

A Nook or a Book? Comparing College Students' Reading Comprehension Levels, Critical Reading, and Study Skills

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This study compared reading comprehension, critical reading, and use of study skills between students reading eTexts on eReaders and those reading with paper texts. This research also examined the practical applications for considering the different skill sets students may need to read eTexts effectively in English classrooms. Our research found no discernible differences in reading comprehension levels between the eReader and non-eReader groups. Survey data also revealed that while students reported using active reading skills (like highlighting, bookmarking, and annotating text) when reading traditional texts, they did not transfer these active reading skills to eTexts/eReading.

Keywords: eReader, reading comprehension, reading skills, critical reading, eTexts

INTRODUCTION

As of April 2011, Amazon.com reported that eTexts for their Kindle eReader had outsold traditional print texts (Miller & Bosman, 2011). And, Barnes & Noble Chief Executive Officer, William Lynch, recently announced, "We now sell twice as many eBooks as we do physical books at BN.com" (Barnes & Noble, Inc., 2011). The popularity of such devices as the Kindle DX and the Nook has led to an increase in research examining eReaders' viability and usability in schools and colleges (Clark, Goodwin, Samuelson, & Coker, 2008; Kiriakova, Okamoto, Zubarev, & Gross, 2010; Kirschner et al., 2010). Educators are no longer asking the question of "if" these devices will filter into their classrooms; they are clearly here for the foreseeable future. However, one important component missing from the current research is a focus on learning with these devices, specifically how we can better use these portable eReader devices for teaching and learning. Particularly, the research literature is lacking, what new reading comprehension skills students will need to learn to be engaged, critical, and active

readers while using these devices, as reading from an eReader is different than traditional, paper-based reading and digital reading from a computer.

Active reading using an eReader varies from reading from a traditional book in several important ways. For instance, with eReaders, readers are unable to mark/write directly on the paper. While eReaders such as the Nook, the Kindle, and the iPad (using apps like Goodreader and iAnnotate), give readers the opportunity to highlight, create notes, look up/define words, and bookmark, creating, organizing, and managing these notes may require different literacy and study skills compared to the skill set needed to read a traditional text. For example, some eReader features allow the reader to digitally index annotations then search through these notes (e.g., CourseSmart). Furthermore, traditional reading tasks such as previewing text, highlighting, bookmarking, and annotating, while feasible with eReaders, are approached in quite a different manner.

On a similar note, many reading devices (like the Nook and the Kindle) and some iPad apps (like CourseSmart and iBooks) have built-in dictionaries that are accessible with one touch. However, the ability to instantly look up and define words might either improve comprehension (through vocabulary development) or disrupt comprehension (through breaks in fluency). Furthermore, with one-touch access to the Internet and other features available for eReaders, reading fluency may also be affected. Unfortunately, every device has its own set of tools for highlighting, annotating, and bookmarking, and these reading features subsequently lack consistency from one to the other. Therefore, a reader would have to adjust their reading strategies depending on the device, the type of text (i.e., narrative/fiction versus expository/informational), and the type of features that are available for them to use.

The purpose of the present study was to find out how students use eReaders for academic reading and if students' reading comprehension of eTexts with an eReader differed from their reading of a traditional paper text. The research questions that guided this study were: (1) Do college undergraduates comprehend text differently when they read from eTexts than when reading from traditional print texts? (2) When reading from eTexts and traditional print texts, what strategies do undergraduate students use to aid comprehension, and do these strategies students use differ across text type (i.e., digital versus paper text)?

REVIEW OF LITERATURE

READING COMPREHENSION

It is possible that readers may need to adapt the reading strategies they use with traditional texts in order to comprehend eTexts. The relatively recent availability of eReaders means that research regarding reading comprehension with these devices is in its infancy. While this topic is informed by a variety of eReader usability and viability studies as well as Internet reading comprehension studies (see below), we wanted to focus on these devices as agents for new literacy and new media because readers are making meaning in a different digital space (Tierney, 2009). Specifically, eReader reading incorporates various modes of reading from traditional text comprehension, digital text comprehension, and digital literacy. In many ways, eReader reading should have its own category for reading because of what it is not: namely, traditional paper reading or Internet/computer-based reading.

Julie Coiro (2009b) posited, "The nature of reading comprehension is changing because of digital technology" (p. 4). Although in her article she was referring to computer-based, standardized testing, the essence of her statement is also true for eReader technology. Furthermore, Alvermann's (2008) definition of transliteracy

supports the potentially transformative position of eReading. Unlike traditional computer and Internet-based literacy, however, many first-generation eReaders lacked the conventionality to easily input and share information. Although some current eReaders allow users to digitally share a collected experience, initial eReaders (like the Nooks used in this study) were rudimentary at best, and subsequently lacked an innovative platform and operating system for literacy output.

Before the availability of eReaders, digital reading tasks like reading from the Internet incorporated some hunt for answers and revolved around five functions for reading: “(a) identifying important questions, (b) locating information, (c) analyzing information, (d) synthesizing information, and (e) communicating information” (Castek et al., 2007, p. 39). However, many of the first-generation eReaders were marketed with the idea that an Internet/Wi-Fi connection was not needed to read a book and therefore restricted users’ ability to hunt, locate, and synthesize information. In short, these devices were limited compared with online, Internet reading. To make matters worse for early adopters of eReaders, the user-interface on early eReaders wholly lacked both the ability to use a mouse, as well as the multi-touch technology available on current devices (like the iPad and the Nook Color), which changed the basic skills one would need to operate and read from these devices.

