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Patrick Meyer

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The Google Effect, Multitasking, and Lost Linearity: What We Should Do

PATRICK MEYER*

INTRODUCTION

Over three billion people have Internet access.¹ There are now over one billion websites.² Thus far today, there have been over 4,250,000,000 Google searches conducted.³ The Internet is ubiquitous. It is also quick and easy to search online. The Internet is here to stay.

Instead of ignoring the fact that Internet usage pervades our students' lives, we should teach our students how to properly use the Internet for educational purposes. As experts have noted, every medium brings cognitive benefits and limitations.⁴ The Internet is no different.⁵ Therefore, in the process of teaching our students how to properly use the Internet for educational purposes, let us not ignore the obvious pitfalls associated with the online environment. Let us not forget that it is one thing for those who are already well-versed in a legal topic to read about it online, where it largely becomes an exercise in updating one's knowledge, but it is quite another thing for law students and new associates to learn the law in the online environment, as they are often confronting the complexities of a new legal subject for the first time. People who encounter a difficult legal topic, as is certainly the case with law students and new associates, need to concentrate at the highest level during this initial phase of information acquisition.

* Associate Professor and Library Director, University of Detroit Mercy School of Law. The author extends gratitude to Assistant Professors Erin Archerd and Catherine Archibald of the University of Detroit Mercy School of Law for their timely and relevant suggestions on the draft of this article. The author would also like to thank Joshua Lanphear, Editor-in-Chief; and the rest of editors at the *Ohio Northern University Law Review* for their generous time commitment and skilled editing work during this process.

1. *Internet Users*, INTERNET LIVE STATS, <http://www.internetlivestats.com/internet-users/> (last visited Oct. 1, 2016).

2. *Total Number of Websites*, INTERNET LIVE STATS, <http://www.internetlivestats.com/total-number-of-websites/> (last visited Sept. 10, 2016).

3. *Google Search Statistics*, INTERNET LIVE STATS, <http://www.internetlivestats.com/google-search-statistics/> (last visited Sept. 10, 2016).

4. Patricia M. Greenfield, *Technology and Informal Education: What Is Taught, What Is Learned*, 323 SCIENCE 69, 71 (2009).

5. *Id.*

The online learning environment is wrought with multitasking traps and physical limitations.⁶ In addition, although Internet-based reading gives us a new and useful cognitive profile and greatly strengthens our spatial visualization abilities, it does so at the expense of the traditional print-based development of “higher-order cognitive processes: abstract vocabulary, mindfulness, reflection, inductive problem solving, critical thinking, and imagination.”⁷ As I will discuss, it is best for neophytes to learn about a new topic in the print format—where distractions are fewer, physical cues are maximized, and deep learning is more possible.⁸

Throughout this article, I often refer to examples from the world of legal research. However, this article applies to all professors who have an online component to their course, upload course documents to an online course management system, or assign readings in a digital format.

Our nation’s legal system is predicated on structure.⁹ The applicability of laws depends on jurisdiction.¹⁰ For instance, each state has a court system structure where lower courts are subservient to higher courts, and where trial courts do not produce binding precedent.¹¹ Court decisions in one state are not binding in another state. Further, each state passes legislation and regulations that only apply to their state’s jurisdiction. In addition, there is also a federal legal structure, as well as many areas of law that have unique legal terminology, which provides additional structure to the American legal system.

Learning legal structure takes on a new meaning with each passing generation, especially with the recent push to digitize every facet of life.¹² The online environment lacks the structure necessary for students to learn and understand the legal system, which impedes their ability to properly choose the legal sources they need to access for research purposes.¹³ One

6. See *infra* The Problems.

7. See Greenfield, *supra* note 4, at 69; see also JANNA QUITNEY ANDERSON & LEE RAINIE, PEW RESEARCH CTR., MILLENNIALS WILL BENEFIT AND SUFFER DUE TO THEIR HYPERCONNECTED LIVES 17, available at http://www.pewinternet.org/files/old-media/Files/Reports/2012/PIP_Future_of_Internet_2012_Young_brains_PDF.pdf [hereinafter PEW RESEARCH CENTER] (quoting communications scholar Sandra Braman).

8. See PEW RESEARCH CENTER, *supra* note 7, at 17.

9. See generally FEDERAL JUDICIAL CENTER, THE U.S. LEGAL SYSTEM: A SHORT DESCRIPTION (2007), available at [http://www.fjc.gov/public/pdf.nsf/lookup/U.S._Legal_System_English07.pdf/\\$file/U.S._Legal_System_English07.pdf](http://www.fjc.gov/public/pdf.nsf/lookup/U.S._Legal_System_English07.pdf/$file/U.S._Legal_System_English07.pdf) (last visited Oct. 24, 2016).

10. See *id.* at 1-2.

11. *Camreta v. Greene*, 563 U.S. 692, 709 n.7 (2011) (quoting 18 J. MOORE ET AL., MOORE’S FEDERAL PRACTICE § 134.02[1][d] (3d ed. 2011)).

12. See Neil Selwyn, *The Internet and Education*, in 19 KEY ESSAYS ON HOW INTERNET IS CHANGING OUR LIVES 191, 196 (Jonathan Fox ed., 2013), available at <https://www.bbvaopenmind.com/wp-content/uploads/2014/04/BBVA-OpenMind-book-Change-19-key-essays-on-how-internet-is-changing-our-lives-Technology-Internet-Innovation.pdf>.

13. NICHOLAS CARR, THE SHALLOWS 10 (2010) (demonstrating how acquiring information from the Internet is not a linear process); see Mark Yates, *Text is Still a Noun: Preserving Linear Text-Based*

must know which sources to consult in order to begin the research process.¹⁴ The researcher is at a distinct disadvantage if she or he does not know where to look for relevant information.¹⁵

Traditional print-based research resources are often categorized by jurisdiction.¹⁶ In other words, they are compiled based on the legal system's structure. Merely learning how to use these resources teaches or reinforces the legal system's parameters. For instance, a Michigan digest book set (there are two such sets in Michigan: Michigan Digest (Michie)¹⁷ and West's Michigan Digest¹⁸) contains the headnotes from Michigan court cases and federal cases affecting Michigan law.¹⁹ So consulting a Michigan digest set, such as West's Michigan Digest, limits the realm of research to the correct jurisdiction and the relevant case law. At a glance, one can see that the print set of West's Michigan Digest allows them to quickly look up a case name to retrieve its citation, examine the issues discussed in the case, see if a word has been judicially defined in Michigan courts, or peruse the clearly-defined index.²⁰ This saves the user from the uncertainty of conducting a broad search and guessing at what search terms to use while also preventing the user from having to filter by jurisdiction, resource type, and published vs. unpublished opinion—all of which are required in Thomson Reuters Westlaw and Lexis Advance. One may notice that the legal topics of each main volume of West's Michigan Digest are arranged alphabetically on the front spine, which allows the user to leverage the

Literacy in an E-Literate World, 18 J. LEG. WRITING INST. 119, 119 (2012) (being able to jump to multiple sources almost instantaneously makes Internet research non-linear).

14. Barbara Bintliff, *Electronic Resources or Print Resources: Some Observations on Where to Search*, 14 PERSPECTIVE: TEACHING LEG. RES. & WRITING 23, 23 (2005) [hereinafter Bintliff, *Electronic Resources*].

15. *See id.*

16. For example, *Michigan Civil Procedure*, *Michigan Appeals Reports*, and *Michigan Civil Jurisprudence* are constructed around the Michigan legal system. *See* 1 INST. OF CONTINUING LEGAL EDUC., MICHIGAN CIVIL PROCEDURE (Kathleen A. Lang et al. eds., 2d ed. 2016); *Michigan Appeals Reports*, THOMSON REUTERS, <http://legalsolutions.thomsonreuters.com/law-products/Reporters/Michigan-Appeals-Reports/p/100001611> (last visited Oct. 24, 2016); *Michigan Civil Jurisprudence*, THOMSON REUTERS, <http://legalsolutions.thomsonreuters.com/law-products/Legal-Encyclopedias/Michigan-Civil-Jurisprudence/p/100027426> (last visited Oct. 24, 2016) [hereinafter *Michigan Civil Jurisprudence*].

17. *Michigan Digest*, LEXISNEXIS STORE, <http://www.lexisnexis.com/store/catalog/booktemplate/productdetail.jsp?prodId=6582&gclid=CJj-y9bWrssCFY-DaQodWMYCYQ> (last visited Oct. 6, 2016).

18. *West's Michigan Digest, 2d (Key Number Digest)*, THOMSON REUTERS, <http://legalsolutions.thomsonreuters.com/law-products/Digests/Westsreg-Michigan-Digest-2d-Key-Number-Digest174/p/100028310> (last visited Oct. 6, 2016) [hereinafter *West's Michigan Digest*].

19. *Id.*

20. *See* STEVEN M. BARKAN ET AL., FUNDAMENTALS OF LEGAL RESEARCH 80, 83, 104 (9th ed. 2009). Examining the issues discussed in the case is accomplished by using the Table of Cases volumes of the set, while seeing if a word has been judicially defined may be accomplished using the Words and Phrases volumes of the set. *See id.*

power of structure.²¹ A user is able to quickly browse that structure to determine which main volume contains cases that addresses the issue. One can then turn to the table of contents for a detailed listing of subtopics therein.²² One can also look up keywords or legal concepts in the Descriptive Word Index volumes²³ and, as often happens, discover a more appropriate word to look up along the way.

The West's Digest System is available on Thomson Reuters Westlaw via a Key Numbers search, where one can see a long list of digest topics, examine them, filter them by jurisdiction, and so forth.²⁴ However, my experience is that law students struggle when using the Key Numbers function. They instead want to run full-text natural language searches and deal with the aftermath later, thus bypassing the digest system's structure. Before there was online legal research, we had to work through the structure of the book sets. Now we do not. Before, we could not help learning the law's structure. Now it can be avoided. In effect, the extent to which the print set's linearity has been transferred to Thomson Reuters Westlaw has been rendered ineffectual by indifference or by sloppy online research habits.

The legal topics located in West's Michigan Digest are part of a long-standing legal classification system.²⁵ Long ago, editors classified the law, and it has been an instrumental part of legal education since the adoption of the case law system.²⁶ The classification system became essential to practitioners who were tasked with making sense of the proliferation of published case law opinions.²⁷ The classification system had benefits beyond legal research, as it was used to help train students to think like

21. *West's Michigan Digest*, *supra* note 18.

22. *See id.* It is called a topical outline on the website.

23. *How Do I Find the Appropriate Topic and Key Numbers?*, THOMSON REUTERS, <https://lawschool.westlaw.com/marketing/display/RE/26> (last visited Oct. 24, 2016).

