations, thus strongly influencing both the power a person actually has to face challenges competently and the choices a person is most likely to make. People generally avoid tasks where self-efficacy is low, but undertake tasks where self-efficacy is high. Research shows that the optimum level of self-efficacy is slightly above ability; in this situation, people are most encouraged to tackle challenging tasks and gain experience.

Low self-efficacy can lead people to believe tasks are harder than they actually are. This often results in increased stress. A person with high self-efficacy will attribute failure to external factors, where a person with low self-efficacy will blame low ability. For example, someone with high self-efficacy with respect to technology may attribute difficulties to the computer whereas a person with low self-efficacy will attribute the result to lack of skills or even ability.

Academic self-efficacy refers to the belief that one can successfully engage in and complete course-specific academic tasks, such as accomplishing course aims, satisfactorily completing assignments, achieving a passing grade, and meeting the requirements to continue to pursue one's major course of study. Various empirical inquiries have been aimed at measuring academic self-efficacy. Other areas of self-efficacy that have been identified for study include teacher self-efficacy and technological self-efficacy.

Other disposition factors found to relate to comprehension include: the readers' self-regulation while reading, setting goals, selecting and using reading strategies, self-evaluation of progress and understanding what was read. Horner and Shewry (2002) found that personal goals, values, beliefs, and needs affect an individual's motivation to read and found that a

disposition toward reading can be readily seen when a pattern of behavior is directed toward reading. Garner, Alexander, Gillingham, Kulikowich, and Brown (1991) found that interest in what is being read is helpful for recalling ideas from informational text.

Motivation to read digitized text involves having a confidence level in both reading and technology. Students are often intuitive about technology and they receive praise for their ability to use and explore technology. This results in a confidence level for technology that may enhance students who do not read well but who are motivated to use the technology. Research has shown that middle school age students who do not read well in printed text do score at a higher level of competence when reading digitally (Coiro & Dobler, 2007).

The second reader trait is prior knowledge, which can be defined as a combination of a reader's pre-existing experiences, and knowledge; it is the knowledge a reader brings to any situation (Anderson & Pearson, 1984). A long line of research supports the idea that the knowledge a reader constructs is actually related to what the reader already knows (Afflerbach, 1986; Means & Voss, 1996). This is clearly individualized knowledge since few people have the same set of background experiences. Even if individuals have the same new experience, they will not understand the experience the same way due to their different backgrounds. The concept of prior knowledge is a key element central to comprehension because it explains how the reader builds upon knowledge already attained.

There appears to be general agreement with the idea that distinct types of knowledge are stored in groups and readers draw from these groups in order to construct meaning. This is especially true when the reading and learning are from informational text. The first type of group is general world knowledge (Anderson & Pearson, 1984), followed by subject-matter knowledge that is broad-based. Finally, there is prior knowledge of text structure, which is the foundation a reader uses to mentally organize ideas. Skilled readers apply appropriate skills and strategies to the informational reading task (Goldman & Rakestraw, 2000).

Studies of traditional print-text comprehension indicate that readers call upon all of these prior knowledge sources to monitor their comprehension (Baker, 2002), construct meaning (Anderson & Pearson, 1984), and ascertain what is important in informational text (Afflerbach, 1986). Readers who have sufficient prior knowledge regularly make inferences that meaningfully bridge textual ideas. Less knowledgeable readers tend to make fewer inferences and, as a result, have a lower comprehension of the text. Skilled readers also draw

upon their prior knowledge and metacognitive use of strategic reading processes to monitor, self-question, and apply appropriate fix-up strategies that repair comprehension (Baker, 2002; Duke & Pearson, 2002). Readers who demonstrate strategic use of how the text looks while drawing on prior knowledge are better able to identify important ideas. Processing strategies used when reading informational text can improve retrieval for later use (Goldman & Rakestraw, 2000). In general, it can be said that skilled readers activate their general world knowledge, their topic-specific knowledge, and knowledge of text structures in order to comprehend more demanding text.

The last characteristic involves the reader's cognitive ability to use a range of skills and strategies when reading. As the reader interacts with the text, the reader makes decisions as to which skills to use or which strategies to apply in order to understand the text. The reader reacts to the text both automatically if it is a skill and consciously if it is a strategy, and skills eventually become learned behaviors that can be applied automatically. The difference between the two is important to understand. Skills are often rote memorization and strategies are conscious, flexible plans that can be applied to a variety of texts. Very good readers automatically apply their skills and then consciously choose from a range of strategies. Skilled readers often preview the text, set goals, make predictions, ask questions, interpret, and summarize the text as they read in order to attain meaning. Both strategies and skills need to be applied when students are reading informational text due to challenging vocabulary and concepts. Narrative text is easier to comprehend and requires fewer strategy applications (Pearson, 2009).

There have been three waves of research devoted to the development of comprehension strategies. The first wave of experimental research occurred between 1980 and 1995 (Pearson & Fielding, 1991; Tierney & Cunningham, 1991). More comprehension instructional research was conducted in this time frame than in all of the previous history of reading research. This research is very supportive of instruction that applied both schema and metacognitive theory and found that students benefited most from teachers who would focus attention on the structure of the text or the knowledge domain (Pearson, 2009). Hansen and Pearson (1983) found that students' dispositions for drawing inferences or making predictions improved when they would make a conscious effort to draw relationships between the text and the background knowledge. Palinscar and Brown (1984) found that

comprehension skills improved when students monitored their own reading, making sure it made sense to them. These same researchers found that when strategies were taught explicitly, students could learn to apply them in ways that improved their comprehension (Pearson, 2009).

The paradigm shift that took place in reading comprehension as a result of all of this experimental research was that the reader became a “builder” constructing knowledge, and a “fixer” correcting understandings. Comprehension appeared to involve a transformation where the reader generated meaning as a result of reading the writers’ ideas (Pearson & Fielding, 1991).

Another result that came out of the early pedagogical experiments was an instructional model that has persisted for more than 25 years. This model suggested the need for research on the dynamic role of the teacher in comprehension strategy instruction. The teachers’ role was to move from modeling and direct instruction to scaffolding and guided practice. This type of instruction has been named the gradual release of responsibility model and the goal is that responsibility moves in the direction of the student who is able to take on more responsibility while being mentored (Pearson & Gallagher, 1983).

Schema Theory began to lose its hold as the dominant theory in the latter part of the 1990s when the perspective shifted and the various strands of language, reading, writing, listening, and speaking were woven together, acknowledging their interdependence. This new perspective became valued as it acknowledged the strength and depth of the combination. At this point in time, scholars in the field of reading began to shift and use the term, “literacy research.” This move toward “literacy” was a shift away from *Schema Theory*.

The landmark studies of Palinscar and Brown (1984) and Paris et al. (1983) paved the way for strategy expansion. Expanded strategy research grew rapidly and continued into the 21st century (Duke & Pearson, 2002; NICHD, 2000; Pearson & Fielding, 1991). Findings were consistent, indicating that as students are taught to apply analytical strategies to text, comprehension improves. Two highly respected “suites of strategies” were developed at this point in time. The first set of strategies became known as Reciprocal Teaching and it is a type of student-teacher dialogue that includes predicting, questioning, clarifying, and summarizing. The second suite of strategies became known as transactional teaching and

argues that meaning is constructed in the transaction between a particular reader and a particular text. Readers bring their prior knowledge to bear on the reading event and meaning is actively constructed. Transactional strategies incorporate the four strategies of reciprocal teaching and add a fifth strategy, which is interpretation (Pearson, 2009).

Strategies for teaching students how to read electronic text depend on whether the text is offline or online. Offline refers to the type of electronic text found in a closed system environment such as e-books and online refers to text that is found on the Internet, a wide-open environment with no boundaries. While some of the strategies used with traditional printed text can be applied to offline electronic text, little is known about the skills and strategies that contribute to successful online reading comprehension. Federal reports acknowledge the reading challenges inherent in Internet text (NICHD, 2000; RRSg, 2002). Data from several studies suggest that students who are skilled in print-based environments may actually struggle in online contexts (Bilal, 2001; Wallace, Kupperman, Krajcik, & Soloway, 2000).

Knowing that different texts prompt readers to flexibly draw upon different sets of cognitive strategies and sources of prior knowledge (RRSG, 2002; Spiro, 2004), this review of the literature is organized to reflect what is currently known about how readers comprehend printed text as well as electronic text. Unfortunately, comparatively little research has conceptualized the use of the Internet as a reading issue or looked specifically at the reader characteristics that contribute to online reading.

Attention needs to focus on the role of the new skills and strategies the reader needs for comprehending online texts. Most studies that explore how students use the Internet for school-related information tasks do not frame the issues as important aspects of reading comprehension. A few studies have begun to investigate the role that reader characteristics, such as reading ability and prior knowledge, may have on reading information in diverse, open-ended Internet contexts.

Schmar-Dobler (2003) used a case-study approach informed by preliminary notions of the *new literacies* (Leu, 2000) to investigate the reading strategies used by five skilled fifth-graders to search for text-explicit and implicit information on the Internet. In addition, Schmar-Dobler observed skilled online readers applying unique navigating processes woven throughout traditional information seeking practices in ways that suggested different

strategies may be required to locate and evaluate online information texts. Schmar-Dobler concluded that new ways of viewing literacy may be required to describe the skills and strategies necessary for reading on the Internet. In two other studies, Bilal (2000, 2001) worked with approximately 25 seventh graders to explore the relationship between children's attributes (e.g., prior knowledge and reading ability) and their success using a children's search engine. Bilal designed an analysis method, the "Web Traversal Measure," to determine the effectiveness, efficiency, and quality of search strategies while students used the Yahoolligan's search engine to locate answers to one researcher-imposed fact-based search task (Bilal, 2000) and a multi-step research task (Bilal, 2001).

