How Technology Has Changed the Nature of Reading:

And What We Read as a Result

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Dr. Frances Laverne Carroll Student Paper Award
Submitted June 23, 2013
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Abstract

E-books and e-readers are a publishing industry phenomenon. In 2011, e-book sales surpassed both paperback and hardback sales (Bosman 2012b). Because of this evolution, opponents of e-readers have predicted the death of reading. The death of reading is not imminent. However, the nature of reading is in flux as a generation of readers adjusts to reading from a computer screen rather than physical print material. Reading off a screen often results in lack of immersion, especially in long texts. This is a consequence of three variables: ergonomic issues, comprehension issues, and phenomenological immersion issues. Ergonomic issues, as considered through a Human-Computer Interaction (HCI) perspective, result from device discomfort and usability problems. Comprehension issues are due to orientation problems within a text, increased text scanning, cognitive overload, and hindered sensory and memory recall when reading from a screen. Phenomenological issues, as evaluated through Idhe’s Human-Technology Relations theory, result from technology obstructing immersion in the text. These variables change the experience, or the nature, of reading when reading off a screen. Likewise, ergonomic, comprehension, and phenomenological immersion issues have prompted changes in the publishing industry, such as a return to serialization, novellas, and short stories, and the production of blurb form news print.

Introduction

This is an age of technological change. Ten years ago, teenagers’ portable music devices consisted of bulky portable CD players. Decades ago, music lovers could listen to cassette
players. Now, music listeners can store thousands of songs on a device the size of their thumb. Just seven years ago, before the first electronic book device, an avid reader might take a stack of unwieldy books stuffed in a separate suitcase when he or she traveled. Now, that same reader can transport hundreds of books with them on vacation in an e-reader the size of his or her palm. Yet, every age has evolving technology. From the carriage to the automobile, flint to the match, the pencil to the typewriter, technology changes the state of the world, making tasks simpler or more complex, more effective or more nominal. What is it about the technological advancements of the twenty-first century that make these evolutions different than changes of the past? Perhaps nothing. Music listeners are still listening to music. Their experience, some might argue, has not changed substantially; though, some vinyl enthusiasts might disagree. In some cases, however, the nature of a task has been altered by technology. In the more distance past, listening to music meant listening to live music. This is certainly a more sensory experience. Likewise, the cognitive process of reading, of successful immersion in a text, has undergone phenomenological changes with every computer screen enhancement, with every e-reader released to market.

E-books and e-readers are a publishing industry phenomenon. In 2011, e-book sales surpassed both paperback and hardback sales (Bosman 2012b). Yet, this evolution has incited panic in opponents of e-readers as predictions of the death of reading ring from newspaper headlines around the world and the World Wide Web. The death of reading is not imminent. In fact, predictions of the death of reading are not even new. After both World Wars, scholars believed reading would fall in the face of film, and then in the face of television (Barth 1996). Obviously, this is not the case. However, the nature of reading is in flux as a generation of readers adjusts to reading from a computer screen rather than physical print material. Reading off a screen, whatever type of screen that may be, results in readers not wanting to immerse
themselves deeply in a long digital text. This is a consequence of three variables: ergonomic issues, comprehension issues, and phenomenological immersion issues. Ergonomic issues, as considered through a Human-Computer Interaction (HCI) perspective, result from device discomfort and usability problems. Comprehension issues are due to orientation problems within a text, increased text scanning, cognitive overload, and hindered sensory and memory recall when reading from a screen. Lastly, phenomenological issues, as evaluated through Idhe’s Human-Technology Relations theory, result from technology obstructing immersion in the text. These variables change the experience, or the nature, of reading when reading off a screen. Likewise, they have prompted changes in the publishing industry, such as increased production of short stories, self-published works, and news stories in blurb form, and they consequently have brought serialization and novellas back into vogue.

