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"In a Case, on the Screen, Do They Remember What They've Seen?" Critical Electronic Reading in the Law Classroom

Debra Moss Curtis

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In a Case, on the Screen, Do They Remember What They've Seen - Critical Electronic Reading in the Law Classroom

Debra Moss Curtis

Judith R. Karp

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**IN A CASE, ON THE SCREEN, DO THEY REMEMBER WHAT
THEY'VE SEEN? CRITICAL ELECTRONIC READING IN
THE LAW CLASSROOM**

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IN A CASE, ON THE SCREEN, DO THEY REMEMBER WHAT THEY'VE SEEN? CRITICAL ELECTRONIC READING IN THE LAW CLASSROOM

*Debra Moss Curtis*¹ and *Judith R. Karp*²

I. INTRODUCTION

In 2005, we produced a well-received article and presentation entitled, “In a Case, In a Book, They Will Not Take a Second Look! Critical Reading in the Legal Writing Classroom.”³ The article examined the educational foundations of critical reading, as well as, critical reading techniques. The purpose was to establish that law students need instruction in critical reading. In the article, we offered creative solutions that had been successfully used in our legal writing classes.

In the two years since, we have found it necessary to reconsider the problem of critical reading in the law school classroom, in light of the different formats in which students may be presented with material. Our first article centered on reading cases in a paper format. This article focuses on the different problems that arise when students read electronically - on a computer screen, rather than in a paper format.

Part II of this article discusses the biological and physiological differences readers experience when reading on a computer screen versus on paper.⁴ Part III discusses our uses of on-screen reading in the law classroom, and establishes why this is a very real situation law students encounter.⁵ In Part IV, we offer solutions for assisting students in their practical on-screen reading skills, as well as, thoughts on how to improve their critical reading in this format.⁶

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³ Debra Moss Curtis & Judith R. Karp, “In a Case, In a Book, They Will Not Take a Second Look!” *Critical Reading in the Legal Writing Classroom*, 41 WILLAMETTE L. REV. 293 (2005). We presented our work on critical reading at the annual Legal Writing Institute conference in 2004, as well as at the biannual Southeastern Legal Writing Conference in 2003.

⁴ See *infra* notes 7-115 and accompanying text.

⁵ See *infra* notes 116-141 and accompanying text.

⁶ See *infra* notes 142-219 and accompanying text.

II. ON-SCREEN READING VERSUS PAPER READING

Much of our reading has shifted from the traditional paper medium to an online reading environment due to the use of the World Wide Web. This transition encompasses activities such as staying current with news and personal communication, locating information in online search engines and databases, using electronic delivery devices, such as the learning platforms TWEN (West), Blackboard (LexisNexis), WebCT, and even reading e-books.⁷

The shift to on-screen reading has changed the reading experience. For many readers, reading on paper is a pleasant habit, associated with being able to easily physically control access and tote a traditional book.⁸ Books have occupied a key place in history.⁹ Nevertheless, students are currently

⁷ See PANAYIOTIS ZAPHIRIS & SRI H. KURNIAWAN, PROCEEDINGS OF THE 45TH ANNUAL MEETING OF THE HUMAN FACTORS AND ERGONOMICS SOC'Y, EFFECTS OF INFO. LAYOUT ON READING SPEED: DIFFERENCES BETWEEN PAPER AND MONITOR PRESENTATION 1210-1214 (2001), http://www.soi.city.ac.uk/~zaphiri/Papers/hfes2001_reading.pdf (discussing an experiment researching reading speeds for paper and screen materials). E-books are digital books read on a computer screen or other electronic device, which are marketed as books and maintain many of the same physical layout characteristics and user abilities of a paper book. Caryn J. Adams, *Random House v. Rosetta Books*, 17 BERKELEY TECH. L.J. 29, 30 (2002).

One author has noted the use of electronic materials as passing through five stages. Grover C. Furr III, *From "Paperless Classroom" to "Deep Reading": Five Stages in Internet Pedagogy*, THE TECHNOLOGY SOURCE, Sept/Oct 2003, <http://www.chss.montclair.edu/english/furr/paperless.pdf>. First, class management through electronic assignments, second, interactivity with use of discussion threads. *Id.* Third and fourth are the use of digital texts and multimedia changing the electronic reading and learning of students. *Id.* The last stage is "deep reading" in which electronic reading can give students a more in-depth educational experience. *Id.*

⁸ Katri Pietilä, Sampo Timonen, Anu Seisto & Susanna Nieminen, *Reading with eBooks*, E.FINLAND.FI, Nov. 1, 2005, <http://e.finland.fi/netcomm/news/showarticle.asp?intNWSAID=43197>.

⁹ See Claire Elizabeth Craig, "Lending" Institutions: The Impact of the E-Book on the American Library System, 2003 U. ILL. L. REV. 1087, 1089 (2003) (discussing the importance of books throughout world history). Key events in history involving books range from Alexander the Great's library, to the Gutenberg press, to the impact of book burning on society. Sorel Reisman, *Declining Importance of Books: Get Over It*, IT PROFESSIONAL, July/Aug. 2005, at 64. Printed books changed the way people thought and learned which led to "scientific innovation, religious transformation, and changes in governance." Rogelio Lasso, *From the Paper Chase to the Digital Chase: Technology and the Challenge of Teaching 21st Century Law Students*, 43 SANTA CLARA L. REV. 1, 5 (2002). The United States Congress acknowledged the importance of books when in 1977 it enacted Public Law 95-129 which led to the creation of The Center for the Book in the Library of Congress. 2 U.S.C. §§ 171-75 (2000). This law recognizes "that the book and the printed word would have had the most profound influence on American civilization and learning and have been the very foundation on which our democratic principles have survived through our two hundred year history..." § 171. The Center for the Book promotes lectures, exhibits, publications and other activities "to heighten public interest in the role of books and printing in the diffusion of ...knowledge." § 171; see also The Center for the Book,

progressing through the school system using computers to a greater extent in both reading and testing situations than in previous years.¹⁰ Some local elementary schools use computer-based reading tests, including reading comprehension passages, to determine reading levels of students as young as second grade.¹¹ Most students entering law school today are computer literate; for them, the computer screen is the center of their universe.¹² Students develop the habit of reading on the computer, and therefore, the positive feelings associated with paper reading are unlikely to be as strong in the current generation of law students as in compared to past generations.¹³ Readers, however, may mistake their familiarity with the computer and their internet navigation skills for an ability to critically read and comprehend information.¹⁴

There are distinctive differences between electronic reading and textbook reading. While electronic reading offers greater access to an infinite variety of resources, these sources are not always reliable. Electronic texts can be altered and updated, and thus may not be as reliable as written texts which are static once printed.¹⁵ Print and electronic texts also differ in

bro.html (last visited Feb. 15, 2007) (discussing the Center's goals to promote reading and books and to stimulate interest in literacy).

The shift the electronic formats affects more than the reading experience, copyright and tort law has not as yet caught up with the distribution of information in such electronic formats. See Noriko Kawawa, *Comparative Studies on the Law of Tort Relating to Liability for Injury Caused by Information in Traditional and in Electronic Form: England and the United States*, 12 ALB. L.J. SCI. & TECH. 493 (2002); Noriko Kawawa, *Contractual Liability for Defects in Information in Electronic Form*, 8 U. BALT. INTELL. PROP. L.J. 69 (2000). Such struggles have been well documented for the electronic book (e-book). See Craig, *supra* note 9.

¹⁰ Critical Issue: Using Technology to Improve Student Achievement, <http://www.ncrel.org/sdrs/areas/issues/methods/technlgy/te800.htm> (last visited Feb. 15, 2007).

¹¹ See, e.g., Scholastic.com, The Scholastic Reading Inventory, <http://teacher.scholastic.com/products/sri/index.htm> (last visited Feb. 15, 2007). The Scholastic Reading Inventory (SRI) is a computer based measurement tool to determine a student's level of achievement in reading and recommending appropriate reading material for elementary school through high school students. *Id.*

¹² Lasso, *supra* note 9, at 20. Entering law students are more screen-based literate than their predecessors and they learn better in a more dynamic and interactive medium than in a printed medium. *Id.* at 19.

¹³ See Reisman, *supra* note 9. There are many concerns with children using the computer in such an increased fashion, including health risks, and visual impairments, from the difference in posture, head tilt, exposure to screen flicker on their eyes and other possible muscle related ailments stemming from reading on an electronic machine rather than paper. Leon Straker, Andrews Briggs, Alison Greig, *ITKids: Reading From Computers Creates Different Biomechanical and Physiological Stresses for Children?* <http://education.umn.edu/kls/ecee/pdfs/iea2003strakerreadingfromcomp.pdf>.

¹⁴ Angel Kymes, *Teaching Online Comprehension Strategies Using Think Alouds*, 48 J. ADOLESCENT & ADULT LITERACY 492 (2005).

¹⁵ Jonathan W. Schooler & Jennifer Wiley, *The Mental Web, Pedagogical and Cognitive Implications of the Net*, in *LEARNING AND TEACHING ON THE WORLD WIDE WEB 247* (Christopher R. Wolfe ed., Academic Press 2000).

authenticity. It is more difficult to authenticate and evaluate information located in electronic text found on the internet than it is to authenticate and evaluate printed published material.¹⁶ Unlike printed text, readers sometimes have the ability to change and edit electronic text, allowing them to make individual contributions.¹⁷ There are also navigational differences affecting what is read and the order in which it is read.¹⁸ Electronic reading is based on choice which allows flexibility and self-control over the reading process, as compared to the more linear structure found in traditional print text.¹⁹

Major differences have also been identified between computer screen reading and paper reading. No single variable as between paper and electronic media can account for the differences between the two formats.²⁰ When reading from paper, we can scan an entire document or peruse pages to assess the "sense of the text."²¹ In contrast, hand-eye coordination works differently when reading text that is digitally controlled on a computer screen.²² Reading from a computer screen overall is slower, less accurate, more fatiguing, causes decreased comprehension and is rated as inferior by those engaged in the reading.²³

For this article's purpose, we divide the differences between the two formats into three subgroups. The first concentrates on the *physical* differences of looking at the words on a machine rather than on a piece of paper.²⁴ The second focuses on the differences in the way that material is *laid out and organized* on computers rather than in printed texts.²⁵ The third includes the use of *hypertext links*, portals through which the reader may interact and "jump" to another document, interrupting the flow of the reading of the first document.²⁶ Lastly, we bring these ideas together to discuss conclusions that may be drawn from these differences.²⁷

¹⁶ *Id.*; see also, PAUL GILSTER, DIGITAL LITERACY 87-124 (John Wiley & Sons, Inc. 1997).

¹⁷ Schooler & Wiley, *supra* note 15, at 247. See, e.g., Wikipedia, http://en.wikipedia.org/wiki/Main_Page (last visited Feb. 15, 2007). Wikipedia is an online encyclopedia that is edited by site members. Site membership simply requires registration.

¹⁸ *Id.* at 248-49.

¹⁹ *Id.* at 249.

²⁰ Paul Muter, *Interface Design and Optimization of Reading of Continuous Text*, www.psych.utoronto.ca/~muter/pmuter1.htm (last visited Oct. 27, 2006).