Data sources for both studies included scores on the Web Traversal Measure, screen shot recordings of all onscreen activity, teacher assessments of student attributes (prior topical knowledge, prior domain knowledge, and reading ability), and student exit interviews. With respect to cognitive strategy use, results indicated a difference in the effectiveness and efficiency of skills and strategies used to navigate online informational text in two different contexts (e.g., search engines and information websites). More specifically, when compared to unsuccessful children, successful or partially successful children were better at formulating keyword searches, they tended to follow hyperlinks with more relevant labels, and their navigational styles were characterized by fewer number of moves and less frequent use of the back button (Bilal 2000, 2001). Analysis of data from the exit interview also suggested affective variables such as positive feelings, self-confidence, persistence, and patience were prevalent among successful readers while confusion and frustration were observed among those unable to successfully complete the tasks. Surprisingly, however, in both studies, results indicated children's domain knowledge influenced their success (Bilal, 2000, 2001).

Four studies conducted by members of the New Literacies Research Team at the University of Connecticut have begun to tackle these issues. Each study directly framed its work on the theory that online reading comprehension is a complex problem-solving process involving aspects of locating, evaluating, synthesizing, and communicating (Leu et al., 2004). In the first study, Coiro and Dobler (2004) employed qualitative methods to explore the nature of online reading comprehension among 11 sixth-grade students purposely selected as having high combinations of standardized reading scores, reading report card

grades, and Internet reading experiences. Students were asked to complete two separate online reading comprehension tasks. First, these skilled readers read within a multi-layered informational website while answering seven comprehension questions, and second, they used the Yahoo!igans search engine to locate answers to two open-ended questions related to the sixth grade curriculum. At the beginning of each online reading session, students were asked to rank their prior knowledge about each task's topic (e.g., tigers and hurricanes) on a scale of 1 to 5, with 5 being the highest. Oral responses to the nine open-ended comprehension questions were scored as incorrect, partially correct, or fully correct. Data from think-aloud protocols, field observations, and semi-structured interviews provide initial insights into the nature of online reading comprehension.

Findings suggested that successful Internet reading experiences appeared to simultaneously require both similar and more complex applications of: (a) prior knowledge sources, (b) inferential reasoning strategies, and (c) self-regulated reading processes. The authors suggested that reading Internet text prompts a process of self-directed text construction that may explain the additional complexities of online reading comprehension (Coiro & Dobler, 2004).

Coiro and Dobler (2007) replicated their study of 11 skilled Internet readers with 10 less-skilled Internet readers. In the 2004 study, 10 sixth-grade readers from the same population with comparatively lower standardized reading scores, reading report card grades, and Internet reading experiences completed the same two online reading comprehension tasks. Data from think-aloud protocols, field observations, and semi-structured interviews were collected from the less skilled readers and compared to those obtained from skilled readers in the earlier study using contrastive case study methods. Coiro and Dobler's (2004) qualitative findings suggested many of the same themes found to characterize the online reading comprehension processes of 10 skilled sixth grade readers (Coiro & Dobler, 2007) could also be used to describe the reading processes of less skilled readers. That is, both skilled and less-skilled readers demonstrated qualitatively similar and more complex applications of: (a) prior knowledge sources, (b) inferential reasoning strategies, and (c) self-regulated reading processes. However, it appeared that traditionally skilled readers with Internet reading experience were aware of, and demonstrated, strategic online reading processes to a higher degree than their less-skilled peers with Internet reading experience.

Across the two studies, there were large differences between the mean accuracy of skilled and less skilled readers on both types of Internet reading tasks. Further evidence from think-aloud protocols suggested that skilled readers appeared to use their topical background knowledge and vocabulary skills to help make choices about what might lead to the information they need on the Internet (Coiro & Dobler, 2007), while less skilled readers seemed to have less detailed knowledge and topical vocabulary from which to draw upon (Coiro & Dobler, 2004). In turn, their reading and navigation choices (e.g., where to click, what to read, where to focus their attention) appeared to be less informed by their prior topical knowledge and more by random decision making as they read for information on the Internet. Similar qualitative patterns of differences appeared in the ways skilled and less-skilled readers applied their inferential reasoning strategies and their ability to make connections and synthesize information from multiple online sources.

These early findings suggested reader characteristics such as offline reading ability and prior topic-specific knowledge may play an important role in effective online reading comprehension. Likewise, information from this study helped shape an understanding of the areas most likely to challenge or hinder readers tasked with locating, evaluating, and synthesizing information on the Internet.

In a third study, Leu et al. (2005) conducted a quantitative analysis of the extent to which teaching new online reading comprehension skills and strategies contributed to learning in middle school science classrooms where the Internet was used. Three sets of research questions related to changes in online reading performance, science content learning, and traditional reading comprehension performance were studied with 89 seventh-grade students in four sections of science at a suburban middle school in the northeastern United States.

Quantitative analyses using ANCOVA, MANCOVA, and correlation procedures evaluated the effects of varying levels of intensity of Internet integration and strategy support into classroom science instruction over a 12-week period. Online reading performance, or the ability to locate, evaluate, synthesize, and communicate information on the Internet, was measured with an instrument called the Online Comprehension Assessment-Blog (ORCA-Blog, as cited in Leu et al., 2005). The three task scores demonstrated adequate construct validity by predicting one general factor that explained 59.2% of the variance in scores. In

addition, the 10 items demonstrated adequate internal reliability with a reported Cronbach's alpha of .84. Results found that Internet integration in a seventh grade science classroom resulted in higher achievement levels on online reading comprehension tasks. The researchers concluded that with additional refinement, the ORCA-Blog assessment might enable researchers to effectively measure the complex proficiencies of online reading comprehension. Moreover, findings from this study indicated a very low and insignificant correlation ($r = .103, p = .352$) between the ORCA-Blog and a common standardized state assessment of traditional reading comprehension. The authors also reported cases of students who were highly proficient offline readers but were unskilled online readers.

Cases such as these add another layer of complexity to earlier work that suggested online reading comprehension requires similar but more complex skills compared to comprehension of traditional text (Coiro & Dobler, 2004, 2007).

In a fourth investigation (Leu et al., 2008), researchers revisited online reading episodes from three seventh grade students gathered by Leu et al. (2005) to evaluate the extent to which online and offline reading comprehension was similar, related, or isomorphic. To do this, each student's online reading performance was qualitatively compared with his or her offline reading proficiency level on a statewide, standardized measure of reading comprehension.

Results provided evidence that a very high achieving offline reader could simultaneously be a low achieving online reader and likewise, a very low achieving offline reader could be a high achieving online reader. In other words, findings suggest we can no longer assume that offline reading and online reading processes are the same. Rather, this study reported preliminary evidence that isomorphism does not exist between offline and online reading comprehension. These findings have important implications for reading instruction, since they suggest that readers who struggle with offline materials may not struggle with online materials to the same extent, as long as they have the essential skills and strategies for online reading comprehension. In summary, the studies reviewed for recent work on comprehension of digital text investigated and explored both reader characteristics and textual characteristics that affect comprehension.

COMPREHENSION AND MOTIVATION TO READ

Reading instructional programs increasingly focus on comprehension skills as children matriculate through school. Researchers are investigating what predicts the growth of reading comprehension skills, given their importance to children's academic success. Motivation researchers have discussed how motivational and cognitive processes interact, and how each affects achievement outcomes (Pintrich, 2003; Pintrich & Marx, 2007). In particular, such research has focused on how motivation provides an activating, energizing role for cognitive processes, which in turn can impact achievement (Pintrich, 2003; Taboada & Guthrie, 2006). For example, Taboada and Guthrie (2006) reviewed work showing that motivational variables such as self-efficacy and intrinsic motivation predict students' achievement in different areas such as reading ability, math, language arts, sports and occupational choice.

In the field of reading motivation, several researchers have examined the relations among motivation variables and literacy skills. For example, research has found relationships between children's reading self-concept and reading comprehension skills (Chapman et al., 2000). Findings showed that children who reported negative reading self-concepts performed poorly on reading-related tasks compared to children with positive reading self-concepts (Chapman et al., 2000).

Late-elementary school students' intrinsic motivation has been associated with reading comprehension and, in addition, specific dimensions of reading motivation (such as involvement and curiosity) and reading comprehension are correlated (Taboada, 2004). Factor analysis has distinguished five related dimensions of reading motivation and argues that they constitute a construct called internal motivation for reading. These five dimensions of motivation are: (a) perceived control, (b) interest, (c) self-efficacy, (d) involvement, and (e) social collaboration. Empirical evidence has shown the interrelatedness of these five dimensions. For instance, Taboada and Guthrie (2006) examined these constructs with fifth-graders and found that correlations among them were statistically significant at two time points in the school year, indicating that they are indeed related to each other. These moderate correlations indicate that these dimensions of motivation are independent, while still related. Internal motivation is strongly related to intrinsic motivation because it comes from within the individual. Support for the cohesiveness of internal motivation for reading is

based on the empirical evidence that has repeatedly shown relationships between internal motivation and reading comprehension at different ages.

In this study, the relationship of comprehension and motivation was investigated because it provides insight into the factors that may be at work after adolescents have been introduced to reading e-books on iPads.

NEW LITERACY THEORY

New Literacy Theory is a broad, inclusive concept in that it permits exploration of the ongoing development of *new literacies* generated by ever-changing devices. By assuming change in the New Literacy model, everyone is open to a continuously changing definition of literacy, based on the most recent data that emerges across multiple perspectives, disciplines, and research traditions. This New Literacy Theory is informed by cognitive and language processing theories such as socio-cognitive psychology, psycholinguistics, *Schema Theory*, metacognition, constructivism, and other similar theories. This orientation includes a particular focus on examining the cognitive and social processes involved in comprehending online or digital texts (Coiro & Dobler, 2003, 2007; Leu et al., 2004).