Conversely, there is an abundance of research with using other digital technologies to help early and struggling readers (Compton-Lilly, 2009; Fisher, Lapp, & Wood, 2011; Korat, 2009), but these lines of inquiry are fraught with irregularities and therefore make it difficult to extrapolate the findings to the college-level reading experience. The most obvious difficulty in using such research to inform the current study is that we are basing our research on the premise that college-level students are generally proficient readers, thus they are likely to engage in different reading processes and strategies than struggling and beginning readers. Korat (2009), for instance, researched reading with Kindergartners and first graders reading eBooks and found that eBook reading was positively associated with vocabulary development and word recognition.

In another study, Fisher, Lapp, and Wood (2011) focused on how eighth-grade students extrapolated information from science and social studies texts and found that the treatment group of students reading digitally performed worse than those students reading traditional texts when recalling and identifying specific details, main ideas, and supporting details from their text. Even though the students reading digitally were not permitted to use the hypertext features associated with Internet reading, the researchers found that the students in the treatment group spent a significant amount of time “clicking” around the screen looking for ways to access other content.

The lack of relevant comprehension research in the area of eReading shows the necessity for more exploration into the distinction between reading with an eReader and traditional reading on a computer so that we can better prepare our students for these ever-changing modes of reading. Coiro (2003) expressed a need to place more emphasis on changing literacy environments, requiring educators, specifically teachers of reading, to be open and adaptive to teaching and assessing digital reading comprehension. Before this can happen with eReaders, more research is needed to better understand the similarities and differences between eReading, computer reading, and traditional reading.

For this study, we focused on five traditional monitoring strategies associated with reading and reading comprehension: (1) highlighting/underlining; (2) taking notes, as in on another sheet of paper or in a notebook; (3) annotating, as in taking notes in or on the text; (4) bookmarking; and (5) dictionary use. We selected these features for measurement and comparison because these are standard features on eReaders and eReading apps. Additionally, there is an abundance of research examining both the benefits (and in some cases, the shortcomings) of these strategies. For research

associated with highlighting and underlining see Pressley (2000) who extols the benefits of underlining as one of many processes associated with metacognitive reading (Ryder & Graves, 2003) and writing (Kellogg, 1994) strategies. Highlighting, on the other hand, while similar to underlining, is often used as a best practice approach with other reading. Similarly, note taking strategies (Harvey & Goudvis, 2007) also incorporates the use of annotations and creating marginalia (like arrows, circles, bracketing, etc.), however, when used alone, highlighting contributes to passive reading (Harvard College Library, 2007). Note taking, in its various forms like the Cornell Note Taking strategy and two-column notes, helps readers to monitor what they are reading, and also enables students to generate and identify main ideas or the “gist” of what they are reading (Ramsay & Sperling, 2011). Additionally, while we recognize that bookmarking is not represented within the reading comprehension literature, we decided to include this strategy within our study because of its widespread use in both pleasure and academic reading.

eREADER USABILITY

The most notable research with dedicated eReaders (like the Nook or the Kindle DX) occurred in the Fall of 2009 when Amazon partnered with seven American colleges and universities (Arizona State University, Case Western Reserve, Pace University, Princeton University, Reed College, the Darden School of Business at the University of Virginia, and the University of Washington) to examine the usability of the Kindle DX device in college classrooms. This pilot research initially had an environmental/sustainability slant as Amazon and the subsequent participating schools were interested in reducing paper printing costs (“The E-Reader Pilot”, 2010). Throughout the project each school developed their own subset of goals and agendas for the research; however, each study was geared towards research related to usability and readability.

We should note, too, that reliable research with devices other than the Kindle DX is limited, and while we acknowledge that there are some differences between Kindles and Nooks, at their technological core each device basically functions as a dedicated eReader. Furthermore, reading on these devices is a similar experience because these devices are neither computers nor laptops nor are they multi-touch tablet devices like the iPad.

Princeton’s research was piloted with three graduate-level courses from the Woodrow Wilson School of Business and International Affairs. Compared to the control groups, 94% of students with Kindle DXs reported consuming less paper and printing and photocopying was decreased on average by about 55%. Students reported that the reading experience on the Kindle DX “was about the same,” however “in focus group discussions, some participants mentioned not being able to compare documents easily, to flip through them or skim for review later in the semester, made their retention worse than usual. They cited lack of flexibility and speed of navigation within the readings as a major factor....” (Princeton University, 2010, p.18). Our interest, specifically, is that students noticed that “their retention [was] worse than usual,” although it would be difficult for Amazon to publically report that reading comprehension was actually reduced by using these devices. However, it is interesting to note, too, that students self-reported the effect eReading had on their comprehension.

Similarly, the researchers with Darden School of Business at the University of Virginia (UVA) found that while the costs associated with paper printing were reduced, students recommended not using these devices in college classrooms, citing the devices were “too rigid” and “clunky” to be used in “fast-paced” college classrooms (“Darden Shares Results”, 2010).

The Kindle research at Reed College was conducted with undergraduates in upper-level French, English, and political science classrooms, unlike graduate business classes

at UVA and Princeton (Marmarelli & Ringle, 2010). The results from the Reed College pilot were very similar to the conclusions from Princeton and UVA: specifically, that the Kindle DX, by itself, is unsuitable for the rigors and expectations for college-level teaching and learning. Researchers cited issues with text formatting (PDFs), highlighting and annotating, as well as text skimming and previewing as issues and reasons why these devices could not meet academic demands. With all of that being said, Marmarelli and Ringle did posit that eReaders would most likely play a “significant, possibly, transformative role in higher education,” but that first the technical and legal issues would have to be addressed to make these devices truly viable alternatives to traditional, text-based (and to some extent, computer/Internet-based) reading and learning (Marmarelli & Ringle, 2010, p. 11).