24. THOMSON REUTERS, WESTLAW GETTING STARTED GUIDE 12, *available at* http://static.legalsolutions.thomsonreuters.com/product_files/westlaw/wlawdoc/web/wln_getting_started_ug.pdf.

25. *See Westlaw Next Tip of the Week: Using the West Key Number System*, THOMSON REUTERS (Apr. 30, 2012), <http://blog.legalsolutions.thomsonreuters.com/legal-research/reference-attorney-tips/westlaw-next-tip-of-the-week-using-the-west-key-number-system/>; *West's Michigan Digest*, *supra* note 18.

26. Sarah Valentine, *Legal Research as a Fundamental Skill: A Lifeboat for Students and Law Schools*, 39 U. BALT. L. REV. 173, 191 (2010) (citing Robert C. Berring, *Legal Research and the World of Thinkable Thoughts*, 2 J. APP. PRAC. & PROCESS 305, 309 (2000)).

27. *Id.* (citing F. Allan Hanson, *From Key Numbers to Keywords: How Automation Has Transformed the Law*, 94 LAW LIBR. J. 563, 568 (2002) [hereinafter Hanson, *From Key Numbers to Keywords*]).

lawyers.²⁸ Historically, the ability to think like a lawyer has been taught by using this structure.²⁹

The loss of legal structure has a devastating effect on legal analysis,³⁰ making it easy to blur jurisdictional differences,³¹ ignore the precise legal terminology that is peculiar to different areas of law, and confuse the important hierarchical distinction between primary and secondary legal authority.³² With the loss of structure in the online environment, it is more difficult to teach students to think like lawyers.³³ Without this structure, students are more likely to think of issues based only on the specific facts instead of in terms of concepts and principles.³⁴

There are examples of very useful, structured print sets in each state.³⁵ One should consider using these print sets to teach the structure of the law to new law students. For instance, Michigan Compiled Laws Annotated and the Michigan Compiled Laws Service both contain Michigan's codified legislation with accompanying Michigan case law summaries, and Michigan Civil Jurisprudence and Michigan Law and Practice discuss sundry civil law subjects in Michigan while citing to Michigan primary law.³⁶ These print-based sources are often best accessed by using a table of contents, which is divided by areas of law, or via an index, which contains critical legal

28. *Id.* at 192 (citing Laura I. Appleman, *The Rise of the Modern American Law School: How Professionalization, German Scholarship, and Legal Reform Shaped Our System of Legal Education*, 39 NEW ENG. L. REV. 251, 285 (2005)).

29. *Id.* at 193 (citing Barbara Bintliff, *From Creativity to Computerese: Thinking Like a Lawyer in the Computer Age*, 88 LAW LIBR. J. 338, 343 (1996) [hereinafter Bintliff, *From Creativity to Computerese*]).

30. *Id.* at 194 (citing Carol M. Bast & Ransford C. Pyle, *Legal Research in the Computer Age: A Paradigm Shift?*, 93 LAW LIBR. J. 285, 285 (2001)).

31. Valentine, *supra* note 26, at 194 (citing Robert C. Berring, *Collapse of the Structure of the Legal Research Universe: The Imperative of Digital Information*, 69 WASH. L. REV. 9, 29 (1994)).

32. *Id.* at 194-95 (citing Hanson, *From Key Numbers to Keywords*, *supra* note 27, at 584).

33. *Id.* at 195 (citing Katrina Fischer Kuh, *Electronically Manufactured Law*, 22 HARV. J.L. & TECH. 223, 236 (2008)).

34. *Id.* (citing Bintliff, *From Creativity to Computerese*, *supra* note 29, at 339).

35. *E.g.*, *Ohio Landlord Tenant Law, 2016-2017 ed.* (Baldwin's Ohio Handbook Series), THOMSON REUTERS, <http://legalsolutions.thomsonreuters.com/law-products/Treatises/Ohio-Landlord-Tenant-Law-2016-2017-ed-Baldwins-Ohio-Handbook-Series/p/103850204> (last visited Oct. 24, 2016); *Kentucky Law of Damages, 2016 ed.*, THOMSON REUTERS, <http://legalsolutions.thomsonreuters.com/law-products/Treatises/Kentucky-Law-of-Damages-2016-ed/p/102565552> (last visited Oct. 24, 2016); *Alabama Workers' Compensation, 2d (Alabama Practice Series)*, THOMSON REUTERS, <http://legalsolutions.thomsonreuters.com/law-products/Treatises/Alabama-Workers-Compensation-2d-Alabama-Practice-Series/p/100203963> (last visited Oct. 24, 2016).

36. *Michigan Compiled Laws Annotated*, THOMPSON REUTERS, <http://legalsolutions.thomsonreuters.com/law-products/Statutes/Michigan-Compiled-Laws-Annotated-Annotated-Statute--Code-Series/p/100028709> (last visited Sept. 30, 2016); *Michigan Compiled Laws Service*, LEXISNEXIS STORE, <http://www.lexisnexis.com/store/catalog/booktemplate/productdetail.jsp?pageName=relatedProducts&prodId=40183> (last visited Sept. 30, 2016); *Michigan Civil Jurisprudence*, *supra* note 16; *Michigan Law and Practice Encyclopedia, Second Edition*, LEXISNEXIS STORE, <http://www.lexisnexis.com/store/catalog/booktemplate/productdetail.jsp?pageName=relatedProducts&prodId=6789> (last visited Sept. 30, 2016).

terminology.³⁷ One's research effectiveness is enhanced by browsing through the structured table of contents or index, which expands one's knowledge base.³⁸ Browsing quite often results in choosing a different entry path into the book; it makes one a better researcher.³⁹ Additionally, the same thing goes for indexes and tables of contents: although a lot of tables of contents exist on Thomson Reuters Westlaw and Lexis Advance, my experience shows that law students nearly always pass up the opportunity to use them, opting instead for full-text searches, which takes away the advantage of the legal structure they provide. It is easiest for a neophyte law student to learn the law's structure in print.⁴⁰ It is necessary to learn the legal system's structure so that one can research the appropriate laws.⁴¹

What subjects are taught, and how they are taught, should be based on what gives students the best chance of learning the information that we, the legal experts, believe they should know. What is taught should not be based on the desires of the neophyte law student.⁴² This is our obligation to our students. In the legal research realm, it means that format choice should not be based on the preferences of law students or young attorneys.⁴³ In order to most effectively teach new students legal structure, there will be instances when we should teach print-based research.⁴⁴ After one is reasonably assured that their students understand the legal structure, format choice in a legal research course is often not an issue.⁴⁵ For that reason, we still need to teach some print-based resources.⁴⁶ Teaching state-based secondary sources, annotated codes, and digests in print is a perfect way to help students learn the law's structure.

Digital natives have figured out that there are significant disadvantages to online learning.⁴⁷ A new study of nearly 250 digital native college

37. See Bintliff, *Electronic Resources*, *supra* note 14, at 24.

38. *See id.*

39. *See id.*

40. *See id.*

41. *See id.*

42. MARK BAUERLEIN, THE DUMBEST GENERATION: HOW THE DIGITAL AGE STUPEFIES YOUNG AMERICANS AND JEOPARDIZES OUR FUTURE (OR, DON'T TRUST ANYONE UNDER 30) 159-61 (2009) (educators have also been blinded by new technology, abandoning more traditional methods and thus failing our students); see JOHN PALFREY & URS GASSER, BORN DIGITAL: UNDERSTANDING THE FIRST GENERATION OF DIGITAL NATIVES 246-47 (2008) [hereinafter PALFREY & GASSER, BORN DIGITAL] (Palfrey and Gasser also promote a balanced approach to teaching with technology).

43. *See* Yates, *supra* note 13, at 151.

44. *See id.*

45. *See id.* at 151-52.

46. *Id.*

47. *E.g.*, *Digital Native*, TECHOPEDIA, <https://www.techopedia.com/definition/28094/digital-native> (last visited Oct. 6, 2016) (a digital native is someone who grew up using digital media); see Marc Prensky, *Digital Natives, Digital Immigrants*, 9 ON THE HORIZON 1, 1 (2001), available at <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20>

undergraduate students from the U.S., Japan, and Germany found that ninety-two percent of the nearly 350 U.S. students favored print textbooks over digital textbooks for longer reading assignments.⁴⁸ Eighty-nine percent of U.S. respondents preferred reading hardcopies if the costs were the same between formats.⁴⁹ Respondents identified the distractions associated with online reading, as well as the physical discomfort and symptoms that result from online reading.⁵⁰ Regarding distractions, eighty-five percent of U.S. students reported multitasking when reading online, while only twenty-six percent of U.S. students reported multitasking when reading in hardcopy.⁵¹ Naomi Baron, architect of the survey, summed up her survey findings by reminding us that reading is a cognitive function that requires attention, and distractions surely get in the way of what we are doing.⁵² Over ninety-two percent of all respondents in Baron's study noted that it was easier to concentrate when reading in print.⁵³ Other recent studies also show that students decidedly prefer to read print books, although at a lower percentage than Baron found.⁵⁴ For instance, a recent study found that seventy-two percent of 500 college student respondents preferred print books.⁵⁵ Respondents who preferred print books reasoned that they were easier to read, easier to navigate, and provided for increased focus and concentration.⁵⁶ Another recent study of nearly 400 UCLA students showed that 67.7 percent of students favored having all course material in print,⁵⁷ whereas only eighteen percent preferred to perform course readings electronically.⁵⁸ Another study found that sixty-one percent of 357 University of Kansas graduate and postdoctoral students and faculty preferred print reading, although School of Pharmacy students and faculty

Part1.pdf (Mark Prensky is often cited as coining the phrase in this article).

48. NAOMI S. BARON, WORDS ONSCREEN: THE FATE OF READING IN A DIGITAL WORLD 81, 84-85 (2015).

49. *Id.* at 86-87 (the number for all respondents (from all countries) was 83 percent).

50. *Id.* at 87-89.

51. *Id.* at 88.

52. *Id.*

53. BARON, *supra* note 48, at 89.

54. Direct Textbook, *Direct Textbook: 72% of College Students Prefer Print Over Ebooks*, PR NEWSWIRE (Sept. 1, 2015, 9:17 AM), http://www.prnewswire.com/news-releases/direct-textbook-72-of-college-students-prefer-print-over-ebooks-300135561.html?et_mid=780371&rid=240993196.