Parameters

To discuss the process of reading, parameters first need to be defined. What is reading? The National Institute of Child Health and Human Development (NICHD), an affiliate of the National Institute of Health, defines reading as “the way a person gets information from written letters and words” (NICHD 2012). The NICHD explains that this process can apply to reading through sight or touch. As further explicated by SEDL, a nonprofit education research organization, reading is a cognitive process of recognizing words, either by sight or touch, decoding the words, and comprehending the words within one’s own scope of reference (SEDL 2012). Cziko, Greenleaf, Hurwitz, and Schoenbach elaborate in their National Writing Project article that reading is “a complex process of problem solving in which the reader works to make sense of a text not just from the words and sentences on the page but also from the ideas,
memories, and knowledge evoked by those words and sentences” (Cziko et al. 2000). Thus, reading is a cognitive process that involves decoding the written word, comprehending and making sense of those words, and applying one’s own situational experiences to create meaning. With these definitions in mind, listening to audiobooks would fall outside the cognitive process of reading; though there is some contention surrounding this issue. Yet, reading Braille, absent sight, is still reading. SEDL (2012) explains that listening to a story is not really reading because the decoding element of recognizing a written word and creating meaning is partially in the hands of another.

While this paper will focus mostly on reading done for recreational reasons, the findings could apply to all types of reading. As this paper is about e-books and electronic reading, it is important to define them. E-books are books that have been converted to a digital format for reading on a computer screen or handheld device (Merriam-Webster 2012). An e-reader is a device whose purpose is to display e-books for the reader, but e-books can be read on a multitude of devices, such as cell phones and personal computers. It is important to note that just because a text is being read on a device does not mean that particular text is an e-book. Some electronic texts are just photocopied pictures of the print material converted to PDF. These instances lead to “incongruent reading conditions,” meaning reading a text in digital format that was created for print format, and vice versa (Eshet-Alkalai and Geri 2010, 244). Likewise, the terms digital reading, reading from a screen, electronic reading, and e-reading can be used interchangeably.

Literature Review and Theoretical Framework

Evidence that digital reading does in fact hinder and change the reading experience can be found in cognitive psychology studies, computer science and human systems management
research, and reading research studies. Likewise, a variety of op-eds and descriptive articles elaborate on the e-book scenario and the history of reading. Comprehension studies, ergonomic evaluations, and phenomenological issues are examined by a variety of scholars and researchers. These researchers evaluate their topics using an assortment of theoretical perspectives, such as Reader’s Response Theory; Landmark, Route, Survey model; Human-Computer Interaction Theory; and Idhe’s Human-Technology Relations Theory.

The ergonomic aspect of e-readers and reading from a screen has been examined by Jeong (2012), Spencer (2006), and Dillon (1992). Most of the research findings about the ergonomic issues of reading from a screen center on eye fatigue. Jeong’s study, which looks at eye fatigue, reading comprehension, and students’ perceptions, uses a critical flicker/fusion threshold to assess eye fatigue. This study determines that students’ eye fatigue is far greater after reading an e-book compared to a print book. He explains “that lower luminance contrast in e-books may contribute to greater eye fatigue” (2012, 401). This is one of the most recent studies on the new generation of e-books. Spencer, on the other hand, focuses more on readers’ perception of e-books. Spencer uses online surveys with follow-up phone interviews to determine how age, comfort, and fatigue affect readers’ feelings toward reading e-books. Her survey finds that age has little effect on preference, as all age groups prefer print books, and a great number of participants describe eye strain and eye fatigue when reading from a screen. Additionally, Spencer explains that “the relative newness of screen reading has its own set of viewing problems including glare, resolution, limitations in screen size, and spatial and relationship challenges” (2006, 40). Lastly, Dillon’s (1992) critical review of the literature determines that reading from a screen may not be intrinsically fatiguing; yet, it might be harder to sustain performance level on a screen over time. As well, Dillon determines that navigation
and mastery of manipulation are two of the main sticking points of reading from a screen or device (1992, 1307). Though his research is dated, this point is still relevant today. With print reading, there is little instruction needed to figure out how to use the material book in order to get to the words within. Most readers learn to open a book and flip the pages at an early age. When using a device, however, the reader might be hindered by lack of technological knowledge. The Human-Computer Interaction theory (HCI) can be applied to the ergonomic issues of reading from a screen. HCI is grounded in cognitive psychology and information processing models, and refers to theories developed to improve human-computer interactions by minimizing the barrier between the user’s cognitive model and the computer understanding the user (Giacoppo 2001). Conceivably, as technology advances, some of the ergonomic issues that might decrease a reader’s desire to read from a screen for a long period of time will be cured.