In 2010, Nielsen conducted a reading speed study with 32 proficient readers. Participants read a Hemingway short story in one of four modes: a traditional, paper-based text, a PC, an iPad, and a Kindle. Nielsen reported that when compared to the paper-based version, users reading on the Kindle and the iPad read at a 6.2% and a 10.7% slower reading speed respectively. However, it is plausible that students read more slowly on the iPad and Kindle because they were less familiar with those formats. When Nielsen asked the participants to compare overall satisfaction with the devices, the iPad, paper text, and the Kindle all scored at the relative same level, while a lower level of reading satisfaction was reported for PC reading (Nielsen, 2010).

PURPOSE OF RESEARCH QUESTIONS

Based on the above literature, it is evident that there are concerns regarding the viability and usability of eReaders in educational settings and the readability of various types of texts on these devices. Our research attempts to disentangle some of these factors that may or may not impede students’ abilities to comprehend eTexts on eReaders, and the new strategies that students may or may not use while reading these eTexts, and to find out whether or not critical reading skills help or hinder students’ levels of reading comprehension.

The following questions guided this research study:

1. Do college undergraduates comprehend text differently when they read from eTexts than when reading from traditional print texts?
 - a. Do students recall the same amount of information from eTexts as they do for traditional print texts?
 - b. Do students provide similar amounts of supporting information for their responses when reading eTexts and traditional print texts?
 - c. Do students exhibit similar levels of comprehension (i.e., literal, inferential, and critical) whether reading eTexts or traditional print texts?
2. When reading from eTexts and traditional print texts, what strategies do undergraduates use to aid comprehension? And do the strategies students use differ across text type?
 - a. Specifically, what strategies do students report using when reading from paper-based texts?
 - b. What features do students report using when reading from an eReader (such as dictionary, highlighting, bookmarking, etc.)

METHODS

PARTICIPANTS

The participants were thirty students enrolled in a first-year, general education composition courses at a mid-sized (undergraduate student enrollment is about 10,000) four-year, public university in the Mid-Atlantic region of the United States. Student enrollment in the course is largely based on SAT Verbal scores; students take this course if their SAT verbal scores are between 490 and 620. If a student scores below 490, they will be enrolled in a remedial, non-credit composition course, although they may also challenge their placement by taking a basic writing comprehension exam. Participants for this study were enrolled in one of two sections; they met in the evenings, twice-a-week for one and a quarter hours for one semester. Most of the students in the course were freshman in their first semester, although several students in the course were sophomore level transfer students. Seventy one percent of the students participating in the study were female and nearly all participating students were Caucasian.

PROCEDURES

Participation in the study was voluntary, and those who participated could choose one of two groups: they could participate without an eReader as the control group, or they could opt to borrow a Nook as the treatment group. Given that many of these students were new to the university and the heavy reading load their classes required, students were permitted to self-select themselves into the treatment or control group to eliminate any extra stress that reading on an eReader might cause them. Except for taking a pre- and a post- survey, all classroom instruction, reading assignments, and writing assignments were part of a normal, first-year introduction composition course. Four in-class Quick Write assignments were evaluated and included in the students' overall grade for the course, and were analyzed more closely for content specific to the study.

The participants were given a pre-survey on the first day of class. Throughout the semester they were given four in-class Quick Write assignments on the readings assigned to them. One of the readings was completed in class and the rest was completed outside of class. The four Quick Write assignments were given in the second, sixth, ninth and twelfth week respectively. The participants completed the post-survey at the end of the semester (during the fourteenth week).

INSTRUMENTATION AND DATA COLLECTION

Two forms of data were collected for this study: quantitative survey data in the form of a pre- and a post-survey, and four written responses which were coded qualitatively but then quantified for the purposes of analysis. A survey from a previous eReader usability and viability study was revised and modified to collect information about students' familiarity with eReaders, their technology habits, and their reading habits and strategy use. Using Survey Monkey, survey data were collected twice, during the first and last week of class. The pre- and post- surveys assessed eReader familiarity and usability, as well as several questions related to critical reading skills (See Appendix).

The second form of data, the four written Quick Write responses were handwritten by students in class on notebook paper, and were administered during the first 15 minutes of class during the second, sixth, ninth, and twelfth week of classes. Students had advanced notice about the readings, and the dates for the Quick Write compositions as indicated by the course syllabus. Prior to analyzing these in-class Quick Write compositions, students

were given a score (1 to 10 points) for their writing that was included as part of their overall course grade.

ANALYSIS

Descriptive statistics were collected on the post-survey to gain understandings on strategic reading methods employed by the students. Students' writing samples were coded for units of thought as well as the level of critical thinking in accordance with Raphael's (1982) Question-Answer Relationship (QAR) framework wherein each unit of thought was counted as well as given a level, 1 to 4, of critical thought (See Table 1). Since identifying the specific units of thought could be considered slightly subjective, each Quick Write response was read by two reviewers, and a third reviewer was available to reconcile considerable differences when needed.

Table 1. *Question-Answer Relationship Framework*

Level of Question	Explanation
Level 1	Answer is pulled from information that is explicitly stated in one place in the text.
Level 2	Answer is developed by making inferences from information found in multiple places throughout the text.
Level 3	Answer is developed by combining participants' background knowledge with information found in the text.
Level 4	Answer extends text using critical thinking and background knowledge.