55. *Id.*

56. *Id.*

57. Diane Mizrahi, *Undergraduates' Academic Reading Format Preferences and Behaviors*, 41 J. OF ACAD. LIBRARIANSHIP 301, 305 (2015), available at <http://www.sciencedirect.com/science/article/pii/S0099133315000506>. This percentage is for answers to question 3. The questions from the questionnaire are at pages 310-11. *See id.* at 310-11.

58. *Id.* at 305. This percentage is for answers to question 14. The questions from the questionnaire are at pages 310-11. *See id.* at 310-11.

overwhelmingly preferred e-books.⁵⁹ The outlier responses from the School of Pharmacy's students and faculty (the School of Pharmacy consists of four majors) likely account for the lower overall book reading preferences in this study, as fifty-nine percent of these students and faculty preferred online reading to print reading.⁶⁰ Print reading was overwhelmingly chosen in ten of the other fifteen majors represented in the survey.⁶¹

It is without doubt that the Internet has fundamentally changed how we acquire information. One can quickly find many answers online. Most everything and every acquaintance is a fingertip away. The current digital generation lives "in a world of ubiquitous connectivity and pervasive proximity."⁶² Digital champions believe that our relationship to knowledge has been fundamentally changed by the Internet, and the linear model by which research was previously conducted has been replaced by instant access to page and relevancy rankings and product and service customer ratings.⁶³ These individuals say that this new relationship with knowledge requires a new means of research: a broader, more surficial approach that touches several disciplines without gaining a deep understanding of any one of them.⁶⁴ Traditionally, legal authorship has been of paramount importance, but the Internet's champions point out that individuals are no longer bound by the authority of known authors.⁶⁵ Now, we can find our answers based on the collective knowledge of the average Internet user; the collective answer serves as validation of source credibility, and speaks to the reliability of the information itself.⁶⁶ Technophiles say that this new social network of the Internet has obviated the need for linearity.⁶⁷

I think most of these observations about the new era of information and how we relate to it are generally correct. However, these observations are not applicable to the field of law. The law is too specialized for these new online rules to apply. Jurisdiction, subject matter issues, and the peculiarity of subject-specific legal terminology will always matter. One must consult specific materials in order to represent the specific issues that pertain to

59. Julie Waters et al., *A Comparison of E-book and Print Book Discovery, Preferences, and Usage by Science and Engineering Faculty and Graduate Students at the University of Kansas*, ISSUES IN SCI. & TECH. LIBRARIANSHIP (2014), available at <http://www.istl.org/14-winter/refereed3.html>.

60. *Id.*

61. *Id.* (see Figure 2).

62. MARK FEDERMAN, WHY JOHNNY AND JANEY CAN'T READ, AND WHY MR. AND MS. SMITH CAN'T TEACH: THE CHALLENGE OF MULTIPLE MEDIA LITERACIES IN A TUMULTUOUS TIME 11 (2005), available at <http://individual.utoronto.ca/markfederman/WhyJohnnyandJaneyCantRead.pdf> (transcript of speech originally delivered to Univ. of Toronto Senior Alumni Assn., Toronto, ON).

63. *E.g., id.*

64. *E.g., id.* at 10.

65. *E.g., id.* at 8-11.

66. *See generally id.*

67. *See generally* FEDERMAN, *supra* note 62.

one's clients. This means that as a matter of course, the legal researcher would absolutely not search for answers in certain areas of the law, let alone from different disciplines. To help teach these matters to law students, many of us teach legal research as a process, which focuses on jurisdiction and the area of law relevant to our problem issues, and which depends on moving from one type of source to the next.⁶⁸ Additionally, many of the specialized legal materials that the law depends on are not online, or they are of limited availability because of high subscription costs. That leaves law review articles and the occasional legal blog as the only free secondary source materials. There is no way around it. In order to adequately represent clients, one must delve deeply into a relatively small number of legal materials. This deep dive is best done in the print format.

Factors associated with the stimulus-rich online environment work against the scientific process of how we learn.⁶⁹ The process has been detailed in many articles, and a very brief summary is all that is necessary here. First, it is not fully understood how the mind decides what to pay attention to.⁷⁰ This is particularly the case when accounting for events other than those where we are startled or threatened by external forces—the attention triggers that we are programmed to notice in the environment.⁷¹ Nonetheless, our minds constantly choose to attend to one stimulus over others.⁷² We remember events and facts that come to our attention through an extremely complicated process called neuroplasticity, which involves “various chemical reactions that register and record experiences in neural pathways.”⁷³ These chemical reactions occur when we are doing or remembering something, resulting in the activation of neurons that help us make initial sense of the event.⁷⁴

With so many details to process in a very short time, other potential neuron sets that are already committed to memory are ignored instead of

68. See, e.g., DEBORAH A. SCHMEDEMANN ET AL., *THE PROCESS OF LEGAL RESEARCH: PRACTICES AND RESOURCES* (9th ed. 2016); Thomas W. Holm, *A Journey of Faith, Love, and Teaching*, 58 *UCLA L. REV. DISCOURSE* 215, 218-19 (2011) (the footnotes on pp. 218-19 are particularly descriptive of the research process he relies on); Ronald E. Wheeler, *Does WestlawNext Really Change Everything? The Implications of WestlawNext on Legal Research*, 103 *LAW LIBR. J.* 359, 363-64 (2011); Spencer L. Simons, *Navigating Through the Fog: Teaching Legal Research and Writing Students to Master Indeterminacy Through Structure and Process*, 56 *J. LEGAL EDUC.* 356 (2006).

69. See generally Lauren A. Newell, *Redefining Attention (and Revamping the Legal Profession?) for the Digital Generation*, 15 *NEV. L.J.* 754 (2015).

70. See *id.* at 761. Newell notes that it is not known exactly how our mind determines what to pay attention to. See *id.*

71. *Id.* at 761-62. Our minds are programmed to scan the horizon for anything out of the ordinary as a means of looking for potential danger. This is referred to as “bottom-up” attention control. *Id.*

72. See *id.*

73. CARR, *supra* note 13, at 26-27.

74. *Id.* at 27.

being employed to help bring initial meaning to an experience.⁷⁵ If the various neuron groups that are triggered into action are in close physical proximity, they bond and information is sent between neurons via axons and dendrites, thus creating memories.⁷⁶ If the experience is repeated, the bonds strengthen and new bonds are also created.⁷⁷ If given enough time, and provided there are no significant interruptions, these temporary memories are transferred to long-term memory.⁷⁸

To illustrate just how tenuous memory is, let us look at the four ways in which memory depends on attention. First, as mentioned, attention determines what we focus on and what we ignore.⁷⁹ Second, attention is what holds information in working memory.⁸⁰ Third, attention shapes and stores information in long-term memory.⁸¹ Fourth, attention is needed in order to retrieve memories.⁸² An experience will be stored in long-term memory in several different groupings, such as groupings based on touch, smell, color, noise, or taste.⁸³ The process of recalling information from long-term memory brings the various neuron groupings back into short-term memory, where they can be modified by additional detail and where additional groupings are formed.⁸⁴ It is vitally important that this complex learning process be uninterrupted, as neuron groupings must work in concert in order for information to be recalled later.⁸⁵

Learning new ways of doing things locks us into a pattern.⁸⁶ Once a new habit is engrained into our minds, it is difficult to undo, particularly as the new connections are strengthened.⁸⁷ At the same time, the link between established neurons weakens with disuse, causing those memories to fade.⁸⁸ The result is that we miss the opportunity to enhance that which had previously been learned.⁸⁹ Finally, information is not automatically

75. *Id.*; MAGGIE JACKSON, DISTRACTED: THE EROSION OF ATTENTION AND THE COMING DARK AGE 78 (2008).

76. CARR, *supra* note 13, at 27; JUDITH HORSTMAN, THE SCIENTIFIC AMERICAN BRAVE NEW BRAIN 39 (2010).

77. HORSTMAN, *supra* note 76, at 27.

78. CARR, *supra* note 13, at 184. *This process may take one hour, if not interrupted. Id.*

79. Newell, *supra* note 69, at 765 (citing M. H. Sam Jacobson, *Paying Attention or Fatally Distracted? Concentration, Memory, and Multi-Tasking in a Multi-Media World*, 16 J. LEGAL WRITING INST. 419, 422-23, 425 (2010)).

80. *Id.* (citing Jacobson, *supra* note 79, at 425).

81. *Id.* at 766 (citing Jacobson, *supra* note 79, at 425, 425 n.29).

82. *Id.* (citing Jacobson, *supra* note 79, at 421, 428 n.43).

83. James B. Levy, *Teaching the Digital Caveman: Rethinking the Use of Classroom Technology in Law School*, 19 CHAP. L. REV. 241, 258 (2016).

84. *E.g.*, CARR, *supra* note 13, at 184-85, 191; Levy, *supra* note 83, at 258-59.

85. CARR, *supra* note 13, at 184; JACKSON, *supra* note 75, at 78.

86. *E.g.*, CARR, *supra* note 13, at 34; Levy, *supra* note 83, at 258.

87. *E.g.*, CARR, *supra* note 13, at 35.

88. *Id.* at 35, 185; *see* Newell, *supra* note 69, at 764-66.

89. *See* Newell, *supra* note 69, at 765.

transferred to long-term memory.⁹⁰ This process may take one hour, if not interrupted.⁹¹

It boils down to attention. Attention metes out the limited resource of working memory (also called short-term memory) by choosing what the mind focuses on.⁹² A plethora of disruptions can occur in the online environment along the way, which negatively affects our attention, and thus our ability to internalize legal material.⁹³ As we have learned through cognitive learning theory, the increased stress on memory load associated with Internet research has major implications;⁹⁴ we can only remember a few main points when introduced to a new topic or skill.⁹⁵ If we try to force more than just a few pieces of information through the very narrow passage between short-term memory and long-term memory, the ability to commit information to long-term memory is greatly diminished and we do not retain the information.⁹⁶

This article builds on current cognitive research pertaining to how the brain works in the digital learning environment. I will review important research studies that have recently been conducted, focusing on multitasking in and out of the classroom (including texting), information literacy, information overload, and physical issues associated with the viewing screen. I list useful observations and techniques gleaned from my research and offer my suggestions to augment them, primarily by applying the observations and techniques to the online legal research environment. I do so based on my teaching experiences over the past eighteen years, which includes several years of teaching an integrated research course to law students in their first semester and having taught traditional classroom and online Advanced Legal Research courses more than forty times.

THE PROBLEMS

Not only is the structure of the law largely lost online, but our minds also work differently when reading in the online environment.⁹⁷ Studies show that reading online leads to more skimming,⁹⁸ which results in

90. CARR, *supra* note 13, at 184.

91. *Id.*

92. See Newell, *supra* note 69, at 757.

93. E.g., TORDEL KLINGBERG, THE OVERFLOWING BRAIN: INFORMATION OVERLOAD AND THE LIMITS OF WORKING MEMORY 46 (2009); see CARR, *supra* note 13, at 184 (any disruption may impede memory acquisition).