One aspect of New Literacies Theory that has attracted researchers' attention is school-age children's comprehension when reading digitally. Specifically, researchers are interested in finding the answers to questions such as: how does digital reading differ from print-based reading? In their research, Donald Leu and Julie Coiro attempted to understand how students become adept at online reading, and how students acquire the necessary skills, strategies, and dispositions to comprehend digitized text. Leu et al. (2008) have begun to explore the use of a modified instructional model of reciprocal teaching that reflects some of the differences between offline and online reading contexts. The model for teaching online comprehension that is currently being researched is known as Internet Reciprocal Teaching where each student has his or her own laptop and the students meet in small groups to do research and use new comprehension strategies.

This particular study includes the new literacy perspective of comprehension because of the integral position that digitized reading has taken within our society. The growing emphasis on digital reading has shown us that this type of reading will not only continue to be important to students but that its emphasis will most likely continue to grow

exponentially. Further, this perspective's emphasis on asking important questions, searching for information, critically evaluating information, synthesizing across texts, and communicating is most closely aligned with literacy learning in today's K-12 classroom (Castek, 2008). In this study, I will draw upon the *new literacies* perspective using the cognitive strategies readers bring to the task of reading in relation to the comprehension process.

Diverse constructs are used to capture the general notion that new technologies often require new literacies. In this study, the *new literacies* (Coiro, 2003; Leu et al., 2004) is a term that is often used in perspectives as diverse as sociocultural theory (Lankshear & Knobel, 2006), gaming and collaborative media (Gee, 2004), media literacy (Jenkins et al., 2006), and cognitive theories grounded in literacy research (Coiro et al., 2008; Leu et al., 2004).

Coiro et al. (2008) have distilled four theoretical principles common across these varied conceptualizations that define a broad, umbrella theory of the *new literacies*, within which all of these perspectives fall. First, all agree that emerging technologies require novel skills, strategies, and dispositions for their effective use. Second, all believe that *new literacies* are central to full civic, economic, and personal participation in a world community. Third, all recognize that *new literacies* constantly evolve as their defining technologies are continuously renewed through constant innovation. Finally, it is commonly recognized that *new literacies* are multiple, multimodal, and multifaceted. Within this broad, common set of principles, many *new literacies* perspectives are developing.

Students of all ages are beginning to read e-books on iPads or other tablets. Other changes also include new ways for teachers to access and monitor student performance. Students report that the tablets allow them to visualize difficult concepts through video clips, revisit lectures and augment lessons in a multitude of ways (Johnson, Adams, & Cummins, 2012). Tablets offer the opportunity for a multi-faceted education. The shift to digitized text is not just about replacing textbooks but inventing new ways of learning. A multitude of educational apps have been developed for the iPad and there is no end in sight as to how many apps will continue to be developed. All of these changes indicate that we are just beginning to grasp the magnitude of the changes that one to one tablets on each desk will have. Although the research is definitely lagging, teachers are finding ways to integrate iPads

and reports on classroom uses are growing. One recent study was conducted by university professors in a K-5 school. The results of this work with 4th graders will be presented next.

Dr. Amy Hutchison, Beth Beschorner, and Dr. Denise Schmidt-Crawford of Iowa State University recently completed a research study using the iPads for literacy instruction. The goal of their investigation was to explore how a 4th grade teacher could integrate iPads into her literacy instruction to simultaneously teach print-based and digital literacy goals. The teacher used iPads for a 3-week period during her literacy instruction and selected apps that provided unique approaches to helping the students meet their literacy learning goals. An explanation of how to develop lessons that meaningfully integrate iPads was presented by Hutchison et al. (2012), as well as lessons learned from the project.

Several positive aspects of using iPads in the classroom were:

1. Students were able to navigate the iPad without a lot of instruction from the teacher.
2. Students worked collaboratively on their assignments using the iPads.
3. The apps made it easy to differentiate assignments for students.
4. The iPads power on and off quickly which makes them very easy to use.
5. It is easy to store the iPads in the desk and then just pull them out to use when the teacher allows this.

Other recent research indicates that tablets foster key 21st century skills in students, including: creativity, innovation, communication, and collaboration (Johnson et al., 2012). Although the amount of research available for tablets is limited, it is interesting to realize that more than 95% of the research done on tablets has been done on iPads due to the dominance in this field (Consortium of School Networking [CoSN] & International Society for Technology in Education [ISTE], 2012). The enthusiasm for these devices is driving researchers to respond and a review of the available research for iPads is an essential starting point. Recent numbers suggest that since 2010, more than 4.5 million iPads have been sold to educational institutions in the United States, and more than 8 million iPads have been sold to educational institutions around the world (<http://www.apple.com>). Projections suggest that, as the price range of less expensive iPads grows, momentum for school purchases will become stronger. However, the large number of sales—particularly for use in the

classroom—provides verification that the iPads are valued and being used in many educational institutions. The following are some reports of classrooms using iPads.

The first group to look at is *iPads for Education*, which is based in Australia. The outcomes they report are positive and there appears to be increased student engagement, a sense of leadership, good teamwork, improved communication, and more effective literature circles. Apps such as “Edmondo” and “Good Reader” were reported as well received by students and i-books are being used to annotate, share notes, and bookmark (Johnson et al., 2012).

Calgary Science School is using the iPad to facilitate one-to-one iPad usage in the classroom. Reports show success in that students are producing instead of just consuming information. This school is part of Apple’s global “Challenge Based Learning” program and this school is documenting its iPad journey so that findings will be beneficial to educators (Johnson et al., 2012).

Pleasant City Elementary School in Florida is using both i-books and e-books for interactive lessons that lead to the creation of a library of e-books that all students can use. The goal of a library of e-books is motivating to students because the content will be driven by students (Johnson et al., 2012).

Ringwood North Primary School in Melbourne, Australia, is using one to one iPad devices with fifth and sixth graders. This study is part of Apple’s global “Challenge Based Learning” program. Research projects include studying areas hit by natural disasters, studying the issues, and then implementing solutions that might help a community recover (Johnson et al., 2012).

Global Nomad Group’s exchange program Youth LINKS is using tablets to reach an audience in Kabul, Afghanistan. Youth LINKS is a year-long program connecting six schools in the U.S. with six schools in Afghanistan via videoconferencing and online platforms. This program has the potential to be extended to places that have a wireless signal (Johnson et al., 2012).

Snoqualmie Valley School District in Washington embarked on an iPad pilot program to identify teacher and student training needs, understand how the iPad can enhance student learning and achievement and provide avenues for teachers to network and share best practices on integrating the device into the curriculum (Johnson et al., 2012).

Tablets have proven benefits for students with special needs. At Belle View Elementary School in Virginia, the iPad has enabled autistic students to communicate what they are thinking and what they need from their teachers. At Auburn School in Maryland, students with social and communication disabilities can be found sitting together, pouring over content displayed on the iPad, and making eye contact with one another (Johnson et al., 2012). Students choose from a wide spectrum of apps and e-books, such as English literature and the enhanced e-book for T.S. Elliot's *The Wasteland*. The e-book versions provide easy-to-comprehend notes on the text, video interviews with authors and scholars, and other reading aids. The school sees the investment as one that will pay for itself by cutting future costs in printing and textbook costs (Johnson et al., 2012).

California-based Archbishop Mitty High School's iPad Program can be found at go.nmc.org/mitty. This high school has been named an Apple Distinguished School. Students are using their iPads for a huge part of the day: graphing quadratic equations and parabolic functions in their mathematics classes, exploring interactive maps in their social studies classes, creating presentations, and performing a wide variety of other tasks across multiple disciplines. The variety of ways to use iPads in the classroom shows the versatility of applications as learning tools. Classrooms that are fortunate enough to go one-to-one with an iPad on each student's desk are no longer futuristic. Educators see the potential and are finding ways to provide innovative iPad opportunities. Once research can show that the learning is improved and that the device can enhance each day in school, the funding will follow. The opportunities and possible uses of this kind of tool are endless.

CHAPTER SUMMARY

This chapter used research to help explain the following questions:

- **RQ 1:** Does using e-books on an iPad change comprehension, as measured by QRI subscales of Independence and Instruction?
- **RQ 2:** Does using e-books on an iPad change motivation to read, as measured by the AMRP subscales of Self-Concept and Value of Reading?
- **RQ 3:** Can the change in reading comprehension be explained by the change in motivation to read after controlling for race, gender, state comprehension tests, and use of e-books as measured by the QRI scale after controlling for gender, ethnicity, established reading comprehension as measured by state testing, and motivation subscales of Self-Concept and Value of Reading?

While findings from these three lines of research provided important implications for literacy education, we unfortunately know little about comprehension proficiency and motivation to read using e-books. There is a need for more empirical research on the new literacy of reading e-books on iPads. This study will add to the literature on this subject.

CHAPTER 3

METHODS

This chapter provides a methodological overview for investigating and statistically analyzing data gathered from the Adolescent Motivation to Read Profile ([AMRP]; Pitcher et al., 2007) and the Qualitative Reading Inventory-5 ([QRI-5]; Leslie & Caldwell, 2011). The problem this study addressed is that very few adolescents choose to read on their own. The purpose of this evidence-based research study was to analyze data and determine if there was a relationship between reading e-books and changes in comprehension and motivation. Reading e-books on tablets is a *new literacy* and it has the potential to motivate adolescents to read.