Each Quick Write sample was also given an overall, holistic score, again based on Raphael's QAR scale, and was measured against the formally assessed Quick Write score (1 to 10 points) that was calculated as part of the students' course grade. The quantified Quick Write data were then analyzed using t-tests and repeated-measures ANOVA that looked for change across the four prompts. The differences between students' comprehension on the four Quick Writes were analyzed using repeated measures ANOVAs that compared students' scores on the assessments (number of idea units; number of supporting details; and overall, holistic score) across Time (the four Quick Writes).

RESULTS

DO COLLEGE UNDERGRADUATES COMPREHEND TEXT DIFFERENTLY WHEN THEY READ FROM ETEXTS THAN WHEN READING FROM TRADITIONAL PRINT TEXTS?

In this study we explored whether students who read course readings using the Nook comprehended text differently than those students who read course readings from traditional texts. We used independent t-tests and repeated measures ANOVAs to analyze three aspects of students' comprehension on four prompts: (1) the number of idea units from the text that they included in their responses, (2) the number of supporting details they used to support their idea units, and (3) the general, holistic level of comprehension of their responses.

The first prompt was used as a control to gauge all students' comprehension when reading from traditional texts. We found no statistically significant differences in

students' number of idea units recalled or the level of supporting details they provided for either group (See Table 2). However, the Nook group did have a higher level of comprehension in the control prompt ($p < .05$).

Table 2. Independent T-Test for Students' Written Comprehension of Texts

		Prompt 1	Prompt 2	Prompt 3	Prompt 4
Recall of Idea Units	Nook	6.50 (1.85)	11.13 (5.71)	5.44 (2.47)	6.25 (2.67)
	Traditional	6.17 (3.02)	11.94 (4.75)	4.88 (1.97)	5.74 (2.18)
Recall of Supporting Idea Units	Nook	2.63 (1.63)	2.88 (2.25)	3.31 (1.30)	3.06 (1.34)
	Traditional	2.44 (1.42)	2.69 (2.27)	3.18 (1.13)	2.23 (1.49)
Level of Response	Nook	1.75 (1.00)*	1.38 (.500)	2.19 (.834)	1.50 (.516)
	Traditional	1.33 (.767)*	1.56 (.629)	2.12 (.781)	1.63 (.496)

* Statistically significant at $p < .05$

The second, third, and fourth prompts were designed to assess whether students' comprehension differed when they read a text using the Nook instead of reading from a traditional text. There were no statistically significant differences in the way students' reading from the Nook and students reading from traditional text comprehended what they read in terms of the number of idea units recalled, the number of supporting details they provided, and the level of comprehension they demonstrated in their responses for these three prompts.

A repeated measures analysis of variance revealed that changes in students' comprehension over the course of the semester were not associated with their mode of reading (Nook or traditional text) (See Table 3).

Students in both the Nook and the traditional text groups did not significantly differ in terms of their recall of idea units, their inclusion of supporting details, or the level of their text comprehension. The ANOVA results showed that although the mean total idea units recalled differed significantly across time points ($F = 25.48, p < .001$), there was not a significant difference in how many idea units were recalled by students reading traditionally on paper or on a Nook. Students recalled similar numbers of supporting details across all four time points and the number of items they recalled did not vary depending on whether students read the text on paper or on the Nook. Finally, although students level of response varied across the four Quick Writes ($F = 7.89, p < .001$), the complexity of their responses was not associated with their mode of reading.

Table 3. Repeated Measures Analysis of Variance

Measure	Effect	MS	df	F	p
Number of Idea Units	Time	280.96	3	25.48	<.001
	Time x Nook Use	7.57	3	.687	.563
	Error	5.74	28		
Number of Supporting Details	Time	4.99	3	2.07	.110
	Time x Nook Use	1.35	3	.559	.643
	Error	1.93	28		
Level of Response	Time	3.45	3	7.89	<.001
	Time x Nook Use	748	3	1.72	.169
	Error	.434	84		

WHEN READING FROM ETEXTS AND TRADITIONAL PRINT TEXTS, WHAT STRATEGIES DO UNDERGRADUATES USE TO AID COMPREHENSION AND DO THE STRATEGIES STUDENTS USE DIFFER ACROSS TEXT TYPE?

In the post-survey, the participants were asked about the study strategies they used when reading traditional texts and eTexts. Those who used the Nooks reported themselves being strategic readers when reading from traditional texts; however, they did not report employing relevant study strategies as frequently when reading from eTexts (See Table 4).

While students reported regular or daily highlighting of the text (50.0%) and taking notes both in the book (28.6%) and on a separate sheet of paper (64.3%) when reading from traditional texts, they reported that they did not use these features on the Nook on a regular or daily basis (highlighting = 14.3%, taking notes in the book = 15.4%, and taking notes on another piece of paper = 21.4%), even though these tools were introduced and made available to the students during an equipment orientation session. The transference of bookmarking from traditional reading to eReading appeared to occur more frequently, as folding down corners of texts was the most often reported strategy used with traditional texts (78.5% of students used this strategy regularly or daily), while using the bookmarking function on the Nook was the second most reported study strategy used with eTexts (35% of students used this strategy regularly or daily). Students also reported the frequent use of the dictionary function on the Nook, as 71.5% of students noted that they used this tool at least once a month.