94. JACKSON, *supra* note 75, at 124-26.

95. E.g., *id.* at 90, 124.

96. *Id.* at 124-25.

97. See Yates, *supra* note 13, at 126-27.

98. CARR, *supra* note 13, at 122 (deep reading is difficult in the online environment), 134-38 (Carr summarizes experiments finding that the vast majority of online readers quickly skimmed the text);

“knowledge deficits.”⁹⁹ There are several major reasons for the propensity to skim digital text, which I discuss in this section.

The Google Effect

First, a phenomenon has developed with the advent of the Internet. If we think information can be easily retrieved online at a later time, we are less likely to commit it to memory.¹⁰⁰ This is called “The Google Effect.”¹⁰¹ Having access to stored information on the Internet, of course, means that we may not undergo the learning processes associated with storing information in our minds.¹⁰² To the extent we are relying on the artificial memory of the Internet, we are not developing our own intellect.¹⁰³ As you will recall from my introduction, we develop our minds and strengthen our memories through the process of determining which events to experience, experiencing and “recording” those events, storing memories long-term, recalling synapses from long-term memory, and re-experiencing events.¹⁰⁴ The Google Effect bypasses the mind’s internal processing.¹⁰⁵

From a professor’s perspective, it is easy to view this issue as only pertaining to students in our classrooms. However, many fear that the collective memories of a new legal generation will be harmed as The Google Effect progresses.¹⁰⁶ Awareness is the first step to remediating a problem. But, like the two decade struggle to make students aware of: (1) the lack of linearity in the online environment; and (2) how to remedy it, group think may win out. What effect will the outsourcing of our thinking processes and the lack of linearity in the online environment have on teaching our students to think like a lawyer?

Information Overload

Second, the immediate access to a plethora of information in the online environment can easily lead to information overload, causing decreased

see Yates, *supra* note 13, at 126-27 (explaining that online reading activates the part of the mind related to decision-making and problem solving, whereas print-based reading activates memory).

99. Yates, *supra* note 13, at 120.

100. See generally Betsy Sparrow et al., *Google Effects on Memory: Cognitive Consequences of Having Information at Our Fingertips*, 333 *SCI.* 776 (2011).

101. See generally *id.*; see also Daniel M. Wegner & Adrian F. Ward, *The Internet Has Become the External Hard Drive for our Memories*, *SCI. AM.* (Dec. 1, 2013), <http://www.scientificamerican.com/article/the-internet-has-become-the-external-hard-drive-for-our-memories/?print=true>.

102. See Wegner & Ward, *supra* note 101.

103. See *id.*

104. CARR, *supra* note 13, at 188-92.

105. See Wegner & Ward, *supra* note 101.

106. CARR, *supra* note 13, at 194-97.

comprehension and a propensity to give up on the research project.¹⁰⁷ This is particularly an issue when first being introduced to a difficult subject or task, which is apparent, for example, when law students are given their first legal writing assignment and they encounter a fact pattern where they may not be able to readily identify main issues. Students struggle to find relevant explanatory material and often settle for incomplete sources.¹⁰⁸ If students are unsure of legal structure and do not know where to look for subject-specific explanatory material, their writing (and grades) will suffer.¹⁰⁹ With so much legal material at their disposal, students usually have no idea where to start the research process, even when issues are identified.¹¹⁰

Complicating the problem of information overload is the presence of hyperlinks, which, of course, frequently offer a plethora of additional information with just one click. Not only does the availability of more information via hyperlinks add to information overload, but simply having to make repeated decisions of whether to click onto hyperlinks also distracts one's comprehension.¹¹¹ Zhu tested 104 graduate and undergraduate students on information searching, learning, and attitude toward "hypermedia systems."¹¹² The group that had the fewest hyperlinks present in an online text obtained significantly higher recall scores on a multiple choice test.¹¹³ Her conclusion suggested that a higher number of hyperlinks equated to information overload.¹¹⁴ The reasons given by test subjects were disruption in reading comprehension, difficulty determining which links to click onto, losing their place or orientation, and nonlinearity.¹¹⁵ Even the minor effort undertaken to assess whether to click onto certain links expends valuable memory.¹¹⁶ Niederhauser et al. came to a similar

107. See John Palfrey & Urs Gasser, *Reclaiming an Awkward Term: What We Might Learn From "Digital Natives"*, 7 *I/S: J. OF L. & POL'Y* 33, 52-53 (2011) [hereinafter Palfrey & Gasser, *Reclaiming*], available at <http://moritzlaw.osu.edu/students/groups/is/files/2012/02/Palfrey.pdf>; see also CARR, *supra* note 13, at 91 (noting that the plethora of stimuli on webpages distracts us).

108. See Palfrey & Gasser, *Reclaiming*, *supra* note 107, at 53.

109. See *id.*

110. Of course, not knowing where to even start a research project is not a new phenomenon. It has certainly been around for my eighteen years of teaching legal research.

111. Yates, *supra* note 13, at 126 (citing CARR, *supra* note 13, at 128) (the decision of whether or not to click onto the hyperlinks diverts the reader's attention from the text); see Eyal Ophir et al., *Cognitive Control in Media Multitaskers*, 106 *PROC. NAT'L ACAD. SCI.* 15583, 15583 (2009), available at <http://www.pnas.org/content/106/37/15583.full.pdf> (noting that multitaskers are more distracted).

112. Erping Zhu, *Hypermedia Interface Design: The Effects of Number of Links and Granularity of Nodes*, 8(3) *J. EDUC. MULTIMEDIA & HYPERMEDIA* 331, 336 (1999).

113. *Id.* at 345, 347.

114. *Id.* at 349.

115. *Id.* at 352.

116. *Id.*

conclusion.¹¹⁷ They tested thirty-nine undergraduate students on online reading comprehension.¹¹⁸ Results of this experiment showed that the use of hyperlinks to compare and contrast content inhibited learning,¹¹⁹ suggesting that the increased information interfered with the learning process.¹²⁰ A common coping mechanism for information overload is to ignore information without processing it, which, of course, means that potentially valuable information is overlooked.¹²¹ The group most affected by distraction when learning are students that have the lowest amount of working memory—which are the students that we are most concerned about in our classes.¹²² Klingberg likens this situation to the “cocktail party effect,” where certain people do not focus well when confronted with all the different conversations and other distractions that may be associated with a cocktail party.¹²³

There is more to be done to combat information overload than merely training students how to consistently locate information that is reliable, detailed, relevant, and of high quality. We also need to teach students how to identify and avoid the bad sources of information. The skill of being able to locate and discern between information sources, and effectively use these sources, is called information literacy (or perhaps, more appropriately in this case, website literacy).¹²⁴ We must teach information literacy, as U.S. students are not well-versed in it.¹²⁵

Information overload is closely tied to multitasking (see section below on Multitasking) and the proliferation of digital devices, but, as noted above, information overload goes beyond the overabundance of available information and devices.¹²⁶ That is where the tie-in with multitasking occurs.¹²⁷ Information overload is mostly about individual cognitive abilities or limits, and the absence of past similar experiences in

117. See generally Dale S. Niederhauser et al., *The Influence of Cognitive Load on Learning from Hypertext*, 23 J. EDUC. COMP. 237 (2000).

118. *Id.* at 240.

119. *Id.* at 249-50.

120. *Id.* at 250.

121. E.g., PALFREY & GASSER, BORN DIGITAL, *supra* note 42, at 195-96.

122. E.g., KLINGBERG, *supra* note 93, at 73.

123. *Id.* at 74-76.

124. *Information Literacy Competency Standards for Higher Education*, ASS'N OF C. & RES. LIBR., <http://www.ala.org/acrl/standards/informationliteracycompetency> (last visited Oct. 6, 2016).

125. EDUCATIONAL TESTING SERVICE, AMERICA'S SKILLS CHALLENGE: MILLENNIALS AND THE FUTURE 11-13, available at <http://www.ets.org/s/research/30079/asc-millennials-and-the-future.pdf>. The Educational Testing Service (ETS) has found that U.S. Millennials scored sixteenth out of twenty-two nations in key information and computer technology literacy skills. *Id.*

126. See generally Anne F. Rutkowski & Carol S. Saunders, *Growing Pains with Information Overload*, IEEE COMPUTER SOC'Y (2010), available at <https://core.ac.uk/download/files/153/6248438.pdf>.

127. See generally *id.*

successfully managing the information that is causing the overload.¹²⁸ The plethora of available information and devices compounds these underlying problems.¹²⁹

Physical Limitations Online

Third, the complex nature of reading in the online environment leads to less reading comprehension than if one uses print-based resources.¹³⁰ For instance, spatial stability is lost when one has to scroll down a screen, which requires more memory diversion from text comprehension.¹³¹ Additionally, as one clicks on more hyperlinks, there is a higher chance of going on a tangent.¹³²

In research conducted in 2012 and 2013, Solak describes more examples of spatial instability in the online environment by analyzing research on ninety-six prospective English teachers.¹³³ Solak found that forty-two percent of the respondents complained of irritated eyes, twenty-three percent noted tiredness, and eighteen percent found it difficult to follow the screen.¹³⁴ Twenty-one percent of the respondents also found that not being able to employ print-based reading strategies was a negative, while fifteen percent found it difficult to concentrate online.¹³⁵ Respondents felt that it was easier to conduct paper-based reading comprehension than it was to conduct reading comprehension online, by a score of 4.4 to 1.79 on a scale from one to five.¹³⁶

Respondents in recent experiments have done more than merely indicate that their reading comprehension is better in the print format. In a 2013 article, Mangen et al. discussed research conducted on seventy-two tenth graders and found that online readers were more likely to have lower reading comprehension than print-based readers when reading a four page

128. *Id.* at 94.

129. *See generally id.*

130. *See generally* Anne Mangen et al., *Reading Linear Texts on Paper Versus Computer Screen: Effects on Reading Comprehension*, 58 INT'L J. OF EDUC. RES. 61 (2013); *see also* CARR, *supra* note 13, at 90 (online reading removes the sense of touch from the equation, resulting in less attention being paid to online reading).

131. *See* Mangen et al., *supra* note 130, at 65; CARR, *supra* note 13, at 90.

132. CARR, *supra* note 13, at 90 (hyperlinks divert our attention from the text of the document and are not the same as footnotes); *see also* Diana DeStefano & Jo-Anne LeFevre, *Cognitive Load in Hypertext Reading: A Review*, 23 COMPUTERS IN HUMAN BEHAVIOR 1616, 1635-36 (2007) (reading information containing hyperlinks decreases one's understanding of the text as compared to reading in print).