²¹ William Costanza, *Reading, Writing, and Thinking in an Age of Electronic Literacy*, in LITERACY AND COMPUTERS, THE COMPLICATIONS OF TEACHING AND LEARNING WITH TECHNOLOGY 12 (Cynthia L. Selfe & Susan Hilligoss eds., The Modern Language Association of America 1994).

²² *Id.*

²³ Andrew Dillon, Cliff McKnight & John Richardson, *Reading From Paper Versus Reading From Screens*, 31 THE COMPUTER J. 457 (1988).

²⁴ See *infra* notes 28-49 and accompanying text.

²⁵ See *infra* notes 50-64 and accompanying text.

²⁶ See *infra* notes 65-92 and accompanying text.

²⁷ See *infra* notes 93-115 and accompanying text.

A. Physical Differences

There are a number of physical differences between reading on paper and reading from a computer screen. These differences include the shape and resolution of the individual characters read, the contrast and light differences between the characters and the background, the distance between the material read and the reader, the angle at which the reader sees the material, the number of characters, words and lines per page of reading, the inter-character and inter-line spacing of the words, the justification and margins of the page and even the posture of the reader.²⁸

One major difference is the composition of the character themselves. Characters on a computer screen are created electronically, and are constantly refreshed to maintain the screen contents.²⁹ How quickly they refresh leads to what is known as screen “flicker,” or the appearance that such characters are fading and refreshing.³⁰ The increased likelihood of seeing flicker depends on how the screen is viewed (peripheral viewing increases flicker appearance), the size of the screen, and if the user is talking while reading, which transmits vocal cord vibrations through to the eye.³¹ Clearly, such character appearance is different in nature from the printed word, which is static.

These differences have contributed to the conclusion that the average person reads slower from a computer screen than from traditional paper text.³² Studies have placed the speed differential as much as 20-30% between the two mediums.³³ One study noted that skimming, a key step in critical reading, was 41% slower from a computer display than from a book.³⁴ This differential, however, may decrease with the use of high resolution screens and more readable fonts in computer based text.³⁵

The effects of reading from a computer screen monitor versus paper have been the subject of several experiments. One study recorded eye movements during reading and found that monitor “flicker” text affected eye

²⁸ ZAPHIRIS & KURNIAWAN, *supra* note 7, at 3 (discussing the results of an experiment of online adult readers).

²⁹ Dillon, McKnight & Richardson, *supra* note 23 (article discussing the differences that may exist between print and computer/online reading).

³⁰ *Id.*

³¹ Muter, *supra* note 20.

³² ZAPHIRIS & KURNIAWAN, *supra* note 7, at 1-2 (citing earlier research studies measuring differences between print and computer reading).

³³ *Id.* This result may be dependent on the resolution of the monitor on which computer pages are being read.

³⁴ Paul Muter & Paula Maurutto, *Reading and Skimming from Computer Screens and Books: The Paperless Office Revisited?*, 10 BEHAVIOUR & INFO. TECH. 257 (1991), available at <http://psych.utoronto.ca/~muter/pmuter2.htm> (last visited Feb. 15, 2007). The effects were less attributable to physicality of the screen rather than the layout of the material. In addition, the technology upon which this was measured is out of date by today's standards.

³⁵ Carol Bergfeld Mills & Linda J. Weldon, *Reading Text from Computer Screens*, 19 ACM COMPUTING SURVEYS 334 (1987).

movements differently than “flicker” free text and suggested that this difference may slow reading speed.³⁶ A different study on the speed of reading with two different resolution monitors found that even when the material on screen was read with black characters on a light background (as one might expect on paper), reading from the hard copy “was reliably faster.”³⁷ Most users prefer dark characters on a light background for reading in either format.³⁸

Another major factor is that screen reading is generally more difficult to do than paper reading. In addition to the problem of the low resolution of the characters on screen, glare from the screen also can also impair reading.³⁹ Additionally, letters on a computer screen may appear “coarse” to the eye, as opposed to the “smooth” appearance they have on paper, which may slow down the reading process and cause eyestrain.⁴⁰ In one study on the acceptability of books in electronic format, researchers found that most users were primarily concerned with the quality of the display.⁴¹

Another major physical difference between paper and computer screen reading is the orientation of the material. Although laptop computer screens may be angled, paper can be handled more easily and oriented to best suit the reader’s preferences.⁴² Also, the visual set up of computers has led to the screen being a further distance from the eye than if the material were brought read on paper.⁴³ In one study designed to assess these differences, paper text was positioned in front of readers in a fashion similar to the orientation found on computer screens.⁴⁴ Despite the similar orientation of the words, readers’ performance was adversely affected when the text was presented on the computer screen.⁴⁵

The difficulties inherent in the physicality of computers may be compounded in the classrooms as new technology is added to old class spaces without thought to accommodating physical differences. For

³⁶ *Id.*

³⁷ ZAPHIRIS & KURNIAWAN, *supra* note 7. Generally, computer screen displays use light characters on a dark background because the flicker is not as obvious as dark characters on a light background. *See*, Mills & Weldon, *supra* note 35 at 342.

³⁸ Muter, *supra* note 20.

³⁹ Alysson Troffer, Writing Effectively Online: How to Compose Hypertext, <http://homepage.mac.com/alysson/htscreen.html> (last visited Feb. 15, 2007).

⁴⁰ *Id.*

⁴¹ Pietilä et al., *supra* note 8. Users prefer a high quality display which does not interrupt the flow of their reading or cause any interruption in the reading process. *Id.*

⁴² Dillon, McKnight & Richardson, *supra* note 23, at 464.

⁴³ *Id.* at 465.

⁴⁴ Mills & Weldon, *supra* note 35, at 334-35. This 1987 study was conducted by J.D. Gould, L. Alfaro, R. Finn, B. Haupt, and A. Minuto. *Id.*

⁴⁵ *Id.* In this study, the adverse affects of computer generated text were attributed to a number of factors: differences in visual angle of a line of text; differences in font, polarity, color of characters, amount of blank space between rows, flicker, luminance levels, and the contrast in brightness between characters and background. *Id.*

example, the lighting set-up in a traditional classroom will likely be appropriate for traditional book reading, and may not support the ideal angle for computer reading.⁴⁶

Another physical difference between paper and screen reading is the potential use of color. While most paper reading is traditional black characters on a light page, web pages often use different colors for both characters and background. Approximately 8% of males are color-blind or otherwise color deficient, and therefore, may experience increased problems with computer on-screen reading.⁴⁷ In addition, color usage may be distracting to a reader due to its overuse, poor contrast, and electronically-generated appearances.⁴⁸ Finally, colors often connote certain expected meaning (such as red being important); these secondary meanings may not be intended in the electronic text. This could potentially confuse the reader.⁴⁹

B. Layout Differences

Onscreen information may be presented in a different layout than paper information. First, a typical computer screen is wider than it is high, which is generally opposite of how paper is formatted.⁵⁰ Second, the design of a word-processing document is focused on producing something that ultimately will look good on the printed page.⁵¹ The features that make a paper document "reader friendly," size of a page, the ease of accessing particular pages and the contrast of the printing, do not necessarily translate well onto the computer screen.⁵² By contrast, web pages were designed to be read on-screen, with different visual interests in mind.⁵³

The layout of the material must be considered carefully in assessing the differences in reading on the page versus electronically. Two experiments, with varying conclusions, have tested whether three-column formatting overall may be better for ease of reading than one column layouts.⁵⁴ Regardless of the column format, however, reading speed is

⁴⁶ Straker, Briggs & Greig, *supra* note 13.

⁴⁷ Muter, *supra* note 20.

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ Dillon, McKnight & Richardson, *supra* note 23, at 466.

⁵¹ Dan Bricklin, Word Processing v. "Web" Documents, http://www.gooddocuments.com/philosophy/wpvsweb_m.htm (last visited Feb. 15, 2007).

⁵² *Id.*

⁵³ *See id.* "[C]omputer screens can easily display images mixed with text, and can mix movable (scrolling) areas and fixed areas. Replacing parts or all of the screen when a button or link is clicked is normal for computer screens, but foreign to paper and work processors." *Id.*

⁵⁴ ZAPHIRIS & KURNIAWAN, *supra* note 7. In one study conducted in 2000, researchers found that a majority of readers read a three-column passage faster than a one column passage. *Id.* In contrast, Zaphiris & Kurniawan's study found there were differences in reading speeds between the one, two and three-column formats, but these differences were not statistically significant. *Id.*

higher on paper.⁵⁵ Studies have found that the number of characters per line and the length of the line are the factors with the greatest influence on reading rate.⁵⁶ Thus, more densely packed screens are read more quickly than screens with fewer words.⁵⁷ Additionally, there are different spatial processes necessary to read text online, which may also affect reading speed in paper compared with electronic formats.⁵⁸

Another layout difference between print and computer is the use of scrolling or paging through computer text rather than turning printed pages. There is no lapse in time when a reader turns the printed page in order to read the next view of material. By contrast, to see the next available piece of information electronically, computer users must scroll or page the text.⁵⁹ Scrolling may be described as inching down the page, using the cursor to move the page "up" into view, piece by piece, while paging is reading one full page at a time on the screen, and then reading the next. Paging has been considered superior for readers to process information, perhaps since the cursor on a page remains within the same location on each page.⁶⁰ Either way, however, there may be more of a delay in getting to the next available material, negatively affecting the electronic reading experience.

Nevertheless, some readers have expressed a preference for reading material in PDF format rather than in print. A PDF is a "Portable Document Format," or an electronic document that is read on the computer, using the Adobe Acrobat computer program.⁶¹ Such a format for a reading has "captured all the elements of a printed document as an electronic image that . . . can [be] view[ed], navigate[d], print[ed] or forward[ed] to someone else."⁶² Essentially, the layout of the document is identical to the printed version, but contains other features unrelated to layout that make the otherwise similar-looking document more appealing on-screen. Readers who need information from documents sometimes prefer to have them in PDF

⁵⁵ *Id.* (finding differences in reading rates to range between 11-32% depending on the number of columns).

⁵⁶ Mills & Weldon, *supra* note 35, at 340.

⁵⁷ *Id.* Studies examining the impact of line length on reading performance and satisfaction have yielded mixed results. A. Dawn Shaikh, *The Effects of Line Length on Reading Online News*, <http://psychology.wichita.edu/surl/usabilitynews/72/LineLength.htm> (last visited Feb. 15, 2007). Some studies indicate that longer line lengths (80-100 characters per line) are read faster while others have found that shorter line lengths (45-60 characters per line) are read faster. *Id.* According to Shaikh's study, readers appear to have a preference for either short (35) or long (95) line lengths, but the line length appears to have little effect on comprehension or satisfaction. *Id.*

⁵⁸ Troffer, *supra* note 39; Mills & Weldon, *supra* note 35, at 340.

⁵⁹ Joel Walz, *Reading Hypertext: Lower-Level Processes*, 57 *THE CAN. MODERN LANGUAGE REV.* 475, 477 (2001).

⁶⁰ Muter, *supra* note 20.

⁶¹ Adobe Portable Document Format, <http://www.adobe.com/products/acrobat/adobepdf.html> (last visited Feb. 15, 2007).