Table 4. Results from the survey of Nook users' study strategies

	Never	Rarely	Occasionally	Regularly	Daily
<i>Traditional texts</i>					
Text highlighting	14.3%	28.6%	7.2%	42.9%	7.1%
Taking notes in the book	21.4%	28.6%	21.4%	28.6%	0%
Taking notes on another piece of paper or computer	14.3%	7.1%	14.3%	35.7%	28.6%
Fold corner of pages down in books	14.3%	0%	7.1%	57.1%	21.4%
Underlining text	21.4%	7.1%	35.7%	21.4%	14.3%
<i>eTexts</i>					
Text highlighting	28.6%	35.7%	21.4%	14.3%	0%
Taking notes in the book	38.5%	30.8%	15.4%	15.4%	0%
Taking notes on another piece of paper or computer	28.6%	21.4%	28.6%	21.4%	0%
Bookmark pages to return to later	21.4%	14.3%	28.6%	14.3%	21.4%
Use the dictionary function on the eReader	14.3%	14.3%	42.9%	14.3%	14.3%

DISCUSSION

In this study, we found that students' overall comprehension was comparable between students using the Nook and those reading from traditional texts. Our baseline data revealed that our treatment group showed evidence of more advanced critical thinking about what they read when reading from a traditional text. This advantage was non-existent, however, when the treatment group read their books on an eReader. However, one of the limitations of our study was that we could not force students to complete their course readings on an eReader. As students self-selected themselves for the treatment group, it is very possible that the more proficient and more motivated

students chose to use the Nook for this class. In order to determine whether the decrease in the complexity of responses for the treatment group was a result of the texts, the eReader, or another factor, it would have been better to have more comparable, randomized groups from the beginning.

Despite this limitation, the results of this study are still interesting as we consider how (and if) eReaders can impact learning in the college classroom. Overall, whether reading from a text or an eReader, students recalled the same number of idea units from the text, regardless of what mode of reading they used. Likewise, on all but the first Quick Write, there were no discernable differences in the complexity of student responses. On the whole, students' responses were fairly low-leveled, and few students were able to provide responses that looked at the material beyond what was explicitly and implicitly stated in the text.

One of the biggest limitations of this research is the use of the Nook device itself, as its lack of a text-to-speech function makes it out of compliance with the American Disabilities Act (ADA) (Marmarelli & Ringle, 2010). In fact, in the above named research pilots with the Kindle DX, the Department of Justice launched an investigation into the usability of these devices for visually impaired or blind individuals. Furthermore, the U.S. Department of Education will no longer fund research with these devices. However, in order to address this limitation with our research, we were prepared to offer a comparable, ADA-approved device, the Apple iPad, to any student whose visual or physical impairment precluded their ability to use the Nook. No students in our sample needed this accommodation, so our entire treatment sample used the Nook for their eReading.

With respect to the device itself, its clunky interface impeded several of the students and their reading, and subsequently those who may have begun reading on the device, either returned it and/or just stopped using it. Unlike the current multi-touch tablet computers (like the iPad), these devices lacked this function and students had to navigate the reading screens with primitive controls. While Barnes & Noble has since released the Nook Color and the All-New Nook (both of which include the multi-touch screen function), we want to reiterate we were not studying the Nook, specifically, but rather non-tablet eReader devices.

Additionally as the study progressed, it was not always obvious who was reading what on what, and while those students who used the device did some of their reading on the device, some students owned both digital and print based versions of the text. Students overwhelmingly reported that they preferred the portability of the devices and the potential to keep all of their books in one convenient place; however, they also reported that they were worried about breaking and/or losing the devices. This finding is definitely paradoxical in the sense that that portability comes at a price and a potential risk. However, students also came to class with cell/smart phones that can be more expensive than eReaders, so we would have to wonder if they had the same concern about damaging their phones.

Since the students themselves were typically first-year, first-semester students in a general education composition/writing course, they also, on the whole, lacked motivation for reading. It is possible that students typically do not look forward to these introductory, first- and second-year mandatory composition courses and have a general apathy towards them. Not all students even read the assigned material (even though their Quick Writes were graded and included in their final course grade). However, their inability to complete reading assignments was echoed in the other writing and formative class assignments, so we do not believe they were turned off to reading *per se* but rather many were making the adjustment from life as a high school student to life as a college student. These changes included living away from home; accepting the academic rigors

and challenges of college life; social and peer pressures as well as the various and other sundry challenges college freshman face (which there is an abundance of research on, but we will not be discussing). In the future, it would be interesting to replicate this study with more motivated students in major-specific and upper level courses. Furthermore, the students in this course were assigned to certain sections, and the two sections of this course, met in the evenings; one section from 4:15 to 5:30pm and the other from 5:45 to 7:00pm. Needless to say, we think students were resentful, that due to the University assigning them courses, they had to take classes in the evening (when they could be out socializing with their friends) and additionally we think that at the end of the day students were most likely tired and/or exhausted from their long days. We do not have research specifically (except standard, university student course evaluations) that validates the above statement except from our experience we are aware that the performance of our students can be affected depending on what time (and what day of the week) students take these classes.

FUTURE IMPLICATIONS

The implications for future research are immense because eReader devices and multi-touch tablet computers are becoming increasingly more prominent from kindergarten through undergraduate and graduate classrooms. However, as these devices are often marketed to improve students' reading ability (e.g., "Learning with Apple", 2011; "nook color. Great reads. Great apps", 2011), we have to step back and truly examine this statement. What if these devices are, in fact, distracting and impede students' abilities to read text at a high level? What if these devices actually made it harder for struggling and early readers to learn how to read text? Certainly we are not hoping for the eradication of all paper-based texts but rather a better understanding of not only how these devices are used by readers at all levels but what implications and potential benefits these eTexts can have for readers.