133. Ekrem Solak, *Computer Versus Paper-Based Reading: A Case Study in English Language Teaching Context*, 4(1) MEVLANA INT'L J. OF EDUC. 202, 205 (2014).

134. *Id.* at 206 (Table 2).

135. *Id.* at 206-07 (Table 2).

136. *Id.* at 206 (Table 1, Items 1 & 2).

document.¹³⁷ Mangen et al. opined that there were several possible reasons for the difference, including: (1) the spatial instability caused by having to scroll; and (2) visual fatigue.¹³⁸ Small et al. performed functional MRI scans on twenty-four subjects while they performed cognitive tasks.¹³⁹ They found that Internet readers must attend to far more visual information than do print researchers, which may have negative implications on the amount of attention the reader can allot to the text.¹⁴⁰ DeStefano and LeFevre found a definite negative correlation between reading comprehension and the additional visual demands of the online world.¹⁴¹

The decreased spatial awareness of online sources lowers comprehension, especially when text is longer and more difficult, but that is only part of the story.¹⁴² The concern is not only about the physical limitations that exist in the online environment.¹⁴³ It is also about the physical attributes lacking in the online environment, which have been proven to result in decreased cognition.¹⁴⁴ Print materials give the reader more spatial awareness, or visual cues, which allow us to, for instance, remember where we saw certain information on a page.¹⁴⁵ When we read, our mind forms a visual map of the material.¹⁴⁶ The print medium gives us more visual cues for which to build the map: we immediately see a left page and a right page, have eight corners as a frame of reference, and can quickly determine how far we have read.¹⁴⁷ These are important cues that support the function of searching and retrieval of information, and they aid one in comprehending material.¹⁴⁸ It leads to a better understanding of the text's structure, which also enhances recall.¹⁴⁹

A memory is not made up of just one isolated thought, rather, a memory is a grouping of many attributes.¹⁵⁰ As Lovelace and Southall concluded from experiments they conducted, being able to identify the spatial location

137. Mangen et al, *supra* note 130, at 63-65.

138. *Id.* at 65-66.

139. Gary W. Small et al., *Your Brain on Google: Patterns of Cerebral Activation During Internet Searching*, 17(2) AM. J. OF GERIATRIC PSYCHIATRY 116, 117-18 (Feb. 2009).

140. *See id.* at 125.

141. DeStefano & LeFevre, *supra* note 132, at 1635.

142. Mangen et al., *supra* note 130, at 65 (“[h]aving a good spatial mental representation of the physical layout of the text supports reading comprehension.”).

143. *See generally* Ferris Jabr, *The Reading Brain in the Digital Age: The Science of Paper Versus Screens*, SCI. AM. (Apr. 11, 2013), <http://www.scientificamerican.com/article/reading-paper-screens/>.

144. *See generally id.*

145. BARON, *supra* note 48, at 142.

146. *See generally* Jabr, *supra* note 143.

147. *See generally id.*

148. *E.g.*, Kenton O’Hara et al., *Supporting Memory for Spatial Location While Reading from Small Displays*, 1999 CHI 220, 220 (1999); Mangen et al., *supra* note 130, at 65-66.

149. O’Hara et al., *supra* note 148, at 220.

150. Eugene A. Lovelace & Stephen D. Southall, *Memory for Words in Prose and Their Locations on the Page*, 11 MEMORY & COGNITION 429, 429 (1983).

of words is a key attribute to a memory, and remembering word location hastens the recall of other components of a memory.¹⁵¹ They found that depriving students of these book-based spatial cues significantly lowered recall.¹⁵²

The cognitive benefits of print materials are enhanced when we consider the study of haptics, or the sense of touch.¹⁵³ In the context of learning, the study of haptics determines how the sense of touch affects cognition, and it is believed that multimodal learning takes place because one can see and touch textbooks.¹⁵⁴ Not only are visual memories created, but memories based on touch are also created.¹⁵⁵

Multitasking

Fourth, there is the well-known issue of multitasking, or alternating between many tasks,¹⁵⁶ which takes place, for example, when one listens to a lecture while typing notes, studying online, checking e-mail, IMing, and so on. Numerous scientific experiments and scientists have warned against the negative cognitive effects of multitasking,¹⁵⁷ including Dr. David Meyer, a well-known leader in cognitive neuroscience at the University of Michigan.¹⁵⁸ Although Dr. Meyer acknowledges that the negative effects of multitasking can be lessened with training, he noted that “except in rare circumstances, you can train until you’re blue in the face and you’d never be as good as if you just focused on one thing at a time.”¹⁵⁹

Multitasking not only negatively affects comprehension, but it also requires one to take time to refocus.¹⁶⁰ Mark et al. found that the average amount of time spent on a task before being interrupted or changing tasks is approximately eleven minutes.¹⁶¹ It takes an average of twenty-five minutes

151. *Id.* at 429, 433-34.

152. *Id.*

153. *Haptic*, DICTIONARY.COM, <http://dictionary.reference.com/browse/haptic> (last visited Oct. 6, 2016).

154. Levy, *supra* note 83, at 294-96.

155. *Id.* at 296.

156. *Multitasking: Switching Costs*, AM. PSYCHOL. ASS’N (Mar. 20, 2006), <http://www.apa.org/research/action/multitask.aspx>.

157. *See id.*

158. *David E. Meyer, Ph. D. Professional Biography*, U. OF MICH., <http://www-personal.umich.edu/~smeyer/demeyer/> (last visited Oct. 6, 2016).

159. JACKSON, *supra* note 75, at 79-80.

160. *See generally* Gloria Mark et al., *No Task Left Behind? Examining the Nature of Fragmented Work*, 2005 CHI 321 (2005), available at <https://www.ics.uci.edu/~gmark/CHI2005.pdf>; *see also* CARR, *supra* note 13, at 132-33 (Carr talks about the “switching costs . . .” of multitasking).

161. Mark et al., *supra* note 160, at 324.

to re-focus on a task.¹⁶² Multitasking is not time well-spent either in law school or in practice.

Multitasking affects our students both in the classroom and out-of-class. As many of us have felt for some time, several studies verify that using a digital device during a lecture hinders absorption of the lecture material. For instance, Sana et al. recently concluded that knowledge comprehension was significantly impaired when multitasking during lectures.¹⁶³ It is not only the acquisition of complex information that is hindered by multitasking.¹⁶⁴ Sana found that the acquisition of simple factual information is also hindered.¹⁶⁵ Multitaskers were not good at processing either simple or complex information!

Nearly all of our students bring their laptops to class in order to type lecture notes. However, students cannot seem to resist using the laptop to multitask during lectures. Hembrooke and Gay conducted experiments to discern how multitasking on laptops affected classroom learning.¹⁶⁶ They divided their class into groups who either used laptops during lectures or who were not allowed to do so, and found that students who were not allowed to use laptops scored significantly higher in a surprise quiz than did those who used laptops during the lecture.¹⁶⁷ Hembrooke and Gay analyzed online browsing conducted during the lectures and, understandably, found that the more time spent off-task equated to less memory being available for comprehending the lectures.¹⁶⁸ Grace-Martin & Gay also came to the same conclusion in their 2001 study.¹⁶⁹

Nearly all of our students bring a mobile device to class. Because of its simplicity, and because its small stature makes it difficult to be detected, students likely use mobile devices to multitask during class. Perhaps the most likely task that students will partake in during a lecture is texting with a mobile device—an activity that has been the subject of much scientific experimentation. In a very recent set of experiments, Gingerich and Lineweaver found that students who texted during lectures answered a significantly lower number of quiz questions correctly than the students

162. *Id.* at 326; see CARR, *supra* note 13, at 132-33 (Carr talks about the “switching costs . . .” of multitasking).

163. Faria Sana et al., *Laptop Multitasking Hinders Classroom Learning for Both Users and Nearby Peers*, 62 COMP. IN EDUC'N, 24, 27, 29, 30 (2013).

164. *Id.*

165. *Id.*

166. See generally Helene Hembrooke & Geri Gay, *The Laptop and the Lecture: The Effects of Multitasking in Learning Environments*, 15(1) J. OF COMPUTING IN HIGHER EDUC. 8 (2003), available at http://web.stanford.edu/dept/CTL/ClassroomLaptops/wikiupload/1/17/Multitasking_Hembrooke.pdf.

167. *Id.*

168. *Id.*

169. Michael Grace-Martin & Geri Gay, *Web Browsing, Mobile Computing and Academic Performance*, 4(3) EDUC. TECH. & SOC'Y 95, 102-03 (2001).

who did not text, with the average score being over fourteen percent lower.¹⁷⁰

Kuznekoff et al. found similar results in their experiments involving 145 undergraduate students.¹⁷¹ Their experiments are important because in addition to testing non-multitaskers and multitaskers, they tested for differences between those whose multitasking was class-related (class-relevant multitaskers) and those whose multitasking was not class-related (non-class related multitaskers).¹⁷² Non-class related multitaskers who used either Twitter or text messaging scored between ten to seventeen percent lower than non-multitaskers and class-relevant texters/tweeters on a multiple choice test, and had a recall of fifty-three to seventy percent lower.¹⁷³

Adding to the literature on the parameters of student multitasking, McCoy surveyed 675 undergraduate and graduate students in order to determine: (1) how they used their mobile devices during class time; and (2) how long they used these devices during class.¹⁷⁴ McCoy found that respondents spent 20.9 percent of class time using their mobile devices for non-class related endeavors.¹⁷⁵ The most prevalent non-class related uses were texting (86.6 percent), e-mailing (76.2 percent), social networking (70.3 percent), and web surfing (42.5 percent).¹⁷⁶ In addition, eighty nine percent of students realized that using digital devices in class caused them to not pay attention, and over eighty percent indicated that doing so caused them to miss instructions.¹⁷⁷ Finally, McCoy determined that secondhand multitasking really exists—nearly sixty percent of McCoy’s respondents reported that they were distracted by another student’s use of a digital device in class!¹⁷⁸

How distracted are secondhand multitaskers? They are likely more distracted than multitaskers, and there is evidence to prove it. The aforementioned experiments conducted by Sana et al. show that

170. Amanda C. Gingerich & Tara T. Lineweaver, *OMG! Texting in Class = U Fail :(Empirical Evidence That Text Messaging During Class Disrupts Comprehension*, 41 TEACHING PSYCHOL. 44, 45, 47 (2014).