Ergonomics can be tied closely to the studies surrounding comprehension and e-books, as seen in both Jeong’s (2012) and Dillon’s (1992) studies. Because some of the comfort, mastery, and eye fatigue issues might distract the reader, comprehension weakens. However, researchers such as Li et al. (2013), Eshet-Alkalai and Geri (2010), and Morineau et al. (2005) determine that other reading comprehension problems when reading from a screen stem from issues in cognition and sensory and memory recall. Li et al. test an e-book system to determine if navigation and interactive toolbars enhance comprehension and lessen cognitive load. They use the Landmark, Route, Survey model, which “is generally used to explain how people construct cognitive maps in physical environments,” to describe how e-books make it difficult to orient oneself in a text (33). The Landmark, Route, Survey model says that one finds a landmark, links it to other landmarks, and then is able to create a survey of the environment. This applies to e-books because the reader is unable to determine placement of one section or passage in relation
to others. They are unable to create a cognitive map of the text. Li et al. determine that this increases cognitive overload, “which will lessen cognitive resources for comprehension” (2013, 33). Similarly, Eshet-Alkalai and Geri, who study the effect of incongruent reading conditions, conclude that reading from a digital text that was originally meant to be a print text increases cognitive overload, which hurts comprehension. Their study also shows that congruent reading conditions in the digital environment (i.e. digital to digital) can result in orientation problems within the text (2010, 248-249). Morineau et al. study how the motor-sensory experience of reading from a print book versus reading a digital text affects memory recall and cognitive processing. They determine by measuring recall of text, humor understanding, and retention that the “semantic mechanisms of understanding” are hindered by the technological instrument (2005, 337).

Lastly, researchers such as Wiegand (1997), Eshet-Alkalai and Geri (2010), Armstrong (2011), Spencer (2006), and Mangen (2008) all note that the digital instrument obstructs immersion in the text or feelings of connection to the text; however, Mangen is the main scholar to delve deeply into the issue from the phenomenological immersion perspective. Adversely, Luce-Kapler, while acknowledging immersion problems in a digital environment, holds that the digital environment enhances imagination (2006, 6). While comprehension and phenomenological immersion are similar, comprehension is a cognitive process and phenomenological immersion refers to the experience of reading a text through mental faculties such as imagination. Mangen uses Idhe’s Human-Technology Relations theory which conceptualizes hermeneutic, embodiment, and alterity relations to describe how materiality of a reading object obstructs or enhances phenomenological immersion. Hermeneutic relations refer to when a reader reads words and interprets them to create meaning. Embodiment relations refer
to when a technology instrument, like an e-reader, is used to experience a text but the technology instrument itself is not experienced. Alterity relations exist when the technology instrument is the focus of the reader’s experience (2008, 413-415). Mangen theorizes that when reading a print text, the technological artifact—the physical cover, the pages—withdraws so the reader’s attention is directed toward the narrative, not the technology. On the other hand, when reading a digital text, the intangibility makes one’s hermeneutic relation (the ability to create meaning) and immersion vulnerable to being captured by other things. Thus, the reader relates to the computer or e-reader in alterity rather than through embodiment relations (2008, 414-415).

On another note, almost all researchers of reading, whether from a cognitive psychology perspective or computer science, consider Reader’s Response Theory. Weigand describes this theory as one in which “readers search for meaning in the text, and the search is heavily influenced by their own contemporary situations, contemporary norms, and historical norms…the act of reading links readers to the text, and at the same time induces them to create the conditions that are necessary for the text to be effective” (1997, 317). Reader’s Response Theory is in the same vein as Brenda Dervin’s Sense-Making Theory, which posits that objective external and subjective internal information aid in sense-making (Dervin 1976; Dervin 1977).