⁶² Whatis?com, *Portable Document Format*, http://whatis.techtarget.com/definition/0,,sid9_gci214288,00.html (last visited Feb. 15, 2007).

format both because the documents are searchable, without relying on the index compiled by the publisher, and because they are portable - one computer may contain as many readings as need be, without the added weight of carrying anything else.⁶³ Some comments of users have noted that there were good uses for both PDF and hard copy - that to sit down and read, the user would prefer a hard copy, but if one is using the printed material as reference, a PDF is preferred.⁶⁴

C. Hypertext Links

Besides the physical and layout distinctions, other differences between the on-screen and paper systems of delivery affect how we read and learn. One key difference between paper reading and computer screen reading is the use of hypertext.⁶⁵ Hypertext, links embedded in the reading that allow users to jump from one document to another and explore a particular point made in the original document, are “ensuring fundamental changes” in the way we read.⁶⁶ It has been suggested that the book is “dead or dying” and that computer hypertext-linking will “force teachers to rethink their practices” while empowering a new way of learning for students.⁶⁷

One main focus is in the structural difference - the linear and strictly verbal nature of printed books versus the topographical focus of electronic reading which encompasses graphics, and other visual ideas incorporated into the reading material.⁶⁸ Computer screen reading frequently liberally uses imagery to enhance the readings. Such use of icons largely has been absent from adult texts over the years, only tolerated in children’s works, or

⁶³ Gentlemen Prefer PDF’s, http://radar.oreilly.com/archives/2006/05/gentlemen_prefer_pdfs.html (last visited on Feb. 15, 2007). In addition, PDF’s often benefit readers by making “printed” material available more quickly to readers through electronic access. Overall, readers enjoy the flexibility that PDF’s offer with the familiarity of a printed page on demand, or interaction with the material electronically when needed.

⁶⁴ *Id.*

⁶⁵ Wikipedia, Ted Nelson, http://en.wikipedia.org/wiki/Ted_Nelson (last visited Feb. 16, 2007). The term was coined by Theodor Holm Nelson in 1963.

⁶⁶ David S. Miall & Teresa Dobson, *Reading Hypertext and the Experience of Literature*, 2 J. OF DIGITAL INFO. Article No. 46, 2001-08-13 (2001), available at <http://jodi.tamu.edu/Articles/v02/i01/Miall/>.

⁶⁷ *Id.* With fewer print resources potentially becoming available for students, or students choosing not to use them, teachers must adapt to new ways of collecting and presenting classroom information. Furr, *supra* note 7. Empiric evidence appears to indicate that the use of technology enhances law students’ learning. Lasso, *supra* note 9, at 47. Technology can be incorporated into the learning experience in a variety of ways. A course web page enables students to access online handouts, flowcharts and outlines for readings. *Id.* at 30-32. An online discussion board using internet technology can expand classroom discussion and interaction. *Id.* at 34.

⁶⁸ Miall & Dobson, *supra* note 67.

even associated with illiteracy.⁶⁹ This rebalance of imagery with adult learning is an enormous change in how we read.⁷⁰

This return to imagery has been criticized in the context of literary reading, as it has the power to diminish the important process of self-imagining when we read words, disabling the individual level of response that makes reading so personal.⁷¹ Hypertext has the ability to promote an image by placing them in text where perhaps it should not be, replacing our imaginations and self-processing of ideas.⁷²

A second major distinction regarding hypertext is the potential order in which ideas are read. In a printed book, the words naturally flow one after each other and a reader passively goes along the one path created by the author or editor. However, when hypertext is included, multiple pathways to approach information are possible.⁷³ Readers may now decide whether to keep reading on the linear path, or to jump to a related idea in the middle of a sentence or paragraph. While some claim that this kind of jumping around is not new - readers might have broken the line of reading by consulting a secondary source or a footnote - the difference here is in the reader's *empowerment* to make multiple choices about the pathway to information.⁷⁴ Authors can no longer clearly define a writing; rather, the trail of links chosen by an electronic reader can be more significant than the original work with which the reader began.⁷⁵ Based on personal choices of order of accessing information and depth of following up on it, the reading experience for two students reading on screen with hypertext links may be *dramatically* different from each other.⁷⁶ Research has shown that navigating the hyperlink network associated with online text is a complex cognitive activity requiring a variety of strategies.⁷⁷

In one study, "think aloud" protocols were used to track hypertext readers' navigational problems.⁷⁸ The research found that disorientation may be an important problem for novice online readers.⁷⁹ Some novice readers were unsure where to locate needed information and some had difficulty

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.*

⁷⁴ Miall & Dobson, *supra* note 67.

⁷⁵ Alex Soojung-Kim Pang, *Hypertext, the Next Generation: A Review and Research Agenda*, FIRST MONDAY, Nov. 2, 1998, http://www.firstmonday.org/issues/issue3_11/pang.

⁷⁶ *Id.* Authors and readers are now both approaching material actively, forever changing the relationship between the two.

⁷⁷ Arif Altun, *Patterns in Cognitive Processes and Strategies in Hypertext Reading: A Case Study of Two Experienced Computer Users*, 9 J. EDUC. MULTIMEDIA & HYPERMEDIA 35, 39 (2000).

⁷⁸ *Id.* at 39 (this 1990 study involved ten hypertext readers).

⁷⁹ *Id.*

reporting what they had read and not read.⁸⁰ In another study, researchers tracked two experienced computer users' approaches to reading hypertext and the strategies they developed to deal with disorientation and navigational issues when making hyperlink choices.⁸¹ These experienced readers addressed downloading issues and delay times by reading one page while opening links in different windows.⁸² They also used the web page's navigational aids including the back and forward navigational buttons to keep track of their paths.⁸³ These experienced computer users emphasized their need for integrating writing while reading by making notes in the margin if the computer program permitted or by printing out the pages for reading, intending to underline and take notes at a later time.⁸⁴

Another study measuring readers' differences with hypertext links embedded in fiction works found that those reading with hypertext took longer on each segment than did those reading linear stories.⁸⁵ Perhaps more telling, hypertext readers have expressed that they felt as if they had "missed something" in the story.⁸⁶ While some readers reported enjoying the process of self-directing their reading order and being given control, others found they could not properly follow the story when they needed to follow hypertext links to get information.⁸⁷

One useful purpose for hypertext links in scholarly work is to examine multiple editions or versions of the same work.⁸⁸ When different versions of a work are connected via hypertext, students may move from one text to another and compare and contrast points and information.⁸⁹ One solution to the issue of disorientation which could maximize the ability to examine multiple documents is a new hybrid form of hypertext known as expanding hypertext.⁹⁰ With expanding hypertext, when hyperlinks are clicked, the linked content is inserted into the same page as the hyperlink rather than the computer screen bringing up an entirely new page.⁹¹

⁸⁰

Id.

⁸¹

Id. at 44.

⁸²

Id. at 49.

⁸³

Altun, *supra* note 77, at 50.

⁸⁴

Id. at 52.

⁸⁵

Miall & Dobson, *supra* note 66.

⁸⁶

Id.

⁸⁷

Id.

⁸⁸

John Lavagnino, *Reading, Scholarship, and Hypertext Editions*, in 8 TEXT: TRANSACTIONS OF THE SOCIETY FOR TEXTUAL SCHOLARSHIP 109-24 (David C. Greetham et al. eds., U of MI Press 1995), available at <http://www.stg.brown.edu/resources/stg/monographs/rshe.html> (last visited Oct. 27, 2006).

⁸⁹

Id.

⁹⁰

J. Lee, *Expanding Hypertext: Does it Address Disorientation? Depends on Individuals' Adventurousness*, 10 J. COMPUTER-MEDIATED COMMUN (Apr. 2005), available at <http://jcmc.indiana.edu/vol10/issue3/lee.html> (last visited Feb. 15, 2007).

⁹¹

Id. Expanding hypertext is a new technology in the beginning stages of study. As research participants become more familiar with this technology, assessing its impact on reading will be helpful. *Id.*

Expanding hypertext provides a more linear flow of information and is intended to minimize cognitive overload.⁹² Whatever the format, hypertext changes the traditional structure and approach to reading.

D. Research Conclusions

Overall, the most common research finding is that reading from a screen is “significantly slower” than reading from paper.⁹³ However, there seems to be an overall belief that the differences between reading on screen and on paper will evaporate as computer screens continue to improve, although we are not yet quite at that stage.⁹⁴

The second conclusion that can be clearly drawn is that when people read on a computer screen, they usually read less accurately than they do when reading on paper.⁹⁵ Accuracy refers to the reader’s ability to “identify errors.”⁹⁶ Studies using well-controlled proofreading exercises have found readers experience “significantly poorer” accuracy in proofreading when conducting such tasks on the computer screen.⁹⁷ In one study, thirty-two individuals read text from both a black computer screen with white characters and a white paper printout with traditional black characters.⁹⁸ In both formats the text was single spaced with double spacing between paragraphs. The test subjects worked significantly slower on the computer screens and detected fewer errors.⁹⁹ In another study, twenty-four individuals read and detected misspellings from text on a paper format and on a dark computer screen with green characters.¹⁰⁰ Again, the test subjects read at a significantly slower rate on the computer screens and detected more errors when working with the paper format.¹⁰¹

Third, some experiments have concluded that frequent computer screen users may experience greater visual fatigue and ocular discomfort when reading dark characters on light backgrounds.¹⁰² Other experiments

⁹² *Id.*

⁹³ Dillon, McKnight & Richardson, *supra* note 23 at 458, 470.

⁹⁴ Jakob Nielsen, *In Defense of Print*, ALERTBOX, Feb. 1996, www.useit.com/alertbox/9602.html (last visited Feb. 15, 2007).

⁹⁵ Dillon, McKnight & Richardson, *supra* note 23 at 460.

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ Mills & Weldon, *supra* note 35, at 329.

⁹⁹ *Id.* at 332. In this 1983 study conducted by P. Wright and A. Lickorish, subjects were found to have worked between 30 to 40 percent slower proofreading from the computer screens. *Id.*

¹⁰⁰ *Id.* This 1984 study conducted by J.D. Gould and N. Grischkowsky assessed the subjects’ feelings as well as performance. *Id.*

¹⁰¹ *Id.* The subjects read from the computer screens at a rate that was 22% slower than the paper text rate. They also detected 3% more misspellings when using the paper format. *Id.*

¹⁰² Dillon, McKnight & Richardson, *supra* note 23.

found no significant differences in fatigue in the reading process.¹⁰³ Such differing conclusions were found to be tied specifically to the quality of the actual computer screen being used.¹⁰⁴

Fourth, at least one study has shown that readers have better spatial and information recall and the ability to reorder scrambled text when working with printed text than with text on a computer screen.¹⁰⁵ In that study, readers were able to recall the page and line location of information more accurately from printed text than from text on a computer screen.¹⁰⁶ This ability is considered an important component for readers in gaining a sense of the structural and semantic arrangement of the text.¹⁰⁷ Readers with a good sense of the text are able to find parts of the text, follow the thread of an argument, and discern the gist of the information.¹⁰⁸ In that same study it was found that it is easier for readers to retrieve information to answer questions from print text than from a computer screen and that the difference is perhaps attributable to the factors of page size and scrolling.¹⁰⁹ Readers retrieved the information from the printed text in thirteen minutes as compared to thirty-two minutes from a computer screen.¹¹⁰ Page size also appeared to be a determinative factor in a related experiment showing that readers did best with paper text when they were asked to reorder a scrambled text.¹¹¹ This task tested the readers' ability to critically read and reorder text from college level textbooks into a correct arrangement.¹¹² Overall, the abilities were significantly different.