171. Jeffery H. Kuznekoff et al., *Mobile Phones in the Classroom: Examining the Effects of Texting, Twitter, and Message Content on Student Learning*, 64 COMM. EDUC. 344, 352-63 (2015).

172. *Id.* at 353-54.

173. *Id.* at 363.

174. Bernard R. McCoy, *Digital Distractions in the Classroom Phase II: Student Classroom Use of Digital Devices for Non-Class Related Purposes 1*, U. OF NEB.-LINCOLN (2016), available at <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1091&context=journalismfacpub>.

175. *Id.*

176. *Id.* at 9.

177. *Id.* at 9-10.

178. *Id.* at 10 (42 percent stated they were “a little distracted,” 13.1 percent stated “more than a little distracted,” 5.5 percent indicated “big or very big distraction,” and 39 percent stated “not distracted”).

comprehension scores on a forty question test for non-multitaskers who sat in view of multitaskers were seventeen percent below the class average,¹⁷⁹ and that multitasker scores (not secondhand multitasker scores) were eleven percent below the class average.¹⁸⁰ This illustrates that the scores for secondhand multitaskers were worse than the scores for multitaskers!

Texting in class is likely to be the number one learning distraction for our students. In order to ascertain the effects (and perceived effects) of texting in class, Gingerich and Lineweaver compiled a texting group and a non-texting group, and had them listen to a lecture.¹⁸¹ Both groups took a quiz based on the lecture and, before the quiz scores were graded, the groups were asked what they thought their quiz scores would be.¹⁸² Not surprisingly, quiz scores for the non-texting group were significantly higher than the scores for the texting group (79.22 percent vs. 60.14 percent).¹⁸³ By comparing actual and perceived scores, Gingerich and Lineweaver hoped to determine students' awareness of multitasking's negative effects in class.¹⁸⁴ Expected versus actual quiz scores for the texting group were much farther apart than for the non-texting students, which suggests that multitasking students are not efficient at self-regulated learning.¹⁸⁵ Students did not accurately perceive the negative effects that texting has on learning.¹⁸⁶ A follow up experiment netted similar results for the texting group, which received significantly lower quiz scores and had much less consistency between their expected and actual quiz scores.¹⁸⁷ Again, this suggests that self-regulated learning is less effective when one texts during a lecture.¹⁸⁸

The reasons why students continue to text in class is complicated. Students know texting during class is improper and possibly negatively affects their grades, yet they still do it. A 2011 study found that students will text even though they know they should not—seventy-three percent knew they should not text in class, seventy-four percent knew that doing so interfered with learning, but seventy-nine percent admitted doing it.¹⁸⁹ Another recent study found that eighty-six percent of the marketing students surveyed had texted during class, even though thirty-two percent of students

179. Sana et al., *supra* note 163, at 27-29.

180. *Id.* at 25-27.

181. Gingerich & Lineweaver, *supra* note 170, at 45.

182. *Id.*

183. *Id.*

184. *Id.* at 44.

185. *Id.* at 46.

186. Gingerich & Lineweaver, *supra* note 170, at 46.

187. *Id.* at 47-49.

188. *Id.* at 48.

189. Joan A. Williams et al., "I Get Distracted By Their Being Distracted": The Etiquette of In-Class Texting, 40 E. EDUC. J. 48, 52-53 (2011).

doubted they could follow the lecture while texting, and only twenty-nine percent felt that texting would affect their grade.¹⁹⁰ Yet those who texted during class received lower class grades.¹⁹¹ Two recent experiments conducted by Sana et al. also demonstrated that students knew multitasking would affect their grades, but thought the effect would be marginal.¹⁹² In fact, their grades were significantly lower than the class average.¹⁹³ Since students do not think that multitasking affects attentiveness to the degree it actually does, this may at least partially explain why multitasking in class is so prevalent.¹⁹⁴

Another piece to the complicated issue of why students multitask during class is that students have a higher view of their abilities than warranted.¹⁹⁵ In a University of California, Berkeley study, Maughan found that only seven percent of undergraduate sociology students thought their information literacy abilities were poor, yet eighty-one percent greatly underperformed on a literacy exam.¹⁹⁶ The numbers for political science undergraduates were similar: four percent felt their abilities were poor and seventy-one percent greatly underperformed on the test.¹⁹⁷ Apparently, experience does not help. Maughan noted that graduating seniors rated their information literacy abilities significantly higher than underclassmen did, which was not supported by higher test scores.¹⁹⁸

However, there may also be a third factor in play. Clayson and Haley noted that their study results indicate that students may have a compulsion or addiction to texting, and thus cannot stop just because they are in class.¹⁹⁹ Weiyu reached the same conclusion in his study, where students noted a strong and persistent compulsion to be connected with friends at any

190. Dennis E. Clayson & Debra A. Haley, *An Introduction to Multitasking and Texting: Prevalence and Impact on Grades and GPA in Marketing Classes*, 35 J. MARKETING EDUC. 26, 31-32, 34 (2013).

191. *Id.* (“The average grade for [students] who texted was equivalent to a high C or low B . . . the average grade for students who did not text was a B . . .”). Although this may seem like a small percentage difference in scores, I suggest that law school classes would typically contain more complicated material than marketing lectures, which may increase the differences in scores between those who text in a law school lecture and those who do not.

192. Sana et al., *supra* note 163, at 30.

193. *Id.* at 27, 29.

194. *See supra* notes 192-93 and accompanying text.

195. *See infra* notes 196-98 and accompanying text.

196. Patricia Davitt Maughan, *Assessing Information Literacy Among Undergraduates: A Discussion of the Literature and the University of California/Berkeley Assessment Experience*, 62 C. & RES. LIBR. 71, 77 (2001).

197. *Id.*

198. *Id.* Maughan also noted similar results from a study conducted at the University of Northern Colorado. *Id.*

199. Clayson & Haley, *supra* note 190, at 27.

moment.²⁰⁰ Students may not be able to stop multitasking without trained intervention.

Whether because of understating multitasking's negative effects, overestimating their abilities, anxiety, compulsion, or merely because today's students may not place the same value on lectures as previous generations did, multitasking during lectures is a major issue in education. This leads us to a logical and timely question: is the urge to multitask in the classroom too great to overcome?

Indeed, a current (and recurring) hot topic in legal academia is whether professors should impose a laptop and handheld device ban in the classroom.²⁰¹ Even if law students are convinced that multitasking is detrimental to their learning, will they continue to multitask? If so, does it justify a ban on devices in the classroom? This issue will be addressed in the Solutions section of this article.

Legal educators are well aware of multitasking's effects in the context of the classroom lecture, where vital information is imparted in a short time frame. Multitasking also has profound effects during study outside of the classroom lecture environment, where students have much more time to devote to the learning process.²⁰² The next several studies discussed below are experiments conducted on college students outside the classroom.

One scientific study included four separate experiments, with one group of college students in each experiment being asked to watch a news story on CNN Headline News, complete with the weather icons, news scrawls, and sports scores that CNN is known for.²⁰³ The other group in each experiment watched the same news story without the icons, scrawls, and scores.²⁰⁴ On subsequent testing, the visual complex groups in all four experiments

200. Zhang Weiyu, *Multitasking With New Media in Large Classrooms: Findings From Online Survey and Focus Groups*, CENTRE FOR DEV. OF TEACHING & LEARNING (2011), available at <http://www.cdtl.nus.edu.sg/tech-in-he/pdf/Section3-Article6.pdf>.

201. E.g., Steven Eisenstat, *A Game Changer: Assessing the Impact of the Princeton/UCLA Laptop Study on the Debate to Ban Law Student Use of Laptops During Class*, 92 U. DET. MERCY L. REV. 83, 111 (2015) (arguing against the unfettered use of laptops in the classroom because using laptops for non-class related activity takes attention away from the lecture, and because typing class notes is not as effective as writing class notes by hand); Jeff Sovern, *Law Student Laptop Use During Class for Non-Class Purposes: Temptation v. Incentives*, 51 U. LOUISVILLE L. REV. 483, 511 (2013) (leaning towards permitting laptop use for 1Ls but excluding laptops for classes offered after the 1L year).

202. See *infra* notes 203-04 and accompanying text.

203. Lori Bergen et al., *How Attention Partitions Itself During Simultaneous Message Presentations*, 31 HUM. COMM. RES. 311 (2005).

204. *Id.*

remembered fewer facts²⁰⁵ and scored significantly lower in the amount of information transferred to long-term memory.²⁰⁶

Not only is less information transferred to long-term memory because of multitasking, but there are also negative effects on acquired information. The most obvious negative effect is related to the accuracy of obtained information.²⁰⁷ Ophir et al. tested both heavy and light media multitaskers,²⁰⁸ with the results showing that heavy media multitaskers allowed more irrelevant stimuli to interfere with cognition, which led to irrelevant memories.²⁰⁹ However, it is more complicated than that. The information that is accurately acquired while multitasking is adversely affected. Foerde et al. performed functional neuroimaging (fMRI) on subjects who completed simple tasks and complex tasks.²¹⁰ The findings suggest that distraction causes acquired knowledge to be less-flexibly applied to new situations than if there were no distractions at all.²¹¹ This, of course, has scary implications for professors who are tasked with teaching students to think like lawyers.

Although multiple experiments covering many different points have been cited thus far, it is worth noting again that studying law is complex and completely different than what any law student has experienced before. Thus, we must be particularly careful with our students when introducing them to a topic for the first time. Fernandez and Moscovitch conducted five experiments with 120 students, finding that recall suffered greatly when interference was present during the initial learning stage.²¹²

Law is complex and all of the aforementioned factors affect legal research on the Internet. Law students must sort and synthesize a great deal of information while being able to distill main points and minor points, determine what is important and unimportant, and assign schemata to the topic.²¹³ Any distraction deviates from this task.

Although there are those who believe our minds will quickly develop to better utilize the online medium, it could take years or perhaps centuries for this to occur (if it happens at all). Nearly all of the studies I summarize in

205. *Id.* at 326-28, 330-31.

206. *Id.* at 333 (“[O]n average, 10% of information . . . did not get through to long-term memory due to visual complexity.”).

207. *See infra* notes 209-13 and accompanying text.

208. *See generally* Ophir et al., *supra* note 111.

209. *Id.* at 15584-85.

210. Karin Foerde et al., *Modulation of Competing Memory Systems by Distraction*, 103 PROC. NAT’L ACAD. SCI. 11778 (2006).

211. *Id.* at 11781-82.

212. Myra A. Fernandez & Morris Moscovitch, *Divided Attention and Memory: Evidence of Substantial Interference Effects at Retrieval and Encoding*, 129 J. EXPERIMENTAL PSYCHOL. 155, 171-72 (2000).