In the future, this research should be replicated with more students (although we will have trouble finding funding for research with devices that are not ADA approved) and with more highly motivated students and readers. For the purposes of this study, the books that were chosen for class were readily available from Barnes & Noble in that they were literature-based texts (*New York Times* bestsellers, for instance); however, this course did not make use of an electronic textbook/tradebook simply because they were not available through the Nook. Subsequently, the publishers of books, specifically textbooks, will need to make more eTextbooks available in order for these devices to truly be useful in the classroom. However, these devices are not necessarily marketed (unless from an ancillary perspective) for use with textbooks.

There is immense potential for these devices to positively impact students' active and critical reading skills, but, first, we as teachers need to learn how to better incorporate these devices into our pedagogies and students must also learn how to use them, too (Afflerbach & Cho, 2008). On the surface, these devices are pretty easy to pick up and start using, but in order to use some other their higher-level functions, like annotating and highlighting for example, there is a steep learning curve. Students and teachers must be willing to invest the time with these technologies and once that occurs we believe that eTexts and eReaders have great potential for differentiation with reading. Thus, we conclude that eReading reading comprehension is not better or worse than traditional text-based reading, but rather an altogether different experience.

REFERENCES

- Afflerbach, P., & Cho, B. Y. (2008). Identifying and describing constructively responsive comprehension strategies in new and traditional forms of reading. In S. Israel & G. Duffy (Eds.), *Handbook of research on reading comprehension* (pp. 69-90). Mahwah, NJ: Lawrence Erlbaum.
- Alvermann, D. (2008). Why bother theorizing adolescents' online literacies for classroom practice and research. *Journal of Adolescent and Adult Literacy*, 52(1), 8-19.
- Castek, J., Coiro, J., Hartman, D., Henry, L. A., Leu, D. J., & Zawilinski, L. (2007). Thinking about our future as researchers: new literacies, new challenges, and new opportunities. *College Reading Association Handbook*, 28, 31-50.
- Clark, D., Goodwin, S. P., Samuelson, T., & Coker, C. (2008). A qualitative assessment of the Kindle eBook reader: Results from initial focus groups. *Performance Measurement and Metrics*, 9(2), 118-129.
- Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher*, 56(5), 458-464.
- Coiro, J. (2009a). Promising practices for supporting adolescents' online literacy development. In K. D. Wood & W. E. Blanton (Eds.), *Literacy instruction for adolescents: Research-based practice* (pp. 442-471). New York: Guilford.
- Coiro, J. (2009b). Rethinking online reading assessment. *Educational Leadership*, 66, 59-63.
- Compton-Lilly, C. F. (2009). What can new literacy studies offer to the teaching of struggling readers? *The Reading Teacher*, 63(1), 88-90.
- Darden shares results of Kindle experiment. (2010). Retrieved from <http://www.darden.virginia.edu/web/Media/Darden-News-Articles/2010/Darden-Shares-Results-of-Kindle-Experiment>
- Fisher, D., Lapp, D., & Wood, K. (2011). Reading for details in online and printed text: A prerequisite for deep reading. *Middle School Journal*, 42(3), 58-63.
- Harvard College Library. (2007). Interrogating texts: 6 reading habits to develop in your first year at Harvard. Harvard University. Retrieved from: http://hcl.harvard.edu/research/guides/lamont_handouts/interrogatingtexts.html.
- Harvey, S., & Goudvis, A. (2007). *Strategies that Work: Teaching Comprehension for Understanding and Engagement*. Portland, ME: Stenhouse Publishers.
- Kiriakova, M., Okamoto, K. S., Zubarev, M., & Gross, G. (2010). Aiming at a moving target: Pilot testing eBook readers in an urban academic library. *Computers in Libraries*, 30(2), 20-24.
- Kirschner, A., O'Donnell, J. J., Marwick, A. E., Fitzpatrick, K., Cassuto, L., Palfrey, J., & Sample, M. L. (2010, June 18). Me and my e-reader. *Chronicle of Higher Education*, 56(38), B10-B15.
- Korat, O. (2010). Reading electronic books as a support for vocabulary, story comprehension and word recognition in kindergarten and first grade. *Computers and Education*, 55(1), 24-31.
- Marmarelli, T., & Ringle, M. (2010). The Reed College Kindle Study. Retrieved from http://www.reed.edu/cis/about/kindle_pilot/Reed_Kindle_report.pdf.
- Miller, C. C., & Bosman, J. (2011, May 19). E-books outsell print books at Amazon. *The New York Times*. Retrieved from <http://www.nytimes.com>
- Nielsen, J. (2010). iPad and Kindle reading speeds. Retrieved from <http://www.useit.com/alertbox/ipad-kindle-reading.html>.

- Princeton University (2010). The e-reader pilot at Princeton. (2010). Retrieved from <http://www.princeton.edu/ereaderpilot/eReaderFinalReportLong.pdf>
- Pressley, M. (2000). What should comprehension instruction be the instruction of? In M. Kamil, P. Mosenthal, P.D. Pearson, R. Barr (Eds.) *Handbook of Reading Research* (Vol. III). Mahwah, NJ: Lawrence Erlbaum.
- Ramsay, C., & Sperling, R. (2011). Exploring main idea generation via electronic note-taking. *Journal of Literacy and Technology*, 12(1), 26-64.
- Raphael, T. (1982). Teaching children question-answer strategies. *Reading Teacher*, 36(2), 186-191.
- Ryder, R. & Graves, M. (2004). *Reading and Learning in Content Areas*. Hoboken, NJ: Wiley & Sons, Inc
- Sawaki, Y. (2001). Comparability of conventional and computerized tests of reading in a second language. *Language Learning and Technology*, 5(2), 38-59.
- Tierney, R. J. (2009). Shaping new literacies research: Extrapolations from a review of the *Handbook of Research on New Literacies*. *Reading Research Quarterly*, 44(3), 322-339.
- Ziefle, M. (1998). Effects of display resolution on visual performance. *Human Factors*, 40(4), 555-568.