THE SITE

This study began with a meeting between the researcher and the district superintendent of a small district in southern California. The researcher presented a proposal for research that would study the effects on motivation to read and comprehension after adolescents read e-books on tablets. The superintendent suggested using the iPad and doing the study with adolescents at the middle school.

The principal of the middle school suggested that the research be done with the sixth grade students who had a 50-minute period of reading every day. The principal explained that there were two reading teachers for the eight sixth-grade reading classes and it was decided that the next meeting would include the reading teachers.

At the next meeting, the researcher explained the study to the reading teachers and they were both interested. However, one reading teacher was going on leave for the rest of the school year. The other reading teacher said she would like to do the study if it could be done after state testing. The school calendar was reviewed and the decision was made to do the study during the last 6 weeks of school, right after state testing.

PARTICIPANTS

The middle school in this small suburban town has over 200 sixth-grade students. The ethnicity of the sixth graders was 75% white and the gender split was 52% females. Many families fall into a middle class bracket; however, there is a wide socioeconomic spectrum. Education is valued in this community and most students go on to higher education. The school district supports the integration of technology and has adopted a Bring Your Own Device policy. Students bring devices such as: tablets, laptops, and smart phones. Students can be provided with Netbooks as needed. The middle school provides a Wi-Fi environment. Internet use is constrained through the use of filters; however, students are also being taught to be responsible users of this privilege.

The reading teacher in the study had four sixth grade classes with 100 students in total. The four classes were kept intact as “Randomized Blocks” and two classes were randomly assigned to the e-book group and two classes assigned to the t-book group. The two new treatment groups had 52 students in one group and 48 in the other. Unbalanced membership did not require special analysis in this quasi-experimental design. To determine initial equivalence of the two treatment groups, differences in gender (male, female) and ethnicity (white, not white) were evaluated with Chi-square tests, and *t* tests were used for comprehension scores from the state testing. These scores provided a baseline for the analyses. As shown in F (p. 38), there were significantly more boys than girls in the e-book condition and there were significantly more white students. There was no significant difference for ethnicity between the groups. The two groups were equivalent using mean scores for comprehension, as shown by the STAR scores. Refer to Table 3 (p. 38) where equivalence is shown in the mean scores between the two groups.

THE BOOK

The book used for the intervention was *The Lightning Thief*, by Rick Riordan (2005). *The Lightning Thief* is Book One in a series about Percy Jackson and the Olympians and the combination of action and fantasy make it a good choice for middle school age students. Two different versions of *The Lightning Thief* were used in the study: the electronic or e-book version and the traditional or printed book. The two treatment groups were named for the e-book group and the t-book group depending on which version of the book the students read.

The experimental group became the e-book group and the control group became the t-book group

The added features of an e-book include:

- Individual words can be tapped providing choices such as: Define, Highlight, Take Notes, and do a Search.
- Tapping Define brings up a small window with a dictionary definition. The definition gives the part of speech and uses the word in a sentence.
- Tapping Highlight allows words or sentences to be highlighted in a variety of colors.
- Students can take notes on a note page.
- Searching the web allows a Google Search or a search on Wikipedia.

E-books can be read on a variety of devices. The iPad was chosen for this study because it had just come out in 2010 and there was a lot of interest in the possibilities offered with this new device. The iPad is a combination e-Reader and a computer. This is a major advantage over the much simpler e-Readers. When the free iBook app is downloaded onto the iPad, it can be used as a virtual library for storing e-books.

TIMELINE

The study took place during the last 6 weeks of the school year, immediately following state testing. Students were given the QRI-5 and the AMRP before and after the Intervention. The timeline in Table 1 shows the 6-week schedule.

Table 1. iPad Intervention Schedule

Sessions	Date
Pretests: AMRP and QRI-5	April 26-April 27
Week 1: Independent Reading	April 30-May 4
Week 2: Independent Reading	May 7-May 11
Week 3: Independent Reading	May 14-May 18
Week 4: Independent Reading	May 21-May 25
Week 5: Independent Reading	May 28-June 1
Posttests: AMRP and QRI-5	June 4-June 5

The daily schedule during the Intervention was based on the four reading classes in the study having a 50-minute period of reading every week. The research design was a 2x2 analysis in that there were 2 groups to compare and 2 measures, with pre- and posttesting. The e-book group read the *The Lightning Thief* for 50 minutes once a week. The researcher

took small groups of 5-6 students each day from this group so that they could read on iPads. When the students in the e-group returned to the regular classes, they did something that the reading teacher assigned while their classmates were reading for 10 minutes (see Appendices A and B for lesson plans). The reading teacher worked with her four reading classes. The two classes in the t-book group read the *The Lightning Thief* for 10 minutes every day. The amount of time the t-book group spent reading was 50 minutes a week. In summary, students in the e-book group read the e-book on the iPad for 50 minutes each week. The students in the t-book group read the printed book for 10 min. a day or 50 min. for the week.

ASSESSMENT INSTRUMENTS

Before the intervention began, as well as after it ended, students in both the e-book group and the t-book group were administered the Adolescent Motivation to Read Profile (AMRP) and the Qualitative Reading Inventory (QRI-5). This section provides an in-depth discussion of these two instruments. The motivation survey, the Adolescent Motivation to Read Profile, was developed in 2007 by a group of researchers who came together at the National Reading Conference. Their goal was to put together a survey that would be appropriate for adolescents. The researchers defined motivation to read in terms of the beliefs, values, needs, and goals that adolescents have. The decline in adolescent motivation to read has been noted by many researchers and the decline usually starts as students progress through middle and go into secondary school. As such, the researchers felt it was critical to look at the roles of engagement, self-efficacy, and purpose for reading as they all relate to both motivation and comprehension (Pintrich & Marx, 2007).

The AMRP was developed as a 20-item survey based on a 4-point Likert scale with the highest possible total score being 80 points (see Appendix C). The even numbered questions were used to determine self-concept as a reader and the odd numbered questions were used to determine the value of reading. To calculate the Self-Concept raw score and Value raw score, student responses were tabulated for each category. Raw scores were converted to percentage scores by dividing student raw scores for each category by the total possible score (40 for each subscale, 80 for the full survey). These scores were then converted to scale scores for statistical analysis.

The Qualitative Reading Inventory ([QRI-5]; Leslie & Caldwell, 2011) is an informal reading assessment that can be given to groups or individually. Students read narrative and expository selections that are provided for the third grade level through high school level and include descriptive science and social studies materials that are highly representative of the structure and topics found in content-area textbooks. To address validity, Leslie and Caldwell (2011) examined their reading inventory for correlation with comprehension tests that have multiple-choice or closed formats. They examined the correlation between the QRI's instructional level and the student's national curve equivalent (NCE) or standard score on a group administered standardized reading test, and the results determined that the QRI is a reliable and valid instrument for determining comprehension proficiency at multiple levels.

The QRI-5 is often used for pre- and posttest assessments. Finding the student's reading level is appropriate in a silent reading group format for grades three and above, according to the authors. This option has been widely used in schools and school districts and was used in this study as well. Operationally, the relevant passages were duplicated and packets were given to both groups of students. The students silently read the passage and wrote answers to the questions on sheets provided for that purpose. If some students finished before others, the teacher asked them to read independently and wait until all had finished. All question sheets were collected at the same time and ample time was given for the slower readers to complete the task. The researcher scored the answers according to the guidelines provided in the QRI-5 manual and the scores were converted to scale scores using the approach described by Braxton (2009). This approach produced an estimate of the student's independent and instructional comprehension levels.

Data from the two measures was entered into Excel spreadsheets for both measures. Finally, the data from Excel was uploaded into SPSS-20 in order to facilitate statistical analyses. This study examined changes in both comprehension proficiency and motivation to read. The initial review of the data determined suitability for various types of hypothesis tests including: Independent Sample, Paired-Sample t-tests, ANOVA's and hierarchical linear regression. The quantitative results are reported in Chapter 4 in sections organized to answer the research questions.

SUMMARY

This chapter addressed the problem of adolescents losing their motivation to read suggesting that the new literacy of reading e-books on iPads might provide motivation to read and subsequently improve comprehension. The relationship of motivation and comprehension suggest that students who are motivated to read become more proficient in their comprehension (Taboada and Guthrie, 2006). The elements in this research design are clearly delineated so that replication of the study is feasible. The next chapter will look at the results of the data analysis and determine whether reading e-books on tablets affects comprehension and motivation to read and what variables predict or explain the change in comprehension proficiency.

CHAPTER 4

RESULTS

Developing the skills and strategies necessary to read and comprehend digitized text will play a key role in the 21st-century students' academic learning and success. To further the research in this area, this study examined changes in comprehension proficiency and motivation to read after sixth grade students read an e-book on an iPad while others read the same book in standard printed text. Pre- and posttest measures were used to examine changes in the motivation to read by looking specifically at self-concept as a reader and the value held for reading. Similarly, pre- and posttest measures were used to calculate changes in comprehension proficiency for Instructional and Independent grade levels of reading. After the data were collected, scored, and initial comparisons of the two groups were made, the descriptive pretest data were analyzed.

This chapter begins with an initial review of the data to determine the suitability of various types of hypotheses tests—including independent sample, paired-sample *t* tests, ANOVAs, and hierarchical linear regression. Following this discussion, the quantitative results are organized into sections headed by the three research questions:

- **RQ1:** Does using e-books on an iPad change comprehension, as measured by the QRI subscales of Independence and Instruction?
- **RQ2:** Does using e-books on an iPad change motivation to read, as measured by the AMRP subscales of Self-Concept and Value of Reading?
- **RQ3:** Can the change in reading comprehension be explained by the change in motivation to read after controlling for race, gender, state comprehension tests, and use of e-books as measured by the QRI scale after controlling for gender, ethnicity, established reading comprehension as measured by state testing, and motivation of subscales of Self-Concept and Value of Reading?