213. Yates, *supra* note 13, at 137.

this article involved digital-age students. However, they still underperformed in the online educational environment. Therefore, whether the brain will evolve is still undetermined because it seemingly has not yet occurred. And many experts believe it will not occur, stating that technology does not change how we are wired; rather it changes how we look at information.²¹⁴ To the extent our students rely on the Internet, they may be missing out on developing a detailed understanding of the law.²¹⁵ Thus, the challenge is to adequately teach students linearity and structure in the online research environment.

SOLUTIONS

Authors have identified several techniques and have made many pertinent observations so that students who use the online environment to learn may do so successfully. These observations and techniques fall under the broad topics of what we can do when planning our courses, how to teach website literacy, how to ameliorate the problem of information overload, and steps you and your students can take to negate the effects of multitasking. I primarily use this research as a lead-in to my comments, which are directed at the realm of legal research. Although these solutions are important for anyone who primarily teaches legal research in the context of online databases and websites (as I do), all professors who have a digital component to their courses will benefit from these solutions.

Preliminary Course Planning

There are several preliminary issues to ponder when structuring our courses. As if we were not going to do so anyway, it should be stated that having some assignments that are lengthy and detailed has the positive effect of working on the process of deep learning.²¹⁶ We should plan to teach students how to conduct meaningful reading both online and in print.²¹⁷ We should plan to provide ample hands-on training.²¹⁸ Training should include technology when possible and appropriate. For example, the

214. *E.g.*, PEW RESEARCH CENTER, *supra* note 7, at 25-26 (quoting communications professor Jeff Jarvis and information science and technology professor Jim Jansen).

215. *See* Greenfield, *supra* note 4, at 71; CARR, *supra* note 13, at 180-81.

216. BARON, *supra* note 48, at 233.

217. *Id.*; Sherry L. Leysen, *Brain Plasticity and the Impact of the Electronic Environment in Law and Learning*, 30 L. REF. SERV. Q. 255, 276-67 (2011).

218. J. Gregory Trafton & Christopher A. Monk, *Task Interruptions*, 3 REV. HUM. FACTORS & ERGONOMICS 111, 121 (2007) ("If people are simply learning the task, training people on the task . . . would reduce the disruptiveness of interruptions."); Roxana Moreno, *Learning in Hi-Tech and Multimedia Environments*, 15 CURRENT DIRECTIONS IN PSYCHOL. SCI. 63, 65 (2006) ([S]tudents learn better when given principle-based explanations than they do when asked to infer principles by themselves.").

ECAR study surveyed over 113,000 undergraduate students in fourteen countries²¹⁹—some of whom are now in, or will shortly be in, law school—and found that: (1) students expect faculty members to use technology in the classroom; (2) students need guidance for the best uses of technology; and (3) the use of classroom technology will be resisted if students think of the technology as being primarily personal in nature.²²⁰

The ECAR study found that students value basic technologies (such as course websites or course management systems) the most, and they expect to access course materials at any time of the day or night.²²¹ Zhu suggests limiting the number of hyperlinks in a web-based assignment until students have a firm grasp of the material, as well as breaking up longer web-based assignments into smaller nodes.²²² DeStefano and LeFevre note that if there are fewer links and more structure, then comprehension, memory, and navigation are maximized.²²³ Moreno suggested guiding students when introducing them to a topic and allowing time for reflection, which provides students with a chance to organize their thoughts.²²⁴

Website Literacy

If you will recall, seventy-one to eighty-one percent of University of California, Berkeley students greatly underperformed on a literacy exam,²²⁵ yet Maughan noted that forty-six to seventy-seven percent of the sundry Berkeley student groups who participated in the study felt they were “excellent” or “very good” at Internet searching.²²⁶ This is an ongoing problem. A 2006 survey conducted by the Educational Testing Service showed that one half of 6,300 test takers were deficient in judging the objectivity of websites.²²⁷

There is initial groundwork to be done before most of our students are website literate.²²⁸ First, basic legal reading literacy must be assured.²²⁹ In that regard, Leysen offers suggestions for how to develop deep reading

219. EDEN DAHLSTROM, J.D. WALKER & CHARLES DZIUBAN, ECAR STUDY OF UNDERGRADUATE STUDENTS AND INFORMATION TECHNOLOGY 4 (2013), available at <http://www.educause.edu/ecar>.

220. *Id.* at 10-11, 32.

221. *Id.* at 4-5.

222. Zhu, *supra* note 112, at 352.

223. DeStefano & LeFevre, *supra* note 132, at 1636.

224. Moreno, *supra* note 218, at 65.

225. Maughan, *supra* note 196, at 77.

226. *Id.* at 78.

227. Irvin R. Katz, *ETS Research Finds College Students Fall Short in Demonstrating ICT Literacy*, C&RL NEWS, Jan. 2007, at 35.

228. See Ellie Margolis & Kristen K. Murray, *Articles on Legal Research and Writing: Say Goodbye to the Books: Information Literacy as the New Legal Research Paradigm*, 38 DAYTON L. REV. 117, 152-56 (2012) (providing teachers with methods of how to implement information literacy).

229. See, e.g., Leysen, *supra* note 217, at 276-80.

abilities which include: assessing students for basic information literacy acumen and addressing deficiencies, teaching students to use structural cues such as the table of contents, noting that it is acceptable to skim and scan text when becoming familiar with the material before deep learning will occur,²³⁰ and teaching students to identify terms used in the assignment beforehand.²³¹ Leysen suggests that we model expert reading strategies and ask post-reading questions that require students to go beyond rote memorization of the material.²³²

Once legal reading literacy is assured, we can focus on website literacy.²³³ In the context of legal research, we must be sure that students know the research basics before we can effectively teach website literacy. Students must know hierarchy of jurisdiction and hierarchy of legal sources, and the characteristics of these sources.²³⁴ After students learn hierarchy, we can best teach source characteristics through a general research process,²³⁵ which begins by researching an unfamiliar topic in a quality, descriptive, and jurisdictionally-relevant secondary source.²³⁶ This process allows one to become familiarized with the legal terms in that area of law and jurisdiction, and it brings understanding to the issues at hand while providing more appropriate terms for future searches.²³⁷ It allows one to learn the law before diving into primary law research.²³⁸ A good way to test competence is to assign projects from different jurisdictions that require students to consult quality secondary sources, choose the appropriate prevailing law, and find supporting or explanatory case law therein.²³⁹

Only after students understand those basics can we hope to be successful in teaching website literacy. Those of us who have an online component to our courses should teach website literacy, as Hembrooke and Gay, Palfrey and Gasser, and Leysen promote.²⁴⁰ A roadmap already exists

230. *Id.* at 275, 277, 280.

231. *Id.* at 277-80.

232. *Id.* at 277-79.

233. See Valentine, *supra* note 26, at 176 (“Legal research [courses] can teach the information and research skills necessary for today’s law practice. [They] can teach life-long learning skills that will allow students to cope with future legal research environments.”).

234. See Brooke J. Bowman, *Researching Across the Curriculum: The Road Must Continue Beyond the First Year*, 61 OKLA. L. REV. 503, 538 (2008).

235. See generally *id.*

236. See, e.g., KENT C. OLSON, *PRINCIPLES OF LEGAL RESEARCH* 309 (2d ed. 2015); AMY E. SLOAN, *BASIC LEGAL RESEARCH: TOOLS AND STRATEGIES* 43 (5th ed. 2012).

237. See, e.g., SLOAN, *supra* note 236, at 43.

238. *Id.*

239. Bowman highlights the necessity for research skills and an understanding of prevailing law in order to be competent as an attorney. See Bowman, *supra* note 234, at 510-12 (referencing case law in which a judge reprimanded attorneys for failing to locate and apply the jurisdiction’s applicable law).

240. Hembrooke & Gay, *supra* note 166, at 16; Palfrey & Gasser, *Reclaiming*, *supra* note 107, at 53-55; Leysen, *supra* note 217, at 276, 278-80.

in the American Association of Law Libraries (AALL) Core Competencies, which identifies the authority (of a website), credibility, currency, and authenticity as necessary components of information literacy.²⁴¹ Since students do not think they are information literacy deficient, we should be sure that they understand statistics on information illiteracy as explained earlier in this article.²⁴² Those of us who teach any online modules need to go farther than teaching authority, credibility, currency, and authenticity. Rather, we need to teach students the best ways to use the online materials or databases they are expected to consult.²⁴³ In the context of legal research, many students want to rely on free websites, assuming that they will not be able to afford Thomson Reuters Westlaw or Lexis Advance subscriptions once they have graduated.²⁴⁴ We must teach students how to find and appropriately use these free options as part of our training.²⁴⁵ We need to go beyond teaching the functionality of these free websites. Students need to be aware, for instance, that free legislative code websites will not contain the case law annotations that help interpret the meaning of code sections and that make an annotated code set or database so useful. Additionally, students need to know that very little thorough secondary source material is available for free.²⁴⁶ They likewise need to learn the specific search syntax each website uses, and that the websites' search syntax often differs from Thomson Reuters Westlaw, Lexis Advance, or Google²⁴⁷—sources to which students are more accustomed. Instead, most free legal research websites only offer the basics.²⁴⁸ For instance, some websites do not offer Boolean search operators and have subpar natural language processing capabilities, thereby making it difficult to feel confident in search results.²⁴⁹ Students must be familiar with how retrieved documents are formatted. On many legal research websites, keywords are not automatically highlighted in the

241. See *AALL Legal Research Competencies and Standards for Law Student Information Literacy*, AM. ASS'N OF L. LIBR., <http://www.aallnet.org/Archived/Leadership-Governance/policies/PublicPolicies/policy-lawstu.html> (last visited Sept. 11, 2016) (noting the knowledge and skill requirements under Principle III.A).

242. See Maughan, *supra* note 196, at 71, 77-78; Katz, *supra* note 227, at 35.

243. See Aliza B. Kaplan & Kathleen Darvil, *Think [and Practice] Like a Lawyer: Legal Research for the New Millennials*, 8 LEGAL COMM. & RHETORIC: JALWD 153, 156 (2011); Margolis & Murray, *supra* note 228, at 118.

244. Catherine M. Dunn, *Conducting Effective Legal Research "On the Cheap"*, 43(4) A.B.A. STUDENT LAW. (Dec. 2014), available at http://www.americanbar.org/publications/student_lawyer/2014-15/december/conducting_effective_legal_research_the_cheap.html.