APPENDIX A

eReader Pre-Survey Instrument (administered through Survey Monkey)

1. Overall, what is your level of comfort and interest in technology?
 - Very uncomfortable
 - Uncomfortable
 - Somewhat comfortable
 - Comfortable
 - Very comfortable
2. When you get a new form of technology, which of the following best describes your experience in learning to use it?
 - I totally rely upon someone else to show me how it works.
 - I have someone give me a general introduction. Then I start playing with it on my own.
 - I start playing with it on my own. But if I run into difficulties, I ask help with an expert.
 - I play on my own with the technology until I have mastered it.
3. When faced with a challenge when working with a computer or other forms of electronic technology, which best describes your experience?
 - I tend to give up on using the technology.
 - I immediately ask for help.
 - I try to figure out what is wrong. If I can't figure it out, I seek help from an expert.
 - I work with it until I have figured it out.
4. An eReader is a portable, electronic device that allows you to read text. Do you own an eReader, such as an Amazon Kindle, Apple iPad or a Barnes & Noble nook?
 - I do not own an eReader.
 - I own an Amazon Kindle.
 - I own a Barnes & Noble nook.

- I own an Apple iPad.
 - I own another eReader device (please specify below).
5. How familiar are you with eReaders?
- I've never used one and am not familiar with eReaders at all.
 - I've heard of eReaders, but I have never used one.
 - I've had one in my hand and may have played with it a bit, but that's about it.
 - I've used an eReader, but I don't know all its features.
 - I use an eReader regularly and am very familiar with its features.
6. Overall, how comfortable do you think you will be when using the eReader?
- Very uncomfortable
 - Uncomfortable
 - Somewhat comfortable
 - Comfortable
 - Very uncomfortable
7. If you have used any eReader device how would you rate the following?
[Answers to the following question were on the following scale of 1-5: 1=Poor; 3=Good; 5=Excellent]
- Readability/Clarity
 - Ease of use/Navigation
 - Convenience/Easily Accessible
8. What would be significant reasons for you to choose an eReader over a traditional textbook? Check all that apply.
- I wouldn't have to carry around a heavy textbook when I go to class.
 - Using an eReader would save paper and materials and therefore help the environment.
 - If the prices of eBooks were lower than traditional textbooks, using an eReader would save me money.
 - It is easier to search and find information on an eReader.
 - Because it is so small and light, I could always have it with me anywhere.
 - I could store so many different books, newspapers and magazines on the eReader.
9. Which of the following would be significant reasons why you would choose a textbook over an eReader? Check all that apply.
- I need to hold a book when I read.
 - I would be afraid to break or lose the eReader.
 - Books are easier to use than the eReader.
 - It is difficult to read the text on an eReader.
 - The feel of the eReader is too sterile.
 - I don't like dealing with technology.
 - The pictures are better on a textbook.
 - My eyes get tired quicker reading on an eReader.
10. I would prefer to use an eReader to read a novel or nonfiction book (for pleasure).
- Strongly disagree
 - Disagree
 - No preference
 - Agree
 - Strongly agree
11. I would prefer to use an eReader to read a newspaper.

- Strongly disagree
 - Disagree
 - No preference
 - Agree
 - Strongly agree
12. I would prefer to use an eReader to read a magazine.
- Strongly disagree
 - Disagree
 - No preference
 - Agree
 - Strongly agree
13. I would prefer to use an eReader to read a textbook (for class).
- Strongly disagree
 - Disagree
 - No preference
 - Agree
 - Strongly agree
14. How often do you use the following study strategies when reading from a traditional textbook? [Answers to the following questions were on the following scale: *Never*; *Rarely (Once or Twice a Semester)*; *Occasionally (Once a month)*; *Regularly (Weekly)*; *Almost every time I read from my textbook (Daily)*]
- Text highlighting
 - Taking notes in the book
 - Taking notes on another piece of paper or computer
 - Fold corners of pages down in books
 - Underlining text
15. How often have you used an eReader for the following: [Answers to the following questions were on the following scale: *Not at all*; *Occasionally*; *Regularly*; *Frequently*]
- For reading a book (other than a textbook)
 - For checking email
 - For searching something on the internet
 - For looking at Facebook, MySpace or other social networks
 - For looking at other internet pages
 - For shopping for books
 - For looking at blogs
 - Listening to music
16. Which would you prefer using for each of the functions? [Answers to the following questions were: *eReader*; *Computer*; *Other*]
- For reading a book (other than a textbook)
 - For checking email
 - For searching something on the internet
 - For looking at Facebook, MySpace or other social networks
 - For looking at other internet pages
 - For shopping for books
 - For looking at blogs
 - Listening to music
17. If you have used an eReader before, how often did you use it for keeping up on news?
- Not at all
 - Occasionally

- Regularly
 - Frequently
18. Which medium would prefer for keeping up on news?
- eReader
 - Computer
 - Newspaper
19. If you have used an eReader before, how often do you use the following study strategies when reading from an eText? [Answers to the following questions were on the following scale: *Never; Rarely (Once or Twice a Semester); Occasionally (Once a month); Regularly (Weekly); Almost every time I read from my textbook (Daily)*]
- Text highlighting
 - Taking notes in the book
 - Taking notes on another piece of paper or computer
 - Bookmark pages to return to later