DATA COLLECTION AND THE INITIAL DATA REVIEW

The two measures used for data collection were the AMRP and the QRI-5. These measures were administered by the same teacher in the same classroom the week before and the week after the intervention. Afterwards, I picked up the boxes and transferred them to my office for scoring and recording. Prior to the statistical analyses, I spent several weeks

coding, marking, recording, and entering the results into spreadsheets. All items were examined for accuracy of data entry, missing values, and outliers, and the target variables were also examined for normality. The spreadsheets themselves were stored in the Cloud so that they could be easily accessed and were safe. Later, the datasets were exported into SPSS 20 for analysis. The initial data review of pretest scores was conducted in preparation for the use of independent sample *t* tests to determine if the means of the two groups were statistically different from each other.

Before conducting the *t* tests, the following statistical assumptions were examined. The middle school had a unique setup for reading instruction in that all sixth grade students had one 50-minute period of reading instruction each day. There were two reading teachers for the eight reading classes. The reading teacher with three classes was going on leave so the number of available classes became five. Then, four out of the five classes were randomly selected for the study. Out of the four selected classes, two classes were randomly assigned to the e-book group and two classes were assigned as “randomized blocks” to the t-book group.

Before running each of the statistical tests, the means, variances, and skewness of the distributions associated with each of the continuous variables were examined to determine the extent to which scores were normally distributed. The AMRP scores and QRI scores were tested for any violations of the assumption of normality and were found to meet these assumptions. Parametric statistics (ANOVA) were used on both the AMRP and QRI data.

The group independence assumption was adequately met with the design of the study. The students whose scores were collected came from four separate reading classes. The teacher who taught the four different classes collected the same assessment data within the regular reading sections.

GROUP INITIAL EQUIVALENCE

To show initial equivalence of the two treatment groups, differences in gender (male, female) and ethnic makeup (white, not white) were evaluated with χ^2 tests and reading comprehension from the standardized state scores with *t* tests. As shown in Table 2, there were significantly more boys than girls in the e-book condition ($\chi^2(1) = 4.8, p = 0.028$) and there were significantly more white students. However, samples can be unbalanced in

Table 2. Distribution of the 100 Students' Gender and Ethnicity by Reading Group

	t-books ($n = 48$)	e-books ($n = 52$)
Gender (boys/girls)	40%-60%	62%-38%
Ethnicity (white/other)	73%-27%	83%-17%

membership (gender, ethnicity) in a quasi-experimental design. This unequal distribution may have been the result of using intact classrooms. However, this kind of imbalance can happen even with a pure random assignment (Campbell & Stanley, 1963).

There was no significant distribution for ethnicity between the groups ($\chi^2(1) = 1.3$, $p = 0.284$). There was no significant difference in the standardized reading scores between the t-book and e-book groups ($t_{98} = -.4$, $p = 0.633$).

Table 3 summarizes the means and standard deviations of the state scores on comprehension. The treatment groups had initial equivalence for ethnicity and reading comprehension.

Table 3. Means and Standard Deviations of Students' Reading Comprehension as Measured by State Standards by Reading Group

	Mean	<i>SD</i>
t-books ($n = 48$)	12.0	3.4
e-books ($n = 52$)	12.4	3.7

RESEARCH QUESTION 1

Research question 1 stated that reading comprehension, as measured by QRI subscales of Independence and Instructional, would change by using e-books on the iPad. The testing of the null hypothesis that there was no difference in the change in reading comprehension was determined with a 2 (t-book, e-book) X 2 (before and after) repeated measures with grouping factor ANOVA on the Instructional and Independence subscales of the QRI.

The results of the ANOVA for the Independence subscale found a main effect for reading group ($F(1, 98) = 14.3$, $p < .001$, $\eta^2 = 0.12$), a main effect for time ($F(1, 98) = 44.7$, $p < .001$, $\eta^2 = 0.39$) and a reading group by time interaction ($F(1, 98) = 231.3$, $p < .001$, $\eta^2 = 0.49$). While the significant interaction overrides the significant main effects, the main effects show that the e-books group had more independence than the t-books and that independence increased over time.

The simple effects for time within e-book group independence (Table 4, Figure 1) increased significantly ($p < 0.001$). The mean independence baseline increased from 6.3 to 7.5. The time effect for t-book users also increased significantly ($p < 0.001$), changing from 5.5 to 6.0. The group simple main effects found the e-book users to have significantly higher independence with a mean score of 6.3 while the t-book users had a mean score of 5.5 ($p = 0.017$). After the intervention the e-book users showed significantly more improvement in independence than t-book users (mean change = 1.2, 0.60, respectively, $p < 0.001$).

Table 4. Means and Standard Deviations of Before, After, and the Change in Reading Comprehension as Measured by the Independent Subscale of the QRI

	Before		After		Change	
	Mean	SD	Mean	SD	Mean	SD
t-books	5.5	1.3	6.0	1.2	0.5	0.5
e-books	6.3	2.0	7.5	1.9	1.2	0.5

Figure 1. Means and standard deviations of the QRI Independent subscale in t-book and e-book users before and after 6 weeks of use.

The results of the ANOVA for the Instructional subscale found a main effect for reading group ($F(1, 98) = 21.1, p < .001, \eta^2 = 0.19$), a main effect for time ($F(1, 98) = 46.5,$

$p < .001$, $\eta^2 = 0.4$) and a reading group by time interaction ($F(1, 98) = 254.6$, $p < .001$, $\eta^2 = 0.41$). While the significant interaction overrides the significant main effects, the main effects show that the e-books group had more independence than the t-books and that independence increased over time. The simple effects for time within e-book group independence increased significantly ($p < 0.001$). The mean independence baseline increased from 7.5 to 8.8 (Table 5, Figure 2). The time effect for t-book users also increased significantly ($p < 0.001$), changing from 6.5 to 7.0. The group simple main effects found the e-book users to have significantly higher independence with a mean score of 7.5 while the t-book users had a mean score of 6.5 ($p = 0.006$). After the intervention the e-book users showed significantly more improvement in independence than t-book users (mean change = 1.3, 0.6, respectively, $p = 0.006$). In summary, the null hypothesis was rejected, as the e-book users showed higher levels of instructional and more improvement after the intervention, while the t-book group also improved their comprehension but, not as much as the e-book group.

Table 5. Means and Standard Deviations of Before, After, and Change in Reading Comprehension as Measured by the Institutional Subscale of the QRI

	Before		After		Change	
	Mean	SD	Mean	SD	Mean	SD
t-books	6.5	1.2	7.0	1.2	0.6	0.6
e-books	7.5	2.0	8.8	1.9	1.3	0.6

RESEARCH QUESTION 2

Research question 2 examined the extent to which the motivation to read, as measured by the AMRP subscales of Self-Concept and Value of Reading, will change after using e-books on the iPad. The null hypothesis that the use of e-books on the iPad will have no effect on motivation to read was assessed with a 2 (reading group) X 2 (assessment time) factorial ANOVA for the AMRP subscales of Self-Concept and Value of Reading.

The result of the ANOVA found no significant main effect for Self-Concept for the t-book group ($F(1, 98) = 0.93$, $p = 0.337$, $\eta^2 = .01$), nor was there a significant main effect for time ($F(1, 98) = 1.53$, $p = 0.219$, $\eta^2 = .02$). There was a significant group X time interaction ($F(1, 98) = 45.86$, $p < 0.001$, $\eta^2 = .47$). Analysis of simple main effect for the time effect in the t-book group found that Self-Concept decreased significantly from a mean of 30.9 to a mean of 28.6. This mean difference of -2.3 was significant ($p < .001$). The simple main effect

Figure 2. Means and standard deviations of the QRI Instruction subscale in t-book and e-book users before and after 6 weeks of use.

of the e-book group was also significant ($p < .001$). This group saw a mean difference of 3.3, with the mean scores beginning at 28.8 and increasing to 32.1. The simple effects for group found that the t-book group was on average 2.2 units higher than the e-book group ($p = 0.011$). As shown in Table 6 and Figure 3, after the intervention the t-book group's Self-Concept was significantly lower than the e-book group (mean difference = -5.5, $p < 0.001$). In summary, the use of e-books increased self-concept whereas those using t-books resulted in a decrease in self-concept. After the intervention the control group's Self-Concept was significantly lower than the e-book group (mean difference = -5.5, $p < 0.001$).

The factorial ANOVA for the value of reading found a significant main effect for group ($F(1,98) = 0.5.5, p = 0.021, \eta^2 = 0.05$) such that the e-book users had higher value of reading than t-book users. There was also a significant effect for time ($F(1, 98) = 20, p < 0.001$) and a significant interaction ($F(1, 98) = 29.2, p < 0.001, \eta^2 = 0.97$), however, overrides the main effects.

Table 6. Means and Standard Deviations of AMRP Self-Concept Scores Before and After a 6-Week Reading Intervention Using e-Books Compared to t-Books (Mean Difference After the Intervention Is Also Shown)

	Before		After		Difference	
	Mean	SD	Mean	SD	Mean	SD
t-books	30.1	3.1	28.6	3.4	-2.1	4.2
e-books	28.8	5.1	32.1	4.1	3.4	4.1

Figure 3. Means and standard deviations of AMRP self-concept scores before and after 6-week reading intervention using e-books compared to t-books.