Finally, studies have shown that while there may be many deficiencies that arise when readers use a computer screen as opposed to materials read in hard copy, there may not be an overall change in comprehension of the material.¹¹³ In one study, a group of individuals read continuous text for two hours from a video screen while another group read

¹⁰³ *Id.*

¹⁰⁴ *Id.* at 461-62. The higher the quality computer screen, the less fatigue readers experienced. In addition, it is important to note that these studies were conducted in the 1980's, when presumably, the quality of computer screen available was not as high as the equipment today's students would be using.

¹⁰⁵ Wilfred J. Hansen and Christian Haas, *Reading and Writing With Computers: A Framework for Explaining Differences in Performance*, 31 COMM'N OF THE ACM 1080 (1988). Subjects in the study read a text of 1000 words from either print or computer text. They were then shown sentences from the text and were asked to mark the location of the text on a blank image of text. *Id.*

¹⁰⁶ *Id.* at 1085.

¹⁰⁷ *Id.* at 1084.

¹⁰⁸ *Id.*

¹⁰⁹ *Id.* at 1086. Subjects read a text of 1800 words and then retrieved answers to questions from the text.

¹¹⁰ *Id.*

¹¹¹ Hansen & Haas, *supra* note 105, at 1086-87.

¹¹² *Id.* Subjects read a 1200 word scrambled text.

¹¹³ Dillon, McKnight & Richardson, *supra* note 23, at 464. The one exception to this was when the reader was new to reading on computer screen; comprehension was then measured at a lower level.

from text in a book.¹¹⁴ Although the group using the video screens read at a significantly slower rate, the format used did not affect comprehension.¹¹⁵ This conclusion could prove important in the law school setting, especially considering both the experiences of students in their first year of law school and even in their experiences in computer reading before coming to law school.

III. ON-SCREEN READING IN THE LAW SCHOOL SETTING

Despite its many potential problems, we have extensively used online reading in the law school setting. We are not alone. Although the legal profession has been known for its reluctance to adapt to “the digital revolution,” many in the law field have had considerable experience in using electronic reading in the law classroom.¹¹⁶

We have used electronic reading in teaching “traditional” classes such as Lawyering Skills and Values, Contracts, and advanced practical workshops. We have also used it in online course delivery formats, in both a conditional acceptance summer program teaching criminal procedure and in an online Master of Science in Health Law program for non-J.D. students.

A. Traditional Courses

1. Lawyering Skills and Values

Since 1997, we have been incorporating extensive online reading into the law school classroom in Lawyering Skills and Values, our first year legal writing class.¹¹⁷ This course is broader in scope than many traditional legal writing programs because it encompasses skills such as negotiation and

¹¹⁴ Mills & Weldon, *supra* note 35 at 333. This 1982 study conducted by P. Muter, S.A. Latremouille, W.C. Treurniet and P. Beam found that the subjects read 222 words per minute from the book text but only 159 words per minute from the video screen. *Id.*

¹¹⁵ *Id.*

¹¹⁶ Peter Schuler, *Professor Isenbergh Embraces Digital Revolution to Teach Law*, THE UNIVERSITY OF CHICAGO CHRONICLE, Apr. 26, 2001, available at <http://chronicle.uchicago.edu/010426/isenbergh.shtml>. At the University of Chicago, a professor led a pilot program in 2001 to assign his students' reading in an electronic textbook, which contained course texts, study guides and supplementary materials. While aspiring to a paperless environment, Professor Isenbergh acknowledged that the pages in the electronic resource were not as “crisp” as conventional textbooks, and the scrolling was not yet up to speed, but anticipated these problems would dissipate with advanced technology. *Id.*

¹¹⁷ Nova Southern University, Lawyering Skills and Values, <http://www.nsulaw.nova.edu/students/current/lsv/index.cfm> (last visited Feb. 14, 2007). NSU's Lawyering Skills and Values classes have incorporated online materials into the program since its inception in 1997. The program is described as “an innovative approach to legal education, one that integrates legal theory with practice, professionalism, and technology right from the first day of law school.” *Id.*

mediation, as well as, professionalism and ethics assignments and discussions derived from both the Model Rules of Professional Responsibility and the Rules Regulating the Florida Bar. As such, in order to prepare and educate our students, we have had to rely on a broader source of materials. In addition to traditional textbooks, materials include online readings from the World Wide Web.

The course is managed by an online syllabus. The online syllabus consists of a chart laying out class dates, topics covered, traditional (book) readings, online readings, assignment due dates, and links to the assignments. Therefore students read on their computers for two purposes: first, to find out what their assignments were, and secondly, to read substantive course material or assignments. Generally, the substance of the course which they read online included professional responsibility rules and educational articles that are unavailable in printed form.

Students sometimes converted these online readings into printed form, simply by printing out the documents. Often, however, students did not print out these passages, but merely accessed and read them online. Some conversations with students reveal why they may have done so. Some students told us that they often did not place as great a weight on assigned online readings as they did on assigned hard copy textbook. This implies that the labeling of a "text" as opposed to merely a "reading" carried a different weight with students' impressions of the importance of an assigned work. Students also informally commented that if a reading was so important, it would have been distributed in printed format, not just accessible online.¹¹⁸

Similar observations were made regarding the professional responsibility rules assigned to be read online. Some students did not give the study of those rules the same level of detail as they did other hard copy assignments. We found that most students read the rules online, but did not generally make it a priority to print these out, particularly if they were not directly perceived to be connected to a graded assignment, even though they were ultimately tested on a final examination.

On the other hand, students had a different response to information regarding assignments such as their traditional "closed universe" memos, open memos, persuasive writing assignments, and the attendant supporting material. Here, we informally found a dramatic difference in the screen/paper use ratio. These assignments also were distributed exclusively in an online format. Yet, nearly every student we encountered printed these assignments with supporting material from the screen, not only for memorializing purposes, but also in our experiences, for reading purposes as well. Students would bring the hard copy to class and discuss the

¹¹⁸ See Shaikh, *supra* note 57. These anecdotal findings may be consistent with a recent survey of reading habits of internet users which found readers preferred reading journal articles as printed text, but preferred reading news and newsletters as online text.

assignment, and work almost exclusively with the hard copy of the assignment in the preparation of their written work. Clearly, students were sending a message about readings, whether or not they intended to do so. The message was that if they thought a reading was important for a course grade, they wanted to read it on paper, and not online.

Interestingly, however, this was not so in the actual *preparation* of their written work. Although one might expect most students to have a paper file of information during the writing of these legal memo assignments, we experienced many students visiting our offices for individual memo conferences, wanting to show us their work on screen. While they prioritized as important the reading of an assignment on paper, they did not take that same approach to drafts of the work that we, as their professors, were to read. We were regularly asked to read drafts on-screen, whether in their presence or through e-mail attachments. This is an interesting dichotomy in their perception as to the importance of reading on paper versus on-screen reading.

In this Lawyering Skills and Values course, students were confronted with many of the complexities of online reading. First, they were required to deal with the physical complexities of reading on-screen. Second, they encountered many different layouts of reading on screen, from rules appearing in various forms to cases appearing in single or dual column layout to assignments designed for the printed page, but distributed electronically. Finally, the electronic syllabus contained hypertext links to readings and assignments, and documents which students accessed also contained extensive hypertext links to resources to assist with the assignments. All contributed to the students' use of the material.

2. *Contracts*

Even within the bounds of a first-year common law course, there were numerous opportunities for students to read online. While the main required reading was a traditional paper textbook, students frequently read electronically, through the use of the LexisNexis vehicle, Blackboard. Handouts, additional readings, problems or assignments were posted on Blackboard throughout the semester for students to read.¹¹⁹ In addition, Computer Assisted Legal Instruction (CALI) exercises also were suggested to students in order to enhance their learning in the course.¹²⁰

Students evaluating the reading assignments and their connection to material tested could clearly conclude that paper was "king" as all of the

¹¹⁹ Nova Southern University, Professor Debra Moss Curtis, www.nslaw.nova.edu/faculty/profiles/courses.cfm?ID=23 (last visited Feb. 15, 2006). The notice of mandatory use of this electronic blackboard website and instructions for registering are also distributed electronically.

¹²⁰ CALI, CALI Lessons, <http://www2.cali.org/index.php?fuseaction=lessons.home> (last visited Feb. 15, 2007).

required cases discussed through the Socratic method were in that traditional textbook. That message seemed to influence students' choices when confronted with other readings that were electronically presented. When document to be electronically read was a classroom handout, posted on the web course instead of distributed in class, almost all students printed these. They generally did not attempt to read them on screen at all. Students interpreted these handouts as something to be read in hard copy, and thus, did so.

However, true computer screen reading occurred in the use of the CALI exercises. CALI is a non-profit consortium of law schools that researches and develops computer-mediated legal instruction.¹²¹ The CALI website has exercises in a number of different law school subjects, including most traditional first year courses, as well as, many popular second and third year bar and elective courses.¹²² The exercises, broken down by unit within each course, are designed to be completed online, and include both educational reading and short quizzes that provide the user immediate feedback.¹²³

For example, in teaching Contracts, the exercise on "Acceptance" of a Contract is described as dealing with one aspect of contract formation, acceptance.

Acceptance is the manifestation of assent that is made by the offeree in response to an offer. In this lesson, you will learn how a party can accept an offer at common law. The lesson takes up issues such as the manner of acceptance, who can accept, silence as acceptance, rejection and counter-offer. The lesson ends with a short analysis exercise on the subject of acceptance.¹²⁴

The students thus read the lesson, read the questions and answered the questions, all online. Because the pages link to one another and follow a logical progression leading to immediate feedback, there is no incentive to print the pages into hard copy – it is designed to be read, interpreted, and processed in a computer screen format. The lesson uses hypertext links to move from one part of the lesson to the other, and to intersperse authority and definitions of concepts which are accessible by the reader. Thus, the reader may easily move nonlinearly through the exercise, which includes handling "pop-up" windows. In addition, the text of the lesson is single column format - mirroring a hard copy textbook – but, generally in short

¹²¹ CALI, Welcome to CALI, www.cali.org (last visited Feb. 15, 2007).

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Id.*

paragraph form on one page before prompting the user to move to the next page.¹²⁵

Students also encounter onscreen reading when PowerPoint technology is used in class. Professors are increasingly using visual aids with information projected on a screen with pictures, bullet points of information, or charts and graphics, all in order to enhance traditional lecture and discussion methods. Although projected in a large format, when students are exposed to PowerPoint presentations, they are engaging in electronic reading, which implicates many of the same issues of other electronic reading for the users, such as angle of viewing, layout of the words, use of color, and even following hypertext links.¹²⁶ The difficulties may even be magnified with the use of in-class PowerPoint, as readers are not in control of the medium - they lack control over the speed, brightness, user functions, and even the critical option of printing out the material themselves.

Therefore, in a common first-year course, students experience the complexities of on-screen reading. There are the physical challenges of reading both handouts and instructional passages on-screen. There are the different layout configurations of word processed documents, text created for the computer, and quizzes created for on-screen use. Finally, there is the liberal use of hypertext in an instructional exercise which requires students to adjust from the linear textbook of in-class use for the successful completion and utilization of the computer exercises.