APPENDIX B

eReader Post-Survey Instrument (administered through Survey Monkey)

1. When faced with a challenge when working with the nook, which best describes your experience?
 - I gave up on using the technology
 - I immediately asked for help
 - I tried to figure out what was wrong. If I couldn't figure it out, I sought help from someone else.
 - I worked with it until I figured it out.
 - I did not use a nook
2. An eReader is a portable, electronic device that allows you to read text. Do you own an eReader, such as an Amazon Kindle, Apple iPad or a Barnes & Noble nook?
 - I do not own an eReader.
 - I own an Amazon Kindle.
 - I own a Barnes & Noble nook.
 - I own an Apple iPad.
3. I own another eReader device (please specify below).
Overall, how comfortable were you when using the eReader?
 - Very uncomfortable
 - Uncomfortable
 - Somewhat comfortable
 - Comfortable
 - Very uncomfortable
 - I did not use an eReader
4. If you have used the Barnes & Noble nook how would you rate the following?
[Answers to the following question were on the following scale of 1-5: *1=Poor; 3=Good; 5=Excellent*]
 - Readability/Clarity
 - Ease of use/Navigation
 - Convenience/Easily Accessible
5. What would be significant reasons for you to choose an eReader over a traditional textbook? Check all that apply.

- I wouldn't have to carry around a heavy textbook when I go to class.
 - Using an eReader would save paper and materials and therefore help the environment.
 - If the prices of eBooks were lower than traditional textbooks, using an eReader would save me money.
 - It is easier to search and find information on an eReader.
 - Because it is so small and light, I could always have it with me anywhere.
 - I could store so many different books, newspapers and magazines on the eReader.
6. Which of the following would be significant reasons why you would choose a textbook over an eReader? Check all that apply.
- I need to hold a book when I read.
 - I would be afraid to break or lose the eReader.
 - Books are easier to use than the eReader.
 - It is difficult to read the text on an eReader.
 - The feel of the eReader is too sterile.
 - I don't like dealing with technology.
 - The pictures are better on a textbook.
 - My eyes get tired quicker reading on an eReader.
7. I would prefer to use an eReader to read a novel or nonfiction book (for pleasure).
- Strongly disagree
 - Disagree
 - No preference
 - Agree
 - Strongly agree
8. I would prefer to use an eReader to read a newspaper.
- Strongly disagree
 - Disagree
 - No preference
 - Agree
 - Strongly agree
9. I would prefer to use an eReader to read a magazine.
- Strongly disagree
 - Disagree
 - No preference
 - Agree
 - Strongly agree
10. I would prefer to use an eReader to read a textbook (for class).
- Strongly disagree
 - Disagree
 - No preference
 - Agree
 - Strongly agree
11. After using an eReader, how likely would you be to purchase one for your own use?
- I definitely will not purchase an eReader
 - I am unlikely to purchase an eReader
 - I may possibly purchase an eReader
 - I am likely to purchase an eReader

- I definitely will purchase an eReader
12. How often do you use the following study strategies when reading from a traditional textbook? [Answers to the following questions were on the following scale: *Never; Rarely (Once or Twice a Semester); Occasionally (Once a month); Regularly (Weekly); Almost every time I read from my textbook (Daily)*]
- Text highlighting
 - Taking notes in the book
 - Taking notes on another piece of paper or computer
 - Fold corners of pages down in books
 - Underlining text
13. How often have you used an eReader for the following: [Answers to the following questions were on the following scale: *Not at all; Occasionally; Regularly; Frequently*]
- For reading a book (other than a textbook)
 - For checking email
 - For searching something on the internet
 - For looking at Facebook, MySpace or other social networks
 - For looking at other internet pages
 - For shopping for books
 - For looking at blogs
 - Listening to music
14. Which would you prefer using for each of the functions? [Answers to the following questions were: *eReader; Computer; Other*]
- For reading a book (other than a textbook)
 - For checking email
 - For searching something on the internet
 - For looking at Facebook, MySpace or other social networks
 - For looking at other internet pages
 - For shopping for books
 - For looking at blogs
 - Listening to music
15. If you have used an eReader before, how often did you use it for keeping up on news?
- Not at all
 - Occasionally
 - Regularly
 - Frequently
16. How often did you use your eReader for keeping up on news?
- Not at all
 - Occasionally
 - Regularly
 - Frequently
17. Which medium would prefer for keeping up on news?
- eReader
 - Computer
 - Newspaper
 - Other mobile device (please specify)
18. If you used an eReader this semester, how often did you use the following study strategies when reading from an eText? [Answers to the following questions were on the following scale: *Never; Rarely (Once or Twice a Semester)*];

Occasionally (Once a month); Regularly (Weekly); Almost every time I read from my textbook (Daily)]

- Text highlighting
 - Taking notes in the book
 - Taking notes on another piece of paper or computer
 - Bookmark pages to return to later
 - Using the dictionary function on the eReader
19. I thought reading from an eReader was:
- More difficult than reading from a traditional text.
 - About the same as reading a traditional text.
 - Easier than reading a traditional text.
 - I did not use an eReader.
20. I thought I understood the content in the eTexts:
- Less than I would have reading from a traditional text.
 - About the same as I would have reading from a traditional text.
 - Better than I would have reading from a traditional text.
 - I did not read any eTexts this semester
21. Is there anything else you can share to explain your experience with using an eReader this semester? If you did not use an eReader, can you explain why you chose not to use one and explain whether you would choose to use one if given the opportunity in the future? [Open-ended response.]