The analysis of simple main effects for time found that t-book users before mean value of reading (28.4) to after (27.8) did not change significantly ($p = 0.386$). On the other hand, e-book users had a significant increase in value of read (before = 28.4, after = 31.8, mean difference = 3.385, $p < 0.001$). The simple main effects for group found no significant difference between the groups before intervention (t-book mean = 28.4, e-book mean = 28.4, $p = 0.976$). As shown in Table 7 and Figure 4, after intervention there was a significant difference between groups (change in t-book mean = -0.7, change in e-book mean = 3.9,

Table 7. Mean $\pm$ Standard Deviation of AMRP Reading Scores Before and After a 6-Week Reading Intervention Using e-Books Compared to t-Books (Mean Difference After the Intervention Is Also Shown)

	Before		After		Difference	
	Mean	SD	Mean	SD	Mean	SD
t-books	28.4	5.8	27.8	4.3	-0.7	4.2
e-books	28.4	5.3	31.2	3.5	3.4	3.9

Figure 4. Means and standard deviations of AMRP value of reading scores before and after 6-week reading intervention using e-books compared to t-books.

mean difference 4.1, $p < 0.001$. In summary, the value of reading increased with the use of e-books and was unchanged with the use of traditional books. The mean difference after the intervention showed a very clear high level on the mean scores for the e-book group.

As such, this research question revealed that the e-books groups significantly improved their score on both Self-Concept score and the Value of Reading.

RESEARCH QUESTION 3

This question examined the extent to which changes in reading motivation, as measured by the change in Self-Concept and Value scales of the AMRP, explains the overall improvement in reading comprehension as measured by the change in the total QRI scale after controlling for gender, ethnicity, assignment to the treatment or control group, and established reading comprehension as measured by state testing.

The null hypothesis that use of an e-book will have no relationship between the change in reading comprehension and the change in motivation to read was tested with a hierarchical linear regression. The results of the hierarchical linear regression found that on Step 1 race and gender were not significantly related to the change in comprehension ($R^2 = 0.018$, $p = 0.414$). Similarly, the addition of the CST-ELA scores during Step 2 did not significantly add to the model ($R^2 = 0.003$, $p = 0.44$). However, the 8% of the variance in the change in comprehension that was explained by addition of the change in motivation was statistically significant ($R^2 = 0.11$, $p = 0.05$) in Step 3. Most importantly, in Step 4 assignment to the treatment group added 19% to the explanation of the change in comprehension ($R^2 = 0.3$, $p < 0.001$).

As such, the null hypothesis for the change in motivation not explaining change in comprehension could not be rejected. However, the null hypothesis associated with the assignment to treatment or control groups was rejected, with e-book users showing higher levels of instructional and more improvement after the intervention.

The regression coefficients (b), standard error of the coefficients (SE) and standardized regression coefficients (β) of the final model are shown in Table 8. In the final model the covariates of Gender ($\beta = 0.002$), Ethnicity ($\beta = 0.002$), and CST ELA Comprehension ($\beta = 0.138$) were not significant contributors to the change in comprehension. Similarly, the motivation variables as measured by the change in self-concept ($\beta = 0.101$) and the change in the value of reading ($\beta = 0.164$) were also not significant. On the other hand, the use of e-books was highly significant ($p = .001$), revealing

Table 8. Summary of the Final Model of the Hierarchical Linear Regression Entering the Covariates of Gender, Ethnicity, and State Standard Reading Comprehension, and the Change in Motivation on the Change in Reading Comprehension After Reading an e-Book

Variable	<i>B</i>	<i>SE</i>	B	<i>t</i>	<i>P</i>
Gender	0.00	0.14	0.00	0.02	0.98
Race	0.00	0.15	0.00	0.02	0.99
SGTRC	0.03	0.02	0.14	1.54	0.13
Δ Self–concept	0.01	0.02	0.10	0.85	0.40
Δ Value of reading	0.23	0.02	0.16	1.37	0.17
e-book	0.74	0.15	0.55	4.96	0.00

that students that read the e-book increased their reading comprehension by .55 standardized units ($\beta = 0.548$).

SUMMARY

The results of the first research question revealed that comprehension ability improved on both subscales after reading an e-book on a tablet. As such, the null hypothesis was rejected, with e-book users showing higher levels of instructional and more improvement after the intervention. The second research question results revealed that the motivation to read improved on both subscales after reading an e-book on a tablet; specifically, the use of e-books increased self–concept whereas those using t-books resulted in a decrease in self-concept. And finally, the analysis underlying the third research question revealed that the use of e-books led to a change in motivation to read and subsequent change in comprehension. More specifically, the findings confirm that both comprehension proficiency and motivation to read improved after reading an e-book on an iPad; in addition, in the regression analysis the only predictor of comprehension proficiency was reading e-books on the iPad.

CHAPTER 5

DISCUSSION

This study examined one of the *new literacies*, reading e-books on iPads, and found results for reading comprehension that were surprisingly strong, despite a small sample size and relatively short intervention period. The combination of e-books and iPads became a new reading experience and *motivation to read* increased significantly. This chapter will discuss the educational implications of the quantitative results presented in the previous chapter. It begins with a brief summary of results and then discusses the major findings for both reading comprehension and motivation to read. The section ends with a brief discussion of policy implications and some recommendations for future research.

DISCUSSION OF THE COMPREHENSION FINDINGS

The term reading comprehension refers to the relationship between the reader and the text and the subsequent process of extracting and constructing meaning through interaction and involvement with written language. Reading comprehension, in this study, was measured by the QRI-5. Using two subscales, the QRI-5 determines grade levels for an *Independence* level and for the *Instructional* level.

One of the major findings of this study was that students in the e-book group improved their comprehension score on the Independence subscale more than a grade level, from a baseline of 6.3 to 7.5. The t-book group also made progress as measured by the Independence subscale, and showed improvement by moving from a grade level of 5.5 to 6.0. After the intervention, the e-book users showed significantly more improvement in independence with a mean change of 1.2 grade levels, while the t-book users had a mean change in grade level of only .6. In summary, the e-book users scored higher than the t-book users on the Independence scale of comprehension.

The results of the two-way ANOVA were a major finding for the Instructional subscale. The students in the e-book group went from a baseline of 7.5 to the ninth grade, a little more than 1.3 grade levels, which is an impressive gain for only 6 weeks. The t-book

group progressed from a grade level of 6.5 to 7.0 in comprehension. The findings for the Instructional level were that the e-book group scored higher than the t-book group. Taken together, reading comprehension improved on both the Independent and the Instructional subscales after reading an e-book on the iPad. The t-book group improved in comprehension, but not as much as the e-book group. The e-book users showed more independence and more improvement after the intervention on both subscales.

The three major findings for comprehension were that scores for the e-book group improved more than a grade level on the Independence subscale and more than a grade level on the Instructional subscale. After the intervention, the e-book users showed more independence and more improvement than the t-book group. These findings are impressive and the reasons for this level of improvement need to be discussed.

In order to gain an understanding of the variables involved in the comprehension process, the model developed by Rosenblatt (1978) is used. In this construct, the “Reader” has three characteristic traits: cognitive ability, prior knowledge, and an attitude or disposition toward reading. All three of these traits come together during the comprehension process. A common attitude held by adolescent students is that reading and literacy activities can be unrewarding, difficult, and not worth the effort. Students believe that what is offered in school is actually peripheral to their interests and needs (Alvermann, 2003; Strommen & Mates, 2004). If this is indeed true, then methods, such as reading e-books, need to be used to make these literacy activities more relevant.

This e-book study examined the change in attitude toward reading after experiencing one of the *new literacies*, reading an e-book on an iPad. The e-book group experienced all the features offered by the e-books and the iPad. When the intervention began, the students were intuitive and needed minimal instruction on navigating the iPad. They were highly motivated and eager to find the iBooks application and then move on to the virtual library. Selecting and opening the e-book was a “cool” way to start reading. All of the features of the e-book and the iPad added interest for the students and they immediately explored the options.

The attitude that prevailed involved self-efficacy for technology; the students believed they could figure out the options either by themselves or by watching and asking questions of other students in the small group. The features included: the ability to highlight in a variety of colors, a note taking option, an easy touch-screen for definitions, Wikipedia

for research, an interactive Table of Contents, and the option to go online and do a search. The ability to go online and search the Internet for clarification on a topic is a skill that can improve with instruction (Coiro & Dobler, 2007). Not surprisingly, adolescent students often have the skills needed to do a search. Some e-books and e-textbooks offer embedded video clips and audio opportunities that further promote an understanding of what has been read. It is understandable that a combination of these features can provide a reading experience that is enhanced beyond that of a traditional printed book.

DISCUSSION OF THE MOTIVATION TO READ FINDINGS

Motivation to read, according to Guthrie et al. (2012), is a construct made up of several variables, including beliefs, values, needs, and goals. These variables produce roles of engagement, self-efficacy, and purpose for the reader. Thus, the closer literacy activities match the values, needs, and goals of an individual, the greater the likelihood that students will expend effort.

Adolescents place different values on reading for pleasure than on reading for academic purposes. The term “reading” is used by students when the reading is done in school. Out of school, students prefer to read about topics aligned with their interests and they like to read using technology. Adolescents often have hand-held devices that they carry with them and they are familiar with the use of this technology outside of the school environment. The reading that is coupled with this type of technology is highly valued by students (Coiro & Dobler, 2007). Thus, it is not surprising in that many 21st-century students have been exposed to technology and they have the skills to use it. They are motivated by the ongoing change in technology and their transfer skills help them adjust to innovation. The results of the motivation survey show that the *new literacy* used in this study produced a new electronic way of reading that was valued. The e-book group had scores that were 3 to 4 points higher than the t-book group on both Self-Concept and Value of Reading. The scores after the intervention showed high mean differences for both Self Concept and Value (Table 6).