The Changing Nature of Reading

The ergonomic, comprehension, and phenomenological immersion problems surrounding e-books are certainly well documented. But do these change the inherent nature of reading? The ergonomic issues in singularity do not. Nor do the comprehension issues. Readers experience eye strain from reading from a print text as well; though, not in as much severity. Likewise, some of the reasons for comprehension issues, such being distracted by digital elements, can happen with
print text as well; though, also in less severity. Yet, the ergonomic, comprehension, and immersion issues tied together as they are while reading from digital formats affect the readers’ ability to read long works deeply due to phenomenology, materiality, and cognitive mapping. Reading from a digital format changes not only the cognitive process of reading, but also the phenomenological experience of reading.

To refresh, reading from a digital text reduces comprehension because the reader has trouble creating a cognitive map of the text and cannot orient him or herself; cognitive overload stresses attention capacities; screen reading increases scanning; and memory recall and retention are hindered. Cognitive mapping and cognitive overload problems change the process of reading for the reader, thus changing the nature of reading. The Landmark, Route, Survey model indicates that disorientation and cognitive stressors result when one cannot create a cognitive map of his or her environment (Li et al. 2013, 33). It is easy to imagine these issues taking place. Envision reading a history textbook on an e-reader. The student might read about the War of 1812 in a chapter after reading about the Declaration of Independence in a separate chapter. Yet, because the student cannot physically tell that the War of 1812 chapter is only ten pages away from the chapter on the Declaration of Independence, the student has trouble drawing a cognitive map between the two events. This cognitive mapping issue only increases as the student tries to draw connections between more miniscule topics within the text. The physical act of turning the page in a book, like the aforementioned textbook, helps the reader create a timeline of the work and enhances recall.

Likewise, cognitive overload increases in a digital environment and more cognitive resources are expended. Cognitive overload happens for a variety of reasons, including cognitive mapping problems, but the numerous stimuli connected to the technology instrument is perhaps
the most salient in relation to e-books. This leads to what some call the split-attention effect, and is particularly relevant to new technology and multimedia (Mayer and Moreno 2003, 45). Because the mind is overloaded and disoriented while reading from an e-book, it compensates, which leads to reading in a different way. In addition to increased scanning, e-book readers, or in fact any individual who reads from a computer, also compensate for their expended cognitive capacities and disorientation by reading in small spurts or by reading primarily small works.

It is important to note that as technology advances, most of the ergonomic problems and some of the cognitive problems will be eradicated. The more an e-reader mimics a print book and includes less extraneous stimuli, such as Web capabilities, the more the experience is like reading from a print text. However, the most popular e-reader on the market, the Kindle [Figure 1], now comes not only with Internet abilities and Wifi but also video viewing capabilities and apps (Bromley 2010, 97). Consequently, cognitive overload is increased with these technological advancements because they create more stimuli with which to distract the reader. Sometimes the ability to click and arrive at new stimuli is too tempting. Some e-readers, however, truly try to imitate the experience of reading from a print text. The Nook Simple Touch [Figure 2] from Barnes and Noble uses no glare, crisp screens in order for the page to look like paper. Likewise, one cannot browse the Internet or watch videos from the Nook Simple Touch, but can browse the Barnes and Noble bookstore (Barnes and Noble). It should be noted that this e-reader is the least advanced of Barnes and Noble’s selections, even though it most lends itself to cognitive orientation and phenomenological immersion.
Phenomenological immersion is the key to the changed nature of reading.