3. Workshops

Both authors of this article teach advanced, upper-class workshops that address the practical aspects of legal practice: a Law Office Management Workshop and an Advanced Professional Responsibility Workshop. In Law Office Management, students use on-screen reading for a variety of purposes. First, students are required to read Rules Regulating the Florida Bar, which are most easily available in online format.¹²⁷ Students generally read these online to prepare for class and complete assignments. Second, students are responsible for finding current periodical or news articles that relate directly to the topic discussed each week in class. Most students have found that the timeliest information can be found through online sources such as web magazines and organization homepages. Students usually read these articles online, and then printed one article for the purpose of sharing it with the class. Third, students must complete weekly assignments, which are

¹²⁵ CALI, Subject List – Contracts, <http://www2.cali.org/index.php?fuseaction=lessons.subjectlist&cat=CONT> (last visited Feb. 15, 2006). The lesson, “Acceptance,” is by Jennifer Martin, Matthew McKinnon, Joseph Grohman & Ronald Brown. The website is password protected to licensed schools with annual membership.

¹²⁶ See *supra* notes 92-115 and accompanying text (describing the many difficulties encountered when reading documents online).

¹²⁷ The Florida Bar, www.flabar.org (last visited Feb. 15, 2007).

posted online and may require practical research best done online. For example, in one assignment, students must investigate local rents for office space to set up their mock law firms, information perhaps best found in online real estate listings.

There are also required hardcopy readings for students in this workshop. The syllabus itself makes no distinction as to the importance of the hardcopy readings as compared with the electronic readings.¹²⁸ Unlike first year students, the upper class students did not seem to assign a different level of importance or priority to the paper versus electronic resources. The mediums were considered equally important for completing workshop assignments. The choice as to whether to read online or on paper was based on availability and ease of use, rather than perceived importance connected with a grade for the assignment. The upper-class students demonstrated more comfort with the use of electronic readings, and more comfort with their reliability as sources.

The Advanced Professional Responsibility Workshop requires upper level students to extensively read, synthesize, and evaluate information from a computer screen after retrieving information from a myriad of online resources.¹²⁹ As registration in this course is limited to upper level law students, it is presumed that students have had some familiarity with retrieving and reading online information from their first year Lawyering Skills and Values course. Students are required to bring laptop computers to every class. Students in this course engage in weekly simulations and role play participation in a Bar Grievance Committee that must decide whether an attorney's actions warrant sanctions for violating rules of professional responsibility. In-depth class discussions transpire after small group activities which require students to research, gather, read, analyze and evaluate legal resources related to a given set of factual circumstances. After the workshop session, each small group prepares and submits a written opinion either in print format or by computer via email.

Since there is no printed text, the research and reading component of the course occurs solely online. Students access online materials such as The Rules Regulating the Florida Bar, American Bar Association (ABA) Model Rules of Professional Conduct, and Florida Standards for Imposing Lawyer Sanctions, in hypertext and PDF format.¹³⁰ Some students print a portion of these materials for use throughout the course while others access and read the materials online as needed.

¹²⁸ Nova Southern University, Professor Debra Moss Curtis, www.nsulaw.nova.edu/faculty/profiles/courses.cfm?ID=23 (last visited Feb. 15, 2006) (current semester course syllabus available).

¹²⁹ Nova Southern University, Professor Judith R. Karp, <http://www.nsulaw.nova.edu/faculty/profiles/courses.cfm?ID=59> (last visited Feb. 15, 2006) (current semester course syllabus available).

¹³⁰ *Id.*

Throughout the course, students also access various web sites, as well as Westlaw and LexisNexis databases. Students are free to choose how to conduct the research aspect of each weekly assignment and different approaches were observed among the groups. Some students traditionally start the process with an internet word search; others start with the Model Rules of Professional Conduct located at the ABA's Center for Professional Responsibility website and Rules Regulating the Florida Bar located at the Florida Bar's website, while others locate information using Lexis and Westlaw databases.

With these different approaches, the layouts and design of the rules, cases, statutes, ethics opinions, and articles the students retrieved differed vastly. Students were observed reading both silently and aloud from online text and hypertext, and sometimes clicking on hypertext to locate additional information. Students were also observed working with several open internet windows simultaneously and jumping from site to site. One click on hypertext while reading a case opinion brought them directly to another case or rule discussed in the opinion. Group members often accessed the information together and discussed what was found or the meaning of language, factual circumstances, case holdings and reasoning in the online documents they had found. The professor facilitated this "think aloud" strategy by posing questions while circulating among the groups.

Students were observed scanning and skimming documents, saving materials they had located to the hard drives of their computers or to flash drives, and highlighting, copying and pasting portions to pages labeled "notes" for that session. During the discussion portion of the workshop, students directed the professor to access online materials and project these on a large screen at the front of the classroom. Students would point to and read aloud from portions of the projected text facilitating comprehension and discussion of the substance of these materials. Almost all of the groups submitted their evaluative assignments via email. With each assignment, students had to submit individual assessments of the learning process, detailing their participation in the group work. These reports indicated that after class students independently reread the downloaded materials more carefully. Some printed out the materials, others conferred with group members by email, and some also used their notes to draft the group opinion.

Essentially, a majority of all students completed the research and reading work for the course using a computer format and were continuously engaged with the complexities of online reading. Sometimes, students would express frustration if internet access was intermittent or if there was difficulty locating a particular website or database. However, overall, the professor observed that these students were much less reliant on printed materials than first year students in the *Lawyering Skills and Values* course, were more comfortable reading from the computer screen and were eager to use a variety of computer related skills to accomplish the assigned tasks.

B. Online Course Deliveries

NSU Law has an extensive program of online courses as part of its curriculum.¹³¹ These courses generally are offered in one of two categories - either the summer conditional admittance program, Alternative Admission Model Program for Legal Education (AAMPLE) or the various non-J.D. masters' programs, including the Masters of Science in Health Law, Education Law, and Employment Law - programs designed for working professionals.¹³² We have each taught in one of these programs and, thus, have seen how the on-screen delivery of information can affect these methods of legal education.

1. Criminal Procedure

Criminal Procedure is generally considered an upper-class course in law school, often offered to second and third year students in preparation for the subject's testing on the bar exam. At NSU Law, however, the course is also offered as part of an alternative admission program for those not admitted to the law school through the traditional admittance process.¹³³ Students take two courses, the second is Negotiable Instruments. If they demonstrate success in these courses as marked by a minimum GPA attained, they are admitted to the first year class in the upcoming fall semester.¹³⁴

Criminal Procedure is a course taught mainly through the students' reading of United States Supreme Court cases, discussing the interpretation of the Fourth, Fifth, and Sixth Amendments to the United States Constitution.¹³⁵ These cases are often verbose and contain many complex legal theories. Although the course is in a conditional admittance program, it has been taught in past years almost identically to how it is taught in the second or third year of law school.¹³⁶

During the first several years that the course was conducted, students purchased the assigned cases from the Law Center on CD-ROM. Therefore, not only did students have to acquire this new skill of reading cases, but the

¹³¹ See course offerings at www.aample.nsulaw.nova.edu/index.cfm (last visited Oct. 17, 2006); <http://mhl.nsulaw.nova.edu/> (last visited Oct. 17, 2006); and <http://msedl.nsulaw.nova.edu> (last visited Oct. 17, 2006).

¹³² Master of Science in Health Law, <http://mhl.nsulaw.nova.edu/> (last visited Oct. 27, 2006); Master's of Science in Education Law Online, <http://msedl.nsulaw.nova.edu> (last visited Oct. 27, 2006).

¹³³ See www.aample.nsulaw.nova.edu/index.cfm (last visited Oct. 27, 2006).

¹³⁴ See *id.*

¹³⁵ See Shepard Broad Law Centers, Course Descriptions, www.nsulaw.nova.edu/students/current/course_descriptions.cfm?sort=txtTitle#C (last visited Feb. 15, 2006) (course description for Criminal Procedure).

¹³⁶ The course syllabus and materials, as posted on the electronic classroom platform at the time, noted the scope of the course.

delivery method was electronic. The instructions and tips given to students clearly recommended that the students print the readings out and create a binder so that they could read them in the more traditional paper format.¹³⁷ Whether students ultimately followed this advice was their choice. During the past few years, the assigned reading was changed to a traditional paper textbook. However, because the course is given via online delivery, and not in person in a physical classroom, the cases read by students are only a small part of their reading experience.

The course, taught through the WebCT platform, originally featured three traditional methods of communication and information exchange.¹³⁸ The first method, and the main focus of the course, was the "Discussion Boards." This asynchronous vehicle was considered "the classroom" where the exchange of ideas occurred. Multiple exam-like problems were posted by the professor each week, and students were divided into groups and given the responsibility of posting the "lead" answer to the problem, applying that week's case law readings to the facts of the problem. During weeks in which students did not lead the discussion, they were assigned to formulate a "response" answer. This allowed the professor to assess the students' ability to apply the proper law and facts in answering the question. Both "lead" and "response" answers had specific deadlines, and students were responsible to read all posted problems weekly

Such responses served a similar purpose to traditional classroom discussion - much in the same way as if a professor gave a hypothetical to a class and elicited both answers and subsequent comments. Through reading the problems, posting answers, and reading the answers, students learned the bulk of the course doctrine. Word processed documents were not permitted to be uploaded to the discussion threads, forcing students to read the postings in the layout form and with the physicalities, such as pop up windows, as dictated by the WebCT platform.

The second method of communication was the class "chat," the only synchronous communication in the course. In its original form, the chat was voice-only, but in later versions, the verbal chat was accompanied by a whiteboard on which the professor could write and the students could view the postings. While many students mistakenly called the once weekly meetings "class," the discussions did not generally resemble the traditional law school classroom for that course. The time was usually filled either by the professor giving a straight lecture on certain topics of importance, or by students asking questions both substantive and administrative about the course. Even when PowerPoint presentations could be posted on the whiteboard to guide discussion, there was little of the active substantive give and take that one would expect when teacher and student physically are

¹³⁷ Such information was distributed in advance to materials sent to students upon registration.

¹³⁸ WebCT, <http://www.nova.edu/webct/> (last visited Feb. 15, 2006). WebCT is an online learning medium to access courses and facilitate learning.

present. Instead, this occurred in the discussion boards, and therefore only through electronic reading.

The last method of communication was entirely written - the email system within the WebCT platform. This method generally was limited to personal communications among students, or between a student and the professor about academic performance or other personal issues that may have arisen during the course.

2. Masters in Health Law

The Legal Research, Methods and Reasoning online class is one of the first courses taken by the working professional students enrolled in the online non-J.D. Masters of Science in Health Law program.¹³⁹ The program is intended to introduce working professionals to areas of law related to their employment.¹⁴⁰ Students engage in a variety of traditional print text and online reading in ten different modules using a WebCT online environment.

Using the WebCT program, students initially access an overview of course materials and assignments in an online calendar. The calendar is displayed in chart format indicating dates for each module, topic, traditional print text readings, online readings with hyperlinks, and assignment due dates. Each module is comprised of a series of icons through which students access a problem, a reading assignment, a PowerPoint, quiz, and the discussion board postings all related to specific legal research and reasoning concepts and areas of law.