THE COMPREHENSION AND MOTIVATION RELATIONSHIP

When this research study was being planned, iPads had just come onto the market and e-books were simply an electronic version of a traditional printed book. In the spring of 2010, tablet computers were introduced and this began a major shift and trend toward the combination of tablets and e-books. The literature shows there is a relationship between motivation to read and comprehension (Taboada & Guthrie, 2006). The research design and questions for the study addressed this relationship in order to determine if reading e-books on iPads affected motivation to read and comprehension. The assumption was that reading an e-book on an iPad would motivate students to read more. The literature shows that there are many motivational variables that can affect comprehension. One frequently used model has nine motivation factors: (a) interest, (b) preference for challenge, (c) involvement, (d) self-efficacy, (e) competition, (f) recognition, (g) grades, (h) social interaction, and (i) work avoidance (Taboada & Guthrie, 2006). The AMRP survey used in this study measured two variables that affect comprehension: *self-concept as a reader* and the *value held for reading*.

The comprehension construct used in this study had three “Readers’ traits”: *Attitude toward Reading*, *Cognitive Ability*, and *Prior Knowledge*. When the comprehension traits and the motivation variables come together in the reading process, both constructs have attitude toward reading and value of reading in common. The scores show that the e-book group had a change in attitude toward reading and this affected comprehension and motivation to read. The change in value of reading became one of the strongest findings of the study. Self-concept for the e-book students was also significantly elevated. Therefore, findings that indicate that adolescents value reading and feel good about being a reader indicate a paradigm shift. The literature on adolescent readers has repeatedly confirmed that adolescents are not interested in reading books. The change score data from the AMRP and the QRI-5 indicate that reading an e-book on an iPad did change motivation to read and improved comprehension proficiency. This change in adolescent thinking took place after the students read an e-book on the iPad.

The regression model used in this study had numerous factors that were analyzed to see which had a relationship with comprehension. The predictors were: race, gender, state test scores on comprehension, two motivation factors, and two grouping factors, e-book and

t-book groups. Hierarchical linear regression (HLR) was used to compare successive regression models and determine the significance that each one had above and beyond the others. This type of model typically starts with the smallest relationship and then builds on with each succeeding step.

The regression analysis clearly showed that the e-book was the only significant predictor of comprehension proficiency. The use of e-books was highly significant ($p = .001$), revealing that students who read an e-book increased their reading comprehension by .55 standardized units ($\beta = 0.548$), or one half of a year's growth in comprehension, in just 6 weeks. The literature suggests that motivation to read should be the strongest predictor variable and it was (Taboada & Guthrie, 2006). However, when the e-book group was added to the model, the motivation to read was rendered insignificant and the e-book became the only significant predictor explaining 19% of the variation in comprehension. Taken together, the entire model explained 30% of the variation in reading comprehension.

There are several attributes of e-books that are quite different from printed text and these features may be responsible for the attitude changes in the e-book group. The e-book purchased from Apple for this study was developed for reading on the iPad. The decision to purchase this version was made because it had the most compatible features when loaded onto an iPad. The following section is a compilation of ideas on the attributes of e-books that might affect attitude, values and subsequently, comprehension.

Reading is normally coupled with the desire to understand what has been read and a personal interaction with the text enhances comprehension. Once readers learn how to use highlighting and note taking electronically, they can easily become adept at these skills. Consequently, readers would benefit from the array of tools offered on the tablet, including changing the font size or color, or changing the background color to black and the font color to white. All of these can provide an improved reading experience. This may be a critical component for students with visual disabilities. Similarly, Siri, the voice to text option on the iPad, is a tool that can be utilized to meet students with special needs because it reads the words aloud for the person who needs to hear the words. Tablets and hand-held devices are multi-modal, providing various opportunities for students with visual and auditory issues.

The iPad screen is aesthetically appealing and it can be enhanced with icons from many different applications. E-books are placed on shelves within the i-books virtual library

and they can be easily retrieved. Books on the high definition screen provide a unique, compelling experience. Students often feel a sense of accomplishment when they learn something new about navigating the Internet on a tablet. The challenges are often stimulating, which can increase persistence. This style of reading is appealing to adolescents, as evidenced by the improved attitude toward reading.

Collaboration can also be facilitated through use of the tablets. Students in middle school are often asked to do research and write reports. In the past, many of these projects were done by students in isolation, where they were encouraged to read, think, and write by themselves. Using tablets promotes a different approach to research and projects in that allowing students to work in small groups and collaborate will facilitate an improved learning experience. The addition of tablets to this learning style facilitates almost every stage of the process. If every student had a tablet, he or she could set up small groups with others doing Internet research, and then make presentations using the Keynote application. Learning how to do this prepares students for higher education and future business opportunities. Further, reading e-books on iPads is a very “cool” thing to do and this is extremely important to adolescents. Testing showed that self-concept improved for the e-books group because e-books are high-tech, look great, and perform a multitude of tasks. Students value the ability to communicate about projects and reports outside of school. Indeed, they will communicate and get work done outside of school due, in part, to the fact that they like using the technology.

Finally, an important approach to learning can be facilitated by the tablet’s ability to provide offline reading of an e-book along with the online option of using the Internet for searches while reading. This combination provides a huge advantage in terms of potential reading comprehension because many students may be experientially disadvantaged relative to others. This disadvantage can be removed when students are able to do a search for clarification as they are reading. Research showed that students who did not comprehend well in printed text may outscore the “better readers” when they are working in an environment where they can go online and do a search that will lead to clarification on concepts or ideas (Coiro & Dobler, 2007).

LIMITATIONS

This study used the AMRP Survey to measure *Motivation to Read*. There are many variables that can affect motivation and this instrument measured only two: self-concept as a reader and the value held for reading. Other instruments need to be investigated to see what motivation variables they can measure. Similarly, the QRI comprehension instrument measured two different levels of comprehension ability. Other measures may look at reader traits, especially attitude, as a means of determining comprehension proficiency. Another possible threat to the internal validity of the study involves the fact that some students in the e-book group may have shared their excitement with students in the t-book group, possibly influencing their attitudes and motivation to read.

The school chosen for this study was relatively small and it is a high SES school with limited exposure to diversity. As such, this work needs to be extended to more diverse student populations in more heterogeneous school communities. Moreover, the sample size for this study was relatively small, and this limits the generalizability of the findings, despite the randomized design of the study. In other words, while this study provides some interesting and in many ways tantalizing findings, caution should be used before attempting to generalize any of these small sample findings. Finally, the book that was chosen for the study is an adventure-oriented, fictional narrative. Expository writing also needs to be used.

FUTURE DIRECTIONS

As in most research studies, findings generate additional questions for further research. In this case, several areas of further study should be considered. Listed below are some of the most obvious areas of focus:

- What other schools could be used to do this type of study?
- What other grades could be studied?
- What other ways to measure Comprehension and Motivation could be used?
- Where else could the study be done?

All of these ideas can be applied to the importance of either replicating this study or doing a similar type of study. Since 2010, a variety of tablets have become available. Further research using various types of tablets needs to be done.

IMPLICATIONS FOR POLICY DEVELOPMENT

The findings from this small sample study suggest that motivation to read and comprehension proficiency improve after middle school students read e-books on tablets. For districts interested in both promoting and integrating e-books into their curriculum, there are a number of important policy decisions that can be made. In this section, these decisions will be briefly discussed, beginning with the students and working up to superintendents and school boards.

The data from this study suggests that middle school students are more motivated to read when they have the option to read e-books. To encourage this activity in class, students who already have access to e-books or tablets could be allowed to bring their devices to class. However, for those students who do not have these devices, a budget for leasing them is an option, and many schools are currently using this. One of the advantages of leasing is that schools would be able to keep up with the latest in improvements in technology. Currently, Apple's education department is developing and providing this service.

Another innovative way to put e-books into the hands of students has been the development of bookless libraries. These libraries are using funds that were originally for printed books but now they are available for purchasing or leasing e-books. The physical layout of this type of library is unique in that there are stations with tablets so that students can work and collaborate on projects in small groups or they can read on tablets individually. Bookless libraries exist in all levels of education and several university libraries (such as Stanford and the University of Texas at Austin) have chosen to make this transition. One of the biggest advantages of these libraries is that they can provide electronic books for students 24 hours a day, 7 days a week.

Of course, teachers need professional development to help them learn how to use new devices and e-books. The use of applications on tablet computers can easily become a means of individualizing literacy lessons for middle school students in reading classes. Those reading teachers able to provide an atmosphere in the classroom where students can read e-books silently for 40 to 50 minutes a day would be offering the students something unique within a school day, while at the same time promoting comprehension and deep thinking. The teachers' role would be to monitor silent reading and know enough about the books and devices to troubleshoot issues

and this would not require much professional development. As leaders of their schools, principals can be the catalyst for change if they have a perspective that values technology. Research that shows a connection between the use of technology and improved test scores would be a means of promoting the purchase of devices and e-books through school leaders. Principals can easily facilitate the development of bookless libraries and the purchases of e-books. A principal who is promoting technology would make decisions that allow the use of devices and reading of e-books to be integrated into the school day. Principals can also be effective in motivating teachers who are not inclined to use technology. For example, teachers who have not seen the value in e-books and tablets may revise their perspective when they see research studies that report strong gains in comprehension and motivation to read after reading e-books.

Finally, the superintendent and school board will surely be interested in hearing the findings in a study like this as it shows that reading e-books on tablets can change an adolescent's perspective on reading. Since the problem of adolescents not wanting or liking to read is of concern to all school leaders, research like this provides an incentive for making the budget decisions necessary to purchase e-books and tablets. From the perspective of superintendents and school boards, the return on investment should be significant. Taken together, policy decisions made within individual classrooms, schools, and districts can hasten the adoption of e-book and tablet use. Although more research is needed to calibrate the effectiveness and return on these new technologies, forward-looking educators need to stay on top of the latest research in this area so as to provide their students with the most effective tools for improving both their desire to read and ultimately, their reading comprehension.