Phenomenological immersion, to restate, refers to having an immersive or engaging experience in the text. Idhe’s Human-Technology Relations Theory uses embodiment, hermeneutic, and alterity relations to describe the possibilities of phenomenological immersion. Embodiment relations, in layman’s terms, are when a reader reads a text off an instrument of some sort, which is always the case, but the instrument does not distract the reader. The instrument can be a physical book, a poster, a plaque, an e-reader, or a computer. Hermeneutic relations refer simply to the reader’s ability to create meaning from the words that he or she reads. Alterity relations denote an experience in which the technological instrument is the focus of the user’s attention. This happens often, on purpose, in videogames or computer games. The equipment to play the game is the channel through which a gamer interacts. However, when reading, especially for
recreational purposes, the reader is hindered by alterity relations because it makes phenomenological immersion more difficult (Mangen 2008, 413-416).

The materiality of a print text versus the intangibility of a digital text creates a separation between being connected to a text and being detached, from being engaged and being distracted. Reading a tangible text creates a motor-sensory experience. Children, in fact babies and toddlers, learn that flipping a page in a book leads to a new surprise on the next. Children are also socialized and taught to read from a print text in a way that makes the instrument—the pages, the cover, the spine—recede from focus in lieu of the narrative. This is embodiment relation where the hermeneutic relation is fulfilled. The reader is able to immerse fully in the text. The technology instrument is not distracting. And the reader is able to create meaning from the words. Yet, when reading from an e-reader or computer, the intangibility of the text makes it difficult to reach phenomenological immersion; though, not impossible. As explained in the discussion on cognitive overload, technology instruments like e-readers make cognitive capacities vulnerable to distraction and alterity. Simply put, the device distracts the reader from being able to “get into” the book.

Avid readers can wax poetic about the feel of paper between their fingers and the dusty smell of old books, and it is easy to dismiss this notion of connection as anything significant. However, the materiality of print books does enhance phenomenological immersion. Thus, when individuals are reading from a screen, their experience is different. The impermanence of digital texts, matched with the difference in the physical experience of turning a page compared to scrolling on a mouse or tapping a touch screen, creates a feeling of disconnection from the text. Researchers on readers’ perception of e-books, such as Jeong (2012), Mangen (2010), Spencer (2006), and Eshet-Alkalai and Geri (2010), all note that study participants describe a feeling of
disconnection when reading e-books, as well as feeling as if they do not own the text. The visceral connection to a favorite novel is compromised when reading from a screen. There is a feeling that the words disappear into the ether of the Internet or digital space once one leaves a page. The impermanence of the words makes the connection impermanent as well. This is not to say that the reader does not enjoy the reading experience, but the lasting connection is not as great. Because part of the reading experience is subjective and dependent on the individual’s own life experiences, per the Reader’s Response Theory, a feeling of ownership is often present when reading a text, even if the reader does not actually own the text. The reader is creating an individualized reading of the work, so he or she creates a hermeneutic relation that is particular to his or her experience. The physicality of a print text enhances this. The text is in the hands of the reader. The reader feels every page as he or she creates meaning on every page. This connection, this ownership decreases by varying degrees when reading a digital text. For example, when reading from an e-reader, feelings of connection and ownership will be more salient compared to reading from a computer, but less significant than when reading a physical book because the device mimics print text more than the computer screen.