Reading assignments are comprised of traditional text readings and online readings hyperlinked to internet sites. PowerPoint presentations consist of text and visual materials. Quizzes are either multiple choice format or open ended written assignments requiring reflection and reaction. Students are instructed and encouraged to print the quiz questions before they begin the assigned readings and to use these questions as a guide to facilitate understanding of the readings. Quizzes and assignments are submitted online.

Communication occurs in both asynchronous discussion board format and synchronous chat forums. Throughout the course, students read case opinions, statutes, administrative rules and regulations, newspaper articles, and scholarly law review and journal articles. Both professor and

¹³⁹ Masters of Science in Health Law Online, <http://nsulaw.nova.edu> (last visited Oct. 27, 2006). This course has been offered since 2003. A similar course will be taught at NSU Law in two forthcoming Masters of Science programs that will begin in 2007: Master of Science in Education Law and Master of Science in Employment Law. Masters of Science in Education Online, <http://msedl.nsulaw.nova.edu> (last visited Oct. 27, 2006); Online Non-Lawyer Graduate Programs, <http://nsulaw.nova.edu/online/> (last visited Oct. 27, 2006).

¹⁴⁰ The two-year thirty credit program "teaches non-lawyer health care professionals the skills necessary to effectively identify, understand and deal with the intricate set of legal issues riddling today's health care environment." Masters of Science in Health Law Online, <http://nsulaw.nova.edu> (last visited Oct. 27, 2006).

students post questions and answers about the course materials in these discussion arenas. The professor's online questions facilitate critical thinking and analysis of the readings and stimulate reflection on the legal reading.

The second and third modules of the course are specifically designed to introduce students to critical reading of case opinions in an online environment and concepts of higher level critical thinking. Students are initially introduced to reading strategies through computer accessed readings and PowerPoint presentations. They are also introduced to concepts by "modeling" the professor's reading of an opinion on a health law topic. Students review a highlighted and annotated version of a case that includes the professor's comments explaining different aspects of the case. Next, they independently read several additional cases related to the same area of health law. An assignment involving a hypothetical situation requires the students to evaluate and apply the law from the given cases to the circumstances. Questions posted on the discussion board and chat forum encourage students to use online "think alouds" to monitor the reading process and assist in their understanding and comparison of the case opinions. Students' responses to these questions indicate that some students engage in self-reflection as they read online and react to the courts' rulings and reasoning as well as to other students' responses. Students are often eager to use their professional experience and expertise as a springboard for these discussions offering insight as to why they consider the opinion "rightly or wrongly" decided.

In later modules, students engage in critical reading of state and federal statutes, administrative rules and regulations, and articles from journals and law reviews. Throughout the modules, students have the ability to click on hyperlinks to retrieve the materials at the precise moment that they read about them in a case opinion. Students are encouraged to use the discussion boards and chat forums for each module to discuss unfamiliar legal terms and concepts, to independently conduct online research to define those terms and then to share the results with other students. The professor monitors these discussion postings, adding probing questions and clarifying concepts when necessary.

3. *Conclusions on Reading in Online Education*

It is clear that students in online courses are at the mercy of their computer screens. Online delivery of education is growing in popularity.¹⁴¹ Therefore, the issue of on-screen reading will continue to grow. Students taking an online course face several problems. First, online students potentially spend enormous numbers of hours reading computer screens, thereby making the issue of their ability to critically read the material

¹⁴¹ Leslie T. Thornton, *Beyond the Blackboard: Regulating Distance Learning in Higher Education*, 3 VAND. J. ENT. L. & PRAC. 210 (2001).

paramount. Rather than having additional material enhance their basic work, many students in online courses must either print a mound of potentially expensive materials or learn how to make on-screen reading as effective as paper reading.

Second, students must learn to read on screen in a non-traditional layout. A forum with discussion threads involves both moving between pages to see original questions and various responses, and the following of a "thread" of discussion when postings may not be in the proper place (i.e. students replying directly to an original post versus replying to those who have replied). Organizational and layout issues may detract from a student's ability to properly follow discussion. In addition, since much of the education is derived from fellow classmates' postings, students electronically read from materials that have not been edited. It is unusual in a traditional law classroom for students to regularly read their peers' work, particularly that which has not been vetted by the professor. However, in the online delivery method, student reading difficulties are aggravated by the lack of "clean" copy, as students regularly read these pieces, which may contain poor grammar, spelling and sentence structure.

Finally, students are required to move around the WebCT or other electronic platform site while they are reading. They may have threads of discussion, or cases, which will require students to jump from one part of a course to another. Since their primary form of information exchange is written, students also may jump from the delivery screen to their own electronic notes, cutting and pasting information. It is clear that online delivery of courses highlight the importance of addressing critical reading in electronic format in today's law school.

IV. POTENTIAL PROBLEMS AND SOLUTIONS IN ONLINE READING IN LAW SCHOOLS

There is no definitive work on how to optimize reading in computer formats, even though computer technology may lead to increased use.¹⁴² To be sure, there are some assertions that computerized reading has advantages over paper reading, including the ease of searching for and updating information, the ease of integrating other media into the reading, use of dynamic presentation of text and inexpensive customization of it, and the potential for interactivity with the writing.¹⁴³ By focusing on the positives of the use of computerized readings and deriving techniques to combat difficulties that may arise, law students can succeed in a learning environment using electronic readings.

There are many issues that potentially arise in assigning computer readings in law school. The first is the issue of availability of the readings to

¹⁴² Muter, *supra* note 20.

¹⁴³ *Id.*

students. The second is the students' perceptions of the "place" of computer assigned readings in their courses. The third is the difficulty of encouraging students to memorialize the readings in some fashion when necessary. The last, and most important, is getting students to critically read material that is on the computer screen. Law students often have problems with their reading material, both in complexity and amount.¹⁴⁴ Solutions to help them deal with both problems when reading electronically may greatly increase learning.

A. Availability of Readings to Students

Online readings are far more accessible to students than print materials. Computers are readily available worldwide in coffee shops, hotels, airport terminals, libraries, office supply and copy stores and elsewhere providing for easy access to locating and reading information online. Students can access online readings from anywhere by using their own computers, a CD-ROM or a flash drive with downloaded files, all the while avoiding the inconvenience of toting books. Furthermore, with the high spiraling costs of books, online materials can be much more cost effective than reading published print materials.

In addition, online research may be outpacing print research. The appearance of wireless internet, DSL and cable lines has hastened the speed with which students can access online materials. Hence, students no longer need library access to locate, copy and print legal resource materials.¹⁴⁵ Students can conduct research easily and quickly using resources and materials located online. They can even store the research material on a computer to print and read at a later time.¹⁴⁶ One example of the superiority of online access to legal research is the ability to update primary sources. In the near future, updating primary sources using books, like Shepards, may well be a thing of the past.¹⁴⁷ Updating sources using LexisNexis' Shepards feature or Westlaw's KeyCite feature is much less time consuming than using print materials.

Electronic access and reading, however, are not without disadvantages. Accessibility can become limited or non-existent if the server system is not available. Ease of access can change to frustration when links to materials are no longer correct because website URLs have changed or

¹⁴⁴ Learning Skills Program, Reading and Understanding Texts, <http://www.coun.uvic.ca/learn/read.html> (last visited Feb. 15, 2006).

¹⁴⁵ See Alan M. Podboy, *The Shifting Sands of Legal Research: Power to the People*, 31 TEX. TECH. L. REV. 1167 (2000) (discussing recent changes to and exploring future development of legal research methods).

¹⁴⁶ Students can conduct online legal research using free databases, such as Findlaw and Loislaw, and fee for service databases like LexisNexis and Westlaw.

¹⁴⁷ See William A. Hilyerd, *Using the Law Library: A Guide for Educators - Part II: Deciphering Citations & Other Ways of Locating Court Opinions*, 33 J.L. & EDUC. 365 (2004).

been removed. Although laptop portability is a major advantage, the laptop's effectiveness can be hindered by a potential loss of power. Furthermore, laptop computers are also easily susceptible to hard drive and software problems, and laptops are more likely targets of theft than books and other print materials.

B. Student Perceptions of Readings

People have different attitudes toward reading hand-held books and engagement with electronic devices.¹⁴⁸ It may be hard to find physical comfort in an electronic document compared to the immediacy and permanence of paper.¹⁴⁹ In addition, many people are more comfortable with print sources because they belong to the traditional educational experience. For these reasons, students may react differently to electronic sources, or treat them with a different level of priority than paper sources.

Many law students - and attorneys for that matter - have expressed a preference for reading in paper format. In her article discussing upcoming changes in bankruptcy practice, Honorable Prudence Carter Beatty went on the record declaring her preference for reading "real books made with real paper."¹⁵⁰ The Judge noted that she prepared for court by reading printed documents and that if the court were to go paperless, "book quality reading devices" would be needed to assist with the volume of reading that would otherwise be, if read on a computer screen, too hard on the eyes.¹⁵¹ It is possible that many attorneys and law students with high volumes of reading may feel the same way.

There is, however, a paper to electronic transformation taking place within the legal profession.¹⁵² Electronic communication is becoming a widely acceptable format within the American legal system and someday it could replace print communications. Courts are using computer technology to convey information on official court web sites.¹⁵³ They are publishing substantive and procedural rules, docketing information, as well as publishing opinions in electronic format on these websites.¹⁵⁴ Courts are also encouraging electronic filing and submissions of briefs, motions and other documents.¹⁵⁵ Bar associations and legal organizations are following the

¹⁴⁸ Charles N. Faerber, *Book Versus Byte: The Prospects and Desirability of a Paperless Society*, 17 J. MARSHALL J. COMPUTER & INFO L. 797, 806 (1999).

¹⁴⁹ *Id.*

¹⁵⁰ Hon. Prudence Carter Beatty, *Judging at the End of the Millennium*, 18 AM. BANKR. INST. J. 28, 28 (1999).

¹⁵¹ *Id.*

¹⁵² Maria Perez Crist, *The E-Brief: Legal Writing for an Online World*, 33 N.M.L. REV. 49 (2003).

¹⁵³ See, e.g., The District Court of the Southern District of Florida, www.flsd.uscourts.gov (last visited Oct. 27, 2006).

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

trend by maintaining web sites with information for both professional and lay persons.¹⁵⁶

Research shows that past reading experience is the key to good critical reading.¹⁵⁷ Students realize that critical reading, as part of the law school experience, should prepare them as practicing lawyers for the transition to technology taking place within the legal profession. Students who have spent time reading hypertext documents and text from computer screens will have an advantage over those who lack such experience. Students' expectations in preparing for this transition during law school will likely affect their perceptions about the importance of online reading.

C. Memorializing the Readings for Students

Playing off of the famous quote, one scholar has noted that "print on paper is a little like democracy: the worst possible system except for all the others."¹⁵⁸ It has been noted that books are fragile, bulky and not easily searched.¹⁵⁹ However, as lawyers, we still value paper files, and begin law school with the indoctrination of the value of having a hard copy. So, the idea of electronic readings may trouble some educators and students if there are not guarantees of the availability of information when it is needed.