CONCLUDING THOUGHTS

This study started when iPads were first introduced. At that time, tablet computers were often confused with eReaders such as Sony's first eReader. The Nook was just entering the market and the Kindle was another option. The major difference between iPads and eReaders was that the iPad was a tablet computer and it could do almost anything a laptop could do, along with being a device for reading e-

books. As a reading specialist, I was always interested in the concept of reading electronically, but the biggest question in my mind was how will this type of reading affect comprehension? I knew there were similarities between e-books and printed books; however, my concerns focused on the effects of the electronics and the possibility that part of this style of reading was distracting to the mind. When I proposed the study to the District Superintendent, he agreed to the research proposal if I would use the iPad as the eReader. The use of the iPad was a very good choice because it did become the most highly used tablet computer. This made the study more relevant as time went on because the iPad became the tablet of choice and a global phenomenon for sales and usage.

As I come to the conclusion of the study it is time to go back to my first question, “Did the e-books change comprehension?” The answer is in the data and it clearly showed on two subscales that comprehension improved after reading an e-book on an iPad. The second question was, “Did the e-books change motivation to read?” Once again, the answer is in the data. Motivation to read improved on two subscales. The first related to self-concept as a reader and the students who had read the e-book scored considerably higher than the students who did not have the experience. The second subscale related to how much the students value reading. The students in the study were all adolescents and at an absolute level, not very interested in reading books. However, the scores regarding value were very high for the group that had read an e-book. It became obvious that the adolescents in the e-book group highly valued reading this new electronic way. They had gone through a paradigm shift. Reading electronically on a device such as the iPad was a “valued” activity. The third question for the study was, “What explains the change in comprehension?” In a series of regression models motivation appeared to explain the change in comprehension. The literature suggests that motivation to read should be the strongest predictor variable and it was. However, when the e-book group was added to the model, motivation to read was rendered insignificant and the e-book became the sole predictor variable explaining 19% of the variation in comprehension of the 30% of the variation in change in comprehension. In summary, the results suggest that the e-books led to a change in *motivation to read* and this led to a change in comprehension

As we consider the major findings of this study, their implications bring several paradoxes to mind. These paradoxes hint at possibilities for changing our thinking about reading and research in the future. I will highlight the paradoxes and share some ideas regarding adolescents. First, some students are coming to school more literate than their teachers in the *new literacies*. This paradox points to the way e-books on iPads were read in this particular study. Students with tablets met in a small group with the teacher and read their e-books silently for 50 minutes. The students were engaged and the teacher was monitoring. In the past, it has been challenging for teachers to get adolescent students to read deeply and stay engaged. This was not the case when students were reading e-books on iPads (Alvermann, 2002; Lankshear & Knobel, 2006).

A second paradox is that some topic-specific prior knowledge usually is important when doing research or projects. When students are reading books and do not know where something like the Appalachian Mountains are, they may have been described as “poor readers” when tested for comprehension. The ability to read an e-book offline and use an online search engine to learn about the Appalachian Mountains will help fill the knowledge gap. Use of the Internet and doing a search may introduce new possibilities for low-knowledge readers who are quickly able to locate information.

The final paradox is that some students who are not motivated to read printed books are motivated to read e-books offline and do Internet searches online in a complementary fashion. This would be a new style of reading and it would be just one more *new literacy*. Bringing low-achieving students back into the reading community is an opportunity offered by this new way of reading. This could inspire new classroom practices that will better meet the needs of all adolescent students and prompt attention to the opportunity of reading e-books on tablet computers.

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APPENDIX A

**INSTRUCTIONAL LESSON PLANS FOR E-BOOK
GROUPS**

INSTRUCTIONAL LESSON PLANS FOR SESSION 1

Session 1

The purpose of this lesson was to introduce small groups of 5-6 students to the iPads so that students could learn how to select the i-Books app and then navigate to the virtual library in order to select the specified e-book off the shelf.

Materials

- 5-6 iPads

Instruction

1. The instructor will begin with a discussion about the strategy that is needed in order to navigate to the virtual library.
2. The instructor will show how to select and open the i-Books app.
3. The instructor will then show how to examine the shelves in the virtual library and select the book, *The Lightning Thief*, which will be read at each session.
4. Features of the e-book will be discussed: highlighting, moving from offline to online in order to do searches, and using the scale at the bottom of the page for searches within the e-book.
5. Google searches for Wikipedia will be discussed.
6. The instructor will discuss options available after highlighting a word.

Instructional Practice

1. Students will practice navigating to the virtual library
2. Students will discuss how to select a book from the shelves.
3. Using think-aloud, the instructor will model highlighting words and choosing either to do a Google Search or go to Wikipedia.

Lesson Closure

The students will return the iPads in their protective covering.

INSTRUCTIONAL LESSON PLANS FOR SESSIONS 2-5*Materials*

- 5-6 iPads

Instruction

1. Students will continue to the icons homepage and select the iBooks icon.
2. They will proceed to the virtual library.
3. Then, select the e-book off the shelf—*The Lightning Thief*.
4. Students will find the page where they left on using the slide at the bottom of the page.
5. Finally, the students will read silently for the rest of the period.

Instructional Practice

The repetition of all of the steps listed above will reinforce the skills of reading an e-book.

APPENDIX B

INSTRUCTIONAL LESSON PLANS FOR THE

T-BOOKS GROUP

Sessions 1-5

Students reading in the t-books group will read for 10 minutes each day.

These students will be doing silent reading with the Reading Teacher.

The total amount of time spent reading *The Lightning Thief* will be 50 minutes per week.

Students in the e-books group and the t-books group will read for the same number of minutes for all 5 sessions: 250 minutes.

APPENDIX C

ADOLESCENT MOTIVATION TO READ

PROFILE READING SURVEY

Name _____ Date _____

Sample 1: I am in _____

- ☐ Sixth grade
- ☐ Seventh grade
- ☐ Eighth grade
- ☐ Ninth grade
- ☐ Tenth grade
- ☐ Eleventh grade
- ☐ Twelfth grade

Sample 2: I am a _____

- ☐ Female
- ☐ Male

Sample 3: My race/ethnicity is _____

- ☐ African-American
- ☐ Asian/Asian American
- ☐ Caucasian
- ☐ Hispanic
- ☐ Native American
- ☐ Multi-racial/Multi-ethnic
- ☐ Other: Please specify _____

1. My friends think I am _____

- ☐ a very good reader
- ☐ a good reader
- ☐ an OK reader
- ☐ a poor reader

2. Reading a book is something I like to do.

- ☐ Never
- ☐ Not very often
- ☐ Sometimes
- ☐ Often

3. I read _____

- ☐ not as well as my friends
- ☐ about the same as my friends
- ☐ a little better than my friends
- ☐ a lot better than my friends

4. My best friends think reading is _____
- ☐ really fun
 - ☐ fun
 - ☐ OK to do
 - ☐ no fun at all
5. When I come to a word I don't know, I can _____
- ☐ almost always figure it out
 - ☐ sometimes figure it out
 - ☐ almost never figure it out
 - ☐ never figure it out
6. I tell my friends about good books I read.
- ☐ I never do this
 - ☐ I almost never do this
 - ☐ I do this some of the time
 - ☐ I do this a lot
7. When I am reading to myself, I understand _____
- ☐ almost everything I read
 - ☐ some of what I read
 - ☐ almost none of what I read
 - ☐ none of what I read
8. People who read a lot are _____
- ☐ very interesting
 - ☐ interesting
 - ☐ not very interesting
 - ☐ boring
9. I am _____
- ☐ a poor reader
 - ☐ an OK reader
 - ☐ a good reader
 - ☐ a very good reader
10. I think libraries are _____
- ☐ a great place to spend time
 - ☐ an interesting place to spend time
 - ☐ an OK place to spend time
 - ☐ a boring place to spend time

11. I worry about what other kids think about my reading _____

- ☐ every day
- ☐ almost every day
- ☐ once in a while
- ☐ never

12. Knowing how to read well is _____

- ☐ not very important
- ☐ sort of important
- ☐ important
- ☐ very important

13. When my teacher asks me a question about what I have read, I _____

- ☐ can never think of an answer
- ☐ have trouble thinking of an answer
- ☐ sometimes think of an answer
- ☐ always think of an answer

14. I think reading is _____

- ☐ a boring way to spend time
- ☐ an OK way to spend time
- ☐ an interesting way to spend time
- ☐ a great way to spend time

15. Reading is _____

- ☐ very easy for me
- ☐ kind of easy for me
- ☐ kind of hard for me
- ☐ very hard for me

16. As an adult, I will spend _____

- ☐ none of my time reading
- ☐ very little time reading
- ☐ some of my time reading
- ☐ a lot of my time reading

17. When I am in a group talking about what we are reading, I _____

- ☐ almost never talk about my ideas
- ☐ sometimes talk about my ideas
- ☐ almost always talk about my ideas
- ☐ always talk about my ideas

18. I would like for my teachers to read out loud in my classes _____

- ☐ every day
- ☐ almost every day
- ☐ once in a while
- ☐ never

19. When I read out loud I am a _____

- ☐ poor reader
- ☐ OK reader
- ☐ good reader
- ☐ very good reader

20. When someone gives me a book for a present, I feel

- ☐ very happy
- ☐ sort of happy
- ☐ sort of unhappy
- ☐ unhappy