An aspect of phenomenological immersion and connection that has been studied very little as it relates to e-books and digital text is the process of choosing a text. While this subject has been studied from the information behavior or searching perspective, it gets little treatment from the phenomenological perspective. For many leisure readers, the process of picking a book from the library, bookstore, or one’s own shelf is neither scientific nor completely unintentional. Infotoday.com describes the searching behavior of library or bookstore users in four domains—well-defined, which constitutes a formal search and retrieval; semidefined, which constitutes browsing, foraging, and scanning; poorly defined, which constitutes browsing, grazing,
navigating, and scanning; and undefined, which constitutes encountering and serendipity (Chang and Rice 1993, 262). Every domain except a well-defined information need exhibits some type of browsing behavior. Browsing, scanning, and encountering are complicated in a digital environment. When looking through shelves of books, the reader takes into account the physicality of a book despite the common idiom to not judge a book by its cover. For example, a reader might want a book to read over a free weekend, but he or she knows that time will be short and he or she can only get a short book. In a digital environment, length of work is hard to determine, not only because pagination might be different between the digital format of a book and the print format but also because it is hard to cognitively process how long x-amount of pages really is without being able to see them stacked against each other. Additionally, problems occur in trying to translate twenty pages of an article from a journal in PDF format and twenty pages of an e-book on an e-reader. Twenty pages in one format do not equal twenty pages in another. Likewise, scanning or browsing an online bookstore as opposed to walking through shelves at a library is a very different experience. Digital browsing of bookstores utilizes scrolling or a path of clicks of a mouse, and there is little room for comparison between books. In a print text environment, like a library, one can scan the environment and establish comparisons of numerous texts’ physical attributes in one look. A digital environment decreases serendipity because the user often has to establish a starting place, domain, or genre in which to search; whereas, in a library, the user can simply walk down an aisle. There has to be more intention in a digital environment. This relates to phenomenological immersion and connection to a text if one considers the search and discovery of a work part of the immersive experience. Having chosen a book from the shelf after surveying the entire area, the reader feels more of a connection to the book because the reader can confidently believe he or she has picked the best selection available.
This feeling is vulnerable in a digital environment because searching, surveying, and comparison is more difficult. However, it is important to note that browsing a library or bookstore is not the only way readers discover texts, but it is a common method for avid readers.

The combination of ergonomic barriers, cognitive obstructions to comprehension, and compromised phenomenological immersion has created a change in the reading experience and motivations of some readers. Certainly, individuals are still reading. They still go and pick up a book, or an e-reader. But the outcome of reading is changing. The decisions while reading are changing. The cognitive process of reading is changing. The nature of reading is changing. This is not to say that a good reader will not be fulfilled when reading from an e-reader, or that his or her comprehension will suffer to a substantial degree. Yet, without knowing it is happening, readers’ cognitive capacities and cognitive maps are vulnerable and stressed. Likewise, that connection and immersion in the text is compromised if the technology instrument functions in alterity. Thus, readers select shorter works, or skip long ones. Readers scan the text rather than immersing themselves fully. It should be noted that a number of other variables affect reading decisions: career, education level, culture, politics, free time, personal taste, etc., but there is a correlation between the rise of e-books and e-readers and the publishing industry’s return to short works.

Reflections in the Industry

A man named Michael Hart created the first e-book in 1971 when he digitized the Declaration of Independence (Ruth 2012, 634). The e-book industry has grown exponentially since, with a big spurt in the last decade as bigger publishing houses signed on. Now a variety of big name authors not only release their books in digital format, but some also release electronic-
only versions, as Stephen King did in 2000 (Reid 2000, 10). Yet, there is a bigger consequence of screen reading on the publishing industry. Eshet-Alkalai and Geri describe the occurrence of participants preferring shorter works if reading from a screen in their study of high school students (2010, 244), and Morineau et al. also establish this (2005, 330). Since e-books have hit the market in a substantial and noticeable way, major publishing houses are releasing new and old books in serial format, and authors are producing novellas or short stories in tandem with their one-novel-a-year schedule. Bosman explains that “the e-book age has accelerated the metabolism of book publishing” (2012a). Not only are e-books available at the touch of a button, but also the publishing industry must compete with the multitude of other types of media that steal readers’ attention. Thus, authors must produce multiple works a year in order to hold their less-than captive, but always demanding, audience. Additionally, the publishing industry has to compensate for the way e-books and screen reading makes readers vulnerable to cognitive distraction and alterity relations. In order to do this, publishers are releasing shorter works in the form of novellas, short stories, and serials. Serial format, heralded by Charles Dickens’ Pickwick Papers in the 1830s, faded in the face of film, but as computers became more common, popular authors such as John Grisham, Caleb Carr, Jackie Collins, and John Saul all reverted back to serial form (Italie 1999). More recently, Amazon.com, in the hopes of drawing in a readership and keeping their attention, has pledged to release serial episodes from new writers for $1.99 a pop (King 2012). Likewise, the popular authors Lisa Scottoline, Steve Barry, Suzanne Brockmann and Lee Child have all started to produce short stories to supplement their novels (Bosman 2012a). News stories have also jumped on the short work bandwagon. The popular site TheDailyBeast.com has a handy Cheat Sheet in which the most popular news stories of the day
can be read in three to four sentence blurbs. This indicates a lack of desire to read deeply (but a wish to still stay informed), as opposed to reading long form news print.