There are, however, ways to ensure availability of electronic readings when necessary. If information has been found through research, bookmarking websites to leave a trail of where to find information may be the first step. If availability to the resources online is the concern, advancing technology may help. The availability of CD-ROMs, external disc drives and flash drives that can easily transfer electronic text to an always-accessible format makes memorializing, categorizing and transporting electronic text a reality.

D. Lessons Learned: Critical Reading in Computer Format

Critical reading is thinking while reading.¹⁶⁰ When users critically read, they are "learning to evaluate, draw inferences, and arrive at conclusions based on evidence."¹⁶¹ Critical reading requires the reader to

¹⁵⁶ See, e.g., The Florida Bar homepage, www.flabar.org (last visited Oct. 27, 2006).

¹⁵⁷ Walz, *supra* note 59, at 477.

¹⁵⁸ Charles N. Faerber, *Book Versus Byte: The Prospects and Desirability of a Paperless Society*, 17 J. MARSHALL J. COMPUTER & INFO L. 797, 797 (1999)(quoting Paul Wallich, *Preserving the Word*, SCI. AM., Jan. 1998 at 110).

¹⁵⁹ *Id.*

¹⁶⁰ Norma Decker Collins, *Teaching Critical Reading through Literature*, <http://library.educationworld.net/a7/a7-100.html> (last visited Oct. 27, 2006).

¹⁶¹ *Id.*

gain distance from the text so that it can be perceived clearly.¹⁶² For non-critical readers, “texts offer the truth, the whole truth, and nothing but the truth. To the critical reader, any single text provides but one *portrayal* of the facts, one individual’s ‘take’ on the subject.”¹⁶³ Research studies have found that expert critical readers differ from novice readers in the comprehension strategies that they use to facilitate reading.¹⁶⁴ Expert critical readers: (1) recall prior knowledge and mentally connect new information with that knowledge as they read; (2) monitor and repair comprehension by rereading and skipping ahead; (3) analyze text to determine important ideas before, during and after reading; (4) summarize and synthesize to check comprehension; (5) draw inferences from prior knowledge and text to fill in the gaps; and (6) ask and answer questions while reading to check comprehension, clarify ideas and focus attention.¹⁶⁵ These same strategies can be applied by readers of internet text.¹⁶⁶

Effective critical reading strategies include a metacognitive component, where the reader is aware of and monitors his or her own involvement in the reading process.¹⁶⁷ These self-monitoring strategies help readers to comprehend the text. Accomplished readers will monitor their reading comprehension and will correct any comprehension difficulties through re-reading, summarizing, making inferences, and consulting outside sources.¹⁶⁸ There is a correlation between high metacognitive abilities and academic achievement. It has been suggested that metacognition is the best single predictor of academic performance, surpassing intelligence and other variables.¹⁶⁹ Research studies have tracked the relationship between metacognition and performance in distance education courses where reading hypertext and reading from a computer screen is a key component of the

¹⁶² Julie L. Coiro, *Rethinking Comprehension Strategies to Better Prepare Students for Critically Evaluating Content on the Internet*, 39 THE NERA J. 29 (2003).

¹⁶³ *Id.* (quoting D. Kurland, *Critical Reading vs. Critical Thinking*, http://www.criticalreading.com/critical_reading_thinking.htm).

¹⁶⁴ Elizabeth Schmar-Dobler, *Reading on the Internet: The Link Between Literacy and Technology*, 47 J. ADOLESCENT & ADULT LITERACY 80, 82-84 (Sept. 2003); see also Debra Moss Curtis & Judith R. Karp, “*In a Case, In a Book, They Will Not Take a Second Look!*” *Critical Reading in the Legal Writing Classroom*, 41 WILLIAMETTE L. REV. 293, 294 n.1, 308-309 (2005).

¹⁶⁵ Schmar-Dobler, *supra* note 164, at 82-84.

¹⁶⁶ *Id.* at 83-85. In one study, adolescent students navigating the internet were observed (1) using prior knowledge to conduct internet searches to locate information; (2) monitoring and repairing comprehension by first skimming text on web pages then reading headings and rereading text more carefully; (3) using keywords searches to find and analyze relevant text and ideas; (4) orally summarizing and synthesizing textual information using their own language; (5) drawing inferences as to the helpfulness of websites; and (6) self-questioning the usefulness of the information that was found. *Id.*

¹⁶⁷ See Curtis & Karp, *supra* note 3, at 305 (a thorough discussion of metacognition theory and critical reading).

¹⁶⁸ *Id.* at 307.

¹⁶⁹ Margaret D. Anderson, *Individual Characteristics and Web Based Courses, in LEARNING AND TEACHING ON THE WORLD WIDE WEB*, at 55 (Christopher R. Wolfe ed., 2000).

course.¹⁷⁰ Computer and web based materials require individuals to use higher metacognitive skills than print based instruction.¹⁷¹ Research involving distance education indicates that distance learners' poor performance can be traced to a lack of metacognitive techniques.¹⁷² Distance learners who perform poorly fail to optimize their time and do not adequately monitor their progress and comprehension of the web based materials.¹⁷³

We have found that these metacognitive techniques can be easily incorporated into our courses and adapted to the reading of online and computer materials. When teaching from print materials we have encouraged students to use metacognitive strategies and found that when used, these metacognitive strategies facilitate comprehension of the reading material.¹⁷⁴

As online readings were added to our courses, we again turned to metacognitive strategies to enhance reading comprehension. For example, in the introductory legal research and reasoning course offered to the non-J.D. students in the Master of Science programs an entire teaching unit is devoted to critical reading strategies, which itself is presented in an online computer format.¹⁷⁵ Students are introduced to reading strategies by modeling the professors' reading of an annotated and highlighted opinion. Students then have the opportunity to use these strategies when reading additional online cases and responding to questions regarding a related hypothetical.¹⁷⁶ In this course, as well as in the other courses we teach, the online discussion boards and chat forums are indispensable tools for encouraging use of "think-aloud" techniques for reading materials, whether in print or online format. Questions posted in these forums encourage students to engage in the self reflection that is the core of metacognition and to respond to questions by reacting to the readings. These discussions provide students with an outlet for testing their individual understanding of the readings and correcting comprehension difficulties encountered as they read.¹⁷⁷

These same metacognitive techniques have been used successfully in group settings, as well. For example, in the Advanced Professional Responsibility Workshop, student groups researched, retrieved and read online versions of cases, statutes, ethics opinions. This work allowed students to conduct "read alouds" in a group setting. Students read excerpts

¹⁷⁰ *Id.*

¹⁷¹ Christopher R. Wolfe, *Individual Differences and the Web*, in *LEARNING AND TEACHING ON THE WORLD WIDE WEB*, (Christopher R. Wolfe ed., 2000).

¹⁷² Anderson, *supra* note 169, at 55.

¹⁷³ *Id.*

¹⁷⁴ Curtis and Karp, *supra* note 3, at 313-322 (discussing the use of metacognitive techniques in critical reading strategies of law students).

¹⁷⁵ See *supra* notes 139-141 and accompanying text. This unit can also be incorporated into a traditional legal research and writing course.

¹⁷⁶ *Id.*

¹⁷⁷ See *supra* notes 129-130 and accompanying text (discussing the Advanced Professional Responsibility Workshop).

of the materials aloud to other group members and through group discussion they voiced their understanding of language, factual circumstances, and reasoning of legal authority.¹⁷⁸ Students were able to evaluate their understanding of the online reading using other students as “outside sources” to test their understanding and hypotheses.

As with written text, in order to optimize learning, critical reading techniques for computer and hypertext documents should accommodate diverse learning styles and personalities. For example, computer reading techniques should compensate for the fact that passive learners tend to rely on specific cues to accomplish tasks and thus, do not perform as well as active learners in hypermedia learning environments.¹⁷⁹

Personality also plays a key role in students’ adaptability to reading in web-based learning environments and from a computer screen. Reading on the web requires greater cognitive flexibility and a heightened tolerance to ambiguity.¹⁸⁰ When reading from the web, students may encounter uncertainty, novel situations. The web has a lack of structure not ordinarily found when reading from traditional printed text. An individual’s willingness to adapt to these circumstances is determined by the individual’s ambiguity tolerance.¹⁸¹ Readers with low ambiguity tolerance require more frequent feedback when reading in web-based learning environments than readers with high ambiguity tolerance.¹⁸² Another relevant personality trait is anxiety tolerance. Highly anxious students prefer learning with a more structured routine than is commonly found in web-based reading and learning.¹⁸³ Students with low tolerance to anxiety tend to make more errors when engaged in computer based learning of difficult materials.¹⁸⁴ Computer reading techniques should incorporate strategies used by expert readers while accommodating individual differences among students.

To critically read using metacognitive techniques, the reader must prepare to read, actively read and then complete post-reading activities in order to apply what has been learned.¹⁸⁵ Critical reading starts with pre-reading techniques: an awareness of purpose followed by a preview of the material gained by looking over the titles, headings, subheadings, graphics italic and bold print - all before beginning to read.¹⁸⁶ Readers then skim the passage before reading it and begin reading having answered the questions of

¹⁷⁸ *Id.*

¹⁷⁹ Anderson, *supra* note 169, at 51.

¹⁸⁰ Wolfe, *supra* note 171, at 6.

¹⁸¹ Anderson, *supra* note 169, at 48.

¹⁸² *Id.*

¹⁸³ *Id.* at 49.

¹⁸⁴ *Id.*

¹⁸⁵ Chitra Varaprasad, *Some Classroom Strategies: Developing Critical Literacy Awareness*, 35 ENG. TEACHING F., 24 (1997), available at <http://exchanges.state.gov/forum/vols/vol35/no3/p24.htm>.

¹⁸⁶ Dennis Doyle, *Reading Efficiently*, <http://english.glendale.cc.ca.us/speed1.html> (last visited Oct. 27, 2006).

“what is the main idea,” “what kind of writing is it,” and “what is the author’s purpose?”¹⁸⁷

Pre-reading techniques are actually quite adaptable to electronic reading. Before reading computer text, the student should be aware of the purpose for finding and reading the information. This awareness can help students focus on relevant aspects of the materials and avoid the frustrations associated with reading in an online environment.¹⁸⁸ Professors can use the same methods for online materials as are used with print materials. These methods are designed to help students understand why they are reading the materials and recall prior related knowledge that would assist with comprehension. In our courses we have found course webpages, discussion boards, and chat forums to be an efficient way of providing students with handouts, hypotheticals and assignments intended to provide students with an awareness of the purpose of the assigned readings.¹⁸⁹ The online and computer readings can also be provided as an attachment or hyperlink to these materials, so students can easily move back and forth from the handout/assignment/hypothetical to the online reading materials.¹⁹⁰

The next step is to preview the material in a mode similar to what is used with printed text. Previewing an internet webpage containing hypertext can assist readers to gain a sense of structure and connections among concepts in the same way as scanning titles, headings, diagrams and bold print.¹⁹¹ Scanning menu choices without actually clicking on them enables readers to see the “big picture” of information found on the computer page and to predict a hyperlink’s path, value and credibility.¹⁹² Such an exercise will allow readers to decide whether a hyperlink will assist critical reading of the text. If text is hyperlinked, students can click on these items, however, they should be cautioned to “bookmark” important pages, so they can maintain a “reading trail” and return to the original material after they have previewed the material.¹⁹³ Another useful preview strategy distinguishes between and appropriately uses the techniques of skimming and scanning. Skimming is used by a reader to “quickly identify the main ideas of a text.”¹⁹⁴ In contrast, “scanning” is the search for “key words or ideas.”¹⁹⁵

¹⁸⁷ *Id.*

¹⁸⁸ Kymes, *supra* note 14 at 493.