Predictions of the Future of Reading

While some over-reactors have predicted the death of reading, others have simply tried to predict its future. Status quo appears to be the most likely of trends as publishers continue to release shorter works from their main authors. This trend will probably hold true as e-readers and e-books become more popular despite the cognitive, ergonomic, and phenomenological reasons already discussed. However, some scholars and proponents of e-reading predict a rise in hyperlink or hypertext fiction. Hypertext fiction is “interactive computer-fiction in which the author designs a matrix of lexias through which the reader navigates with clicks of the mouse or the keyboard, entering or exiting the narrative through any of many available doors and steering the plot along any of many optional way points” (Barth 1996). However, hypertext fiction has been around since the 1980s and has never truly caught on. A more likely change will be e-books in which the reader can hyperlink to original sources, the Internet, videos, etc. The links will not be part of the narrative as they are in hypertext fiction, but will work as extras, much like DVD extras, that help inform the book. Nonfiction is a likely avenue for this form. For example, a travel e-book on New York City could link the reader to restaurant reviews, ticket purchasing sites for a Broadway show, and the weather at that very moment. This type of linked style makes for very interactive and engaged reading, but diminishes possibility of immersion because the links will be a tempting distraction and will make the narrative choppy.

Another consequence of the online presence of future (and present) readers is to turn them into hyperreaders. While already happening in a substantial population, many scholars
believe that the presence of hyperreaders will only increase in the future (Hay 2010). Hyperreaders are reader-writers that engage with and respond to what they read (Hay 2010). Most Internet users are hyperreaders on a small scale; for example, any user who has commented on a Facebook status has engaged with something written on the Internet. Now most news sites and practically any site with published articles or stories provide a comment section through which the hyperreader can interact with the author and other readers. Blogs, wikis, and Twitter are other locations in which readers become writers. In the future, everyone will have an opportunity to have a voice. Publishing, at least in the online environment, will be decentralized and democratized.

Benefits of E-Readers

While this paper has attempted to highlight the ways in which reading from a screen changes the nature of reading, it does not mean to discourage the use of e-readers. For many, the benefits of e-readers far outweigh the costs in cognitive overload and obstructed immersion. In fact, more research needs to be done to determine if very proficient readers can block the negative effects of reading from a screen. Some of the benefits of e-readers include flexibility, searchability, instantaneous contact with bookstores or libraries, portability, saving of environmental resources, and the ability to change font size (Dillon 1992, 1297; Jeong 2012, 391). In fact, the ability to change the font size might be one of the main selling points to the older generation of which many believe have rejected reading from a screen outright. If readers enjoy reading from an e-reader more than reading from a print book, they should not be deterred. However, the benefits of reading from a screen do not negate the changed nature of reading.
Conclusion

The phenomenological immersion possible when reading an e-book is compromised by the intangible nature of screen reading. Likewise, cognitive overload and problems creating cognitive maps while reading from a screen expend cognitive resources and are reflected in increased scanning and lower comprehension. The ergonomic issues surrounding e-books and digital texts will hopefully be solved as technology advances, but for the moment, eye strain and mastery of manipulation create problems for extended reading. These three variables paired together change the nature of reading. Mangen explains, “In order for phenomenological immersion to be obtained, our cognitive capacity needs to be more or less fully occupied in a cohering and consistent way so that we do not experience any perceptual or cognitive surplus of attention available to other tasks” (2008, 413). This is not a death of reading; nor is it even a sickness. It is simply the state of technological advancement, and there seems to be no turning back, either in readers’ perceptions and motivations or the publishing industry. Reading from a screen is not bad, but cognitively and phenomenologically, reading a print book, a book that one can smell and feel and manually turn the page is perhaps a little better.
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