¹⁸⁹ See Lasso, *supra* note 9, at 30-41 (discussing how course web pages, online discussion groups, electronic mail and listservs can assist law students before, as, and after they read complex text).

¹⁹⁰ Web CT, TWEN, LexisNexis Blackboard all have functions that allow course developers to post documents and hyperlink other materials to these documents.

¹⁹¹ Julie Coiro, *Making Sense of Online Text*, 63 EDUCATIONAL LEADERSHIP 30, 32 (October 2005).

¹⁹² *Id.* at 32.

¹⁹³ Linda B. Gambrell & Jacquelynn A. Malloy, *Approaching the Unavoidable: Literacy Instruction and the Internet*, 59 THE READING TEACHER 482 (2006).

¹⁹⁴ The Topic: Skimming and Scanning, <http://42explore.com/skim.htm> (last visited Feb. 15, 2006).

¹⁹⁵ *Id.*

Skimming includes grasping the length and organization of a piece, as well as the titles, subheadings and graphics.¹⁹⁶ In traditional print text, this could include reading a table of contents, an index, looking at chapter subheadings, or content length. A reader's ability to skim on a computer screen may be affected by the appearance and presentation of the words. Traditional methods of skimming may not be easily applicable to electronic documents. For example, an electronic document may not contain an index, relying instead upon a search engine that does not lend well to skimming. Further, electronic pages may only be navigated in one direction, which precludes a reader from assessing the initial length of a document.

When a reader scans, the reader looks for specific words and phrases, searching to see if the document can answer a specific question.¹⁹⁷ In a paper document, the reader seeks this answer in visually accessible places such as chapter and other subheadings, or indices that may not be as readily apparent in a search engine-based electronic reading.

Law students reading cases should both skim and scan text. First, students should be skimming for organization and structure, to note the methods used by the author to present the facts, reasoning, and application of the law. While skimming, students should identify and highlight the placement of unfamiliar terms and concepts that will need to be explored in the active reading stage. Students should also scan cases for key phrases such as holdings, facts, case names. Separating the functions of skimming and scanning may make each technique more efficient.

When confronted with electronic case reading, traits of electronic documents may be used as tools to assist with both skimming and scanning. Judging the memory size of a document can assist students in assessing its length. In addition, search and find functions of computers and Adobe Acrobat PDF format can assist students as they scan materials. These features actually enhance the ease with which students can locate a word or series of words in a document.

We found students using these preview strategies in several of our classes, especially when previewing rules or statutes with logical organizational patterns. For example, our first year students and upper level students were required to locate and read relevant rules of professional conduct from both the ABA Center for Professional Responsibility website and the Rules Regulating the Florida Bar at the Florida Bar's website.¹⁹⁸ Scanning the table of contents of these rules provided a sense of the overall structure of the rules and their relationship to one another. Using hyperlinks, students could decide to access a particular group of rules or a specific rule without using the find and search function of each website. They could then bookmark their research trail for further in depth reading. Such skimming

¹⁹⁶ *Id.*

¹⁹⁷ *Id.*

¹⁹⁸ *See supra* notes 117-118, 127-130 and accompanying text.

and scanning techniques were also put to daily use in the online courses, where students were regularly reading and following discussion threads. When engaging any particular thread to critique and interact with the written word, students were encouraged to scan the board for format, and skim the readings for content before entering the active reading stage.

The second stage of critical reading is active reading.¹⁹⁹ During this stage, it is essential that the reader actively engage with the material.²⁰⁰ Active reading techniques focus on an actual interactive process in conjunction with reading, such as highlighting, annotating a passage, or actively taking notes on the passage.²⁰¹ This type of interaction with the material is what causes readers to *think* about the material with which they are engaged, rather than merely passing their eyes over the words. This is the heart of critical reading.

In an experiment on reading techniques there were differences observed in active reading techniques between print reading and online reading.²⁰² While suggested ways to complete the active stage of critical reading include writing summaries in the margins, circling unknown words, placing asterisks or question marks next to passages which require further attention, drawing arrows to show relationships, and/or creating diagrams to explain the material, these are not always possible in electronic reading scenarios.²⁰³ Subjects in the experiment who read on paper used different methods than those engaged electronically, including using a finger or a pen or to guide them through the words.²⁰⁴ These methods were observed less often in online reading, although some guidance with the mouse cursor was observed.²⁰⁵

When electronically reading, students must make appropriate adjustments to their print reading strategies to complete the active reading stage. We observed that as our students became accustomed to reading a majority of the materials in an online, they adjusted their print strategies to an online medium. Highlighting techniques are available on computer screens such as underlining, enclosing text in a box, using a cursor arrow, reversing polarity (light print on dark page), flashing text, or varying the size, font, boldness or color of text.²⁰⁶ Students must learn to incorporate these into their active reading to ensure the same level of engagement with the material that they may have previously had with paper readings. Also available are means to duplicate the materials and incorporate them in separate note pages. Students can use the copy and paste functions for both

¹⁹⁹ See Curtis and Karp, *supra* note 3, at 299-300.

²⁰⁰ *Id.*

²⁰¹ See *id.* at 300 (for a discussion of active reading techniques for critical reading).

²⁰² ZAPHIRIS & KURNIAWAN, *supra* note 7.

²⁰³ Curtis & Karp, *supra* note 3, at 305.

²⁰⁴ ZAPHIRIS & KURNIAWAN, *supra* note 7.

²⁰⁵ *Id.*

²⁰⁶ Muter, *supra* note 20.

HTML and Adobe Acrobat PDF formatted documents to accomplish this. Documents presented in Adobe Acrobat PDF format also have functions enabling students to mark up the PDF files by highlighting text and by using the comment function to attach notes anywhere in the text.²⁰⁷ These notetaking functions can be used for retention of key information, summarizing, synthesizing, evaluating and incorporating explanatory information gathered from other online aids.²⁰⁸

In our advanced workshops, we observed the upper level students using these functions in their notetaking efforts to a much greater degree than the first year students. Most students, however, freely utilized the copy and paste functions, after scanning and skimming documents, and saved a great deal of information to their hard drives or flash drives.

The potentially interactive yet traditionally designed format of e-books allow for critical reading strategies in an electronic format.²⁰⁹ An e-book is a book either composed in, or converted to, a digital format, and is intended to be read on an electronic device.²¹⁰ Most e-books can be read linearly as a paper book, but also, for example, allow the reader to “flip” through passages to allow for the pre-reading process of skimming.²¹¹ In addition, readers of an e-book may highlight passages, insert bookmarks, and even annotate the margins to mimic the more traditional processes in the active stage of critical reading.²¹² Some law schools have incorporated electronic textbooks into the curriculum.²¹³ The American reading public, however, has not yet en masse warmed to eBooks.²¹⁴

Lastly, true critical reading contains a post-reading activity to reinforce and cement concepts learned.²¹⁵ In the law school setting, such activities are most easily grasped by students if they are tied to a written assignment in that subject matter. Post-questions are found to be more valuable for comprehension and processing than pre-questions.²¹⁶ Questions

²⁰⁷ See Concordia University: John Molson School of Business, <http://johnmolson.concordia.ca/amba/acrobat7.cfm?MainM=resources> (last visited Oct. 27, 2006) (discussing Adobe Acrobat highlighting and comment feature); see also Adobe, <http://www.adobe.com/products/acrobat> (last visited Oct. 27, 2006) (discussing Adobe features).

²⁰⁸ Kymes, *supra* note 14.

²⁰⁹ Curtis and Karp, *supra* note 3, at 300. Critical reading involves active stage behavior including marking and otherwise physically interacting with the written page.

²¹⁰ Pietilä et al., *supra* note 8.

²¹¹ Adams, *supra* note 7, at 38.

²¹² *Id.* at 38-39.

²¹³ See, e.g., Richard A. Matasar & Rosemary Shiels, *Electronic Law Students: Repercussions on Legal Education*, 29 VAL. U. L. REV. 909 (1995); Richard Warner et al., *Teaching Law With Computers*, 24 RUTGERS COMPUTER & TECH. L.J.107 (1998).

²¹⁴ Craig, *supra* note 9, at 1088. The author attributes some of the problems in eBooks' growth to digital-rights management issues, as well as practical problems such as bulkiness and batteries.

²¹⁵ Curtis & Karp, *supra* note 3, at 303.

²¹⁶ Michele M. Dormisch & Rayne A. Sperling, *Elaborative Questions in Web-Based Text Materials*, 31 INT'L J. INSTRUCTIONAL MEDIA 49, 50 (2004).

should be designed to evaluate students' comprehension of the materials. Research on facilitator questioning of text comprehension among college level students shows that the type of question asked and the level of question affects cognitive processing and information learning.²¹⁷ Readers can be asked questions eliciting factual information from the text or more elaborative interrogation questions, which are designed to integrate new information with prior knowledge.²¹⁸ To facilitate higher level critical thinking, the assignment should require students to do more than just summarize the material. Given the nature of computer text, inserting questions directly into the document can be an effective way to integrate post-questions into an assignment in order to focus readers' attention and facilitate cognitive processing of the material.²¹⁹ The different web based platforms that were used in our classes enabled us to integrate thought provoking questions into online handouts, hypothetical problems, assignments and sometimes even the hyperlinked readings. With the click of a mouse, students were engaged in reading while simultaneously pondering the questions raised by the hyperlinked materials. Given the flexibility offered by the WEB CT, Westlaw's TWEN and LexisNexis' Blackboard formats that were used in our classes, the questions could be multiple choice, short answer or essay form. These online formats also enabled students to submit their responses electronically and it allowed the professors to provide immediate feedback as well.

V. CONCLUSION

With the advancement of computer technology, the legal profession can expect a continuous transition to finding, reading and conveying information in an electronic and online environment with computer generated text as the norm. Overall, the advantages of computerized reading outweigh the disadvantages. Computerized textual versions of materials can be fairly inexpensive as compared to printed materials. Furthermore, computer text is easily accessible and capable of being copied and carried from place to place.²²⁰ Furthermore, electronic versions of text invites readers "to enter a piece of writing and make themselves at home in it, developing a sophisticated understanding of what text is all about through a hands-on experience."²²¹ Thus, readers connect with the materials in an interactive fashion, thereby activating prior knowledge and connecting that knowledge to new information. Online readers can simultaneously search for and update information, and can edit and add to the on-screen materials thereby making them their own.

²¹⁷ *Id.* at 50.

²¹⁸ *Id.* at 51.

²¹⁹ *Id.* at 49-50.

²²⁰ Altun, *supra* note 77.

²²¹ Kymes, *supra* note 14.

To better prepare law students for this engaging and interactive aspect of the practice of law, law schools should provide students with strategies for critically reading electronic materials and opportunities to practice these strategies. We advocate that with a little creativity, pre-reading, active reading, and post-reading strategies that work for critical reading of print text can be successfully adapted and applied to the reading of electronic text.