245. Kaplan & Darvil, *supra* note 243, at 156; Margolis & Murray, *supra* note 228, at 118.

246. Betsy Lenhart, *The Seventeenth Century Meets the Internet: Using a Historian's Approach to Evaluating Documents as a Guide to Twenty-First Century Online Legal Research*, 9 LEGAL COMM. & RHETORIC: JALWD 21, 26 (2012).

247. Jootaek Lee, *Gatekeepers of Legal Information: Evaluating and Integrating Free Internet Resources into the Classroom*, 17 BARRY L. REV. 221, 226 (2012).

248. *Id.*

249. *See id.*

retrieved documents, making it difficult to become oriented after performing a search.²⁵⁰ Some websites offer little in the way of substantive summaries for retrieved documents, if any at all, thus making research more difficult.²⁵¹

It is most appropriate, to be sure, to include the reliable free Internet sources in any research training module or class, such as Findlaw,²⁵² Washlaw Web,²⁵³ Cornell University Law School's Legal Information Institute,²⁵⁴ or the plethora of free government websites that host primary law.²⁵⁵ Make sure students become familiar with the layout of these sites, what their positive and negative aspects are, and how to properly use their search features.²⁵⁶

Information Overload

Information overload has long been an issue with law students, who find it to be a daunting challenge when confronted with the myriad of available legal resources—a dilemma that existed well before the proliferation of Internet sources.²⁵⁷ Information overload is only compounded on the Internet.²⁵⁸ People naturally deal with information overload by simply ignoring the vast majority of available information, not knowing what they have missed or what they should have found.²⁵⁹

250. See generally Mary Rumsey, *UPDATE: A Guide to Fee-Based U.S. Legal Research Databases*, GLOBALEX (Jootaek Lee & Brittany Strojny eds., 2016), http://www.nyulawglobal.org/globalex/US_Fee-Based_Legal_Databases1.html. For example, various legal database searches in findlaw.com, such as through the California Code or Ninth Circuit case law, illustrate this weakness. See generally FINDLAW, <http://lp.findlaw.com/> (last visited Oct. 24, 2016). See also Lee, *supra* note 247, at 236 (noting that, among other things, if keywords are not easily able to be seen, users become frustrated with the experience).

251. See Rumsey, *supra* note 250 (describing the difficulties legal search engines experience with acquiring results).

252. FINDLAW, *supra* note 250.

253. WASHLAW, <http://www.washlaw.edu/> (last visited Sept. 11, 2016).

254. LEGAL INFORMATION INSTITUTE, <https://www.law.cornell.edu/> (last visited Sept. 11, 2016).

255. Steven S. McCarty-Snead & Anne Titus Hilby, *Research Guide to European Data Protection Law*, 42 INT'L J. LEGAL INFO. 348, 377 (2014) ("Researching case law of the CoE and EU is remarkably easy to accomplish on free government websites. While these sites do not have the full functionality of Westlaw or Lexis, they do allow you to search effectively by Article (e.g. Article 7 or Article 8), date range, or legislative instrument.").

256. See Lisa Smith-Butler, *Cost Effective Legal Research Redux: How to Avoid Becoming the Accidental Tourist, Lost in Cyberspace*, 9 FLA. COASTAL L. REV. 293, 300-02 (2008).

257. Yates, *supra* note 13, at 144; Ann Blair, *Information Overload, The Early Years*, BOSTON GLOBE (Nov. 28, 2010), http://www.boston.com/bostonglobe/ideas/articles/2010/11/28/information_overload_the_early_years/?page=2 (providing a succinct account of the history of "information overload," and noting that its origins can be traced back to the 1st century A.D.).

258. See generally Ira S. Nathenson, *Internet Infoglut and Invisible Ink: Spamdexing Search Engines with Meta Tags*, 12 HARV. J. L. & TECH. 43 (1998).

259. See PALFREY & GASSER, *BORN DIGITAL*, *supra* note 42, at 194-96.

Palfrey and Gasser note that information overload can limit students' ability to make rational decisions and posit that students will ignore websites with lots of information because they feel overloaded with information.²⁶⁰ They recommend that librarians teach students how to effectively work with the wealth of available information²⁶¹ and should continue to be the intermediaries between the novice and this information.²⁶²

As a start, and as Leysen notes, we should be especially sure to let students know what we expect of them when we give them assignments.²⁶³ Niederhauser et al. found that the most successful online learners focused better with clearly-defined goals.²⁶⁴ This focus decreases cognitive load and makes more memory available for learning.²⁶⁵ Make sure that your students know exactly why they are online and what they will learn.²⁶⁶ We have all graded assignments only to wonder why few students were able to provide us with appropriate answers. We thought the questions were crystal clear, but they weren't. Although we often want our students to struggle with and ponder differing information in order for them to develop expertise, the questions we ask must be clear. Regarding the answers, I have learned over the years to be sure to tell students what information should clearly be ignored on my assignments, and what information I want them to focus on. I am sure to have students check with me if they are confused about an assignment after having worked on it for a certain amount of time, at which point I provide focus by asking them a series of questions. I give them parameters while not giving away the answers. If we review our assignments, we will likely be able to find instances when our goals for the assignment are not as clear as we thought they were, and it is thus imperative that we clearly articulate our objectives.²⁶⁷

At the base level, and as mentioned above, it is extremely helpful to teach legal research as a process.²⁶⁸ I spend all semester teaching the framework by which students will be able to address any research assignment they may be asked to complete. The basic process is to first become educated about an unfamiliar area of law by using expertly compiled, descriptive secondary sources that are limited to the correct jurisdiction before proceeding to primary law research and citator

260. *See id.* at 192-93, 196.

261. Palfrey & Gasser, *Reclaiming*, *supra* note 107, at 54-55.

262. *See id.*

263. Leysen, *supra* note 217, at 276.

264. Niederhauser et al., *supra* note 117, at 239.

265. *Id.* at 252.

266. *See* ROY STUCKEY ET AL., BEST PRACTICES FOR LEGAL EDUCATION 8 (2007).

267. *Id.*

268. *See supra* note 68 and accompanying text.

services.²⁶⁹ Once students are comfortable with the process, their anxiety is greatly reduced, as they realize that they have the power to expertly limit the plethora of resources by focusing on jurisdiction and topic.²⁷⁰ For instance, the leading publisher of secondary source legal material in Michigan is ICLE, the Institute of Continuing Legal Education.²⁷¹ Teaching students how to find the various subject-specific e-texts and how to effectively search through these e-books is a great way to help students combat information overload while preparing them for the future.

Hembrooke and Gay suggest we should teach students how to browse effectively and how to monitor their browsing behavior for bad habits they can avoid in the future.²⁷² In addition, Leysen suggests that we stress the importance of training students on website navigation techniques for the most popular databases by, for example, adjusting database preferences and identifying structural cues that will make it easier to learn.²⁷³ She notes that simple tasks such as knowing how to increase text size, access PDF versions of documents, and change to “full screen” are all ways to optimize readability, which will enhance the learning process.²⁷⁴ Leysen notes that students should locate the indices and tables of contents for sources in frequently used databases, as well as finding other structural cues, such as how to trace a research trail.²⁷⁵ Thomson Reuters Westlaw and Lexis Advance, amongst other services, enable you to trace your research trail via their History functions.²⁷⁶ You may do the same in Casemaker,²⁷⁷ Ravel Law,²⁷⁸ and Bloomberg Law.²⁷⁹ Furthermore, services offered through

269. E.g., Austin Martin Williams, *Researching Georgia Law*, 34 GA. ST. U. L. REV. 741, 751 (2015) (stating that it can be helpful to begin researching Georgia law with secondary sources to gain an overview of the law and find primary authority); see *supra* note 68 and accompanying text.

270. See Ted Tjaden, *Reducing Research Anxiety in the Legal Research Process*, SLAW (Sept. 15, 2010), <http://www.slaw.ca/2010/09/15/reducing-research-anxiety/>.

271. I can attest to this fact because I work in Michigan and teach Michigan legal research. See, e.g., Barbara H. Garavaglia, *Libraries and Legal Research: Selected Michigan Probate Law Research Resources*, 83 MICH. B.J. 42, 44 (2004) (“In the area of probate and estate law, the leading secondary sources for Michigan probate and estate law continue to be the print treatises published by Michigan Institute of Continuing Legal Education[.]”); see also *id.* at 42 (“ICLE deserves high marks for its web-based practice offerings and publications; its reputation as the premier legal publisher of Michigan legal materials is well-earned.”).

272. See Hembrooke & Gay, *supra* note 166, at 16.

273. Leysen, *supra* note 217, at 279-80.

274. *Id.*

275. *Id.* at 280.

276. THOMSON REUTERS, COMPARING WESTLAW AND WESTLAWNEXT 6, available at <https://lscontent.westlaw.com/images/content/WLNCompareWL10.pdf> [hereinafter COMPARING WESTLAW AND WESTLAWNEXT]; *What is the History Feature?*, LEXISNEXIS, http://help.lexisnexis.com/tabula-rasa/newlexis/history_cpt-concept?lbu=us&locale=en_us&audience= (last visited Sept. 10, 2016) [hereinafter *Lexis, What is the History Feature?*].

277. CASEMAKER, USER GUIDE 19 (2014), available at <http://www.casemakerlegal.com/staticmain/CasemakerLegalUserManual.pdf> [hereinafter CASEMAKER USER GUIDE].

278. Will Callan, *What is the Research Center?*, RAVEL (Apr. 6, 2016, 7:39 PM), <https://ravellaw>.

Fastcase, in addition to others, allow for easy navigation from within a document by way of navigation tools.²⁸⁰ We should teach our students the value of using these tools to save time and direct focus. Using the navigation tools is an effective means by which to combat information overload and keep focused on the task at hand.

In addition to teaching students how to better navigate the web and use structural cues to help get the most out of frequently used databases, Trafton and Monk suggest teaching students how to effectively resume training when interrupted.²⁸¹ A great way to do so is to stress using the History functions as a means of retracing our research steps for either prior relevant searches or to review our research process.²⁸² This step may be more important as the research process progresses, as additional facts come to light and one's subject-specific legal terminology develops. We should teach students to conduct searches within their document results as a means to limit the number of extraneous results. You can perform such a secondary search in Thomson Reuters Westlaw,²⁸³ Lexis Advance,²⁸⁴ and Casemaker.²⁸⁵ Along with past retrieved documents, prior searches are also retrievable in the History functions.²⁸⁶ Likewise, we should encourage students to use the Favorites link in Thomson Reuters Westlaw, Fastcase, and Lexis Advance as a means of quickly getting back into an often-used database.²⁸⁷ We must also teach students how to properly use the Folders

zendesk.com/hc/en-us/articles/213292967-What-is-the-Research-Center- [hereinafter Callan, *Research Center*].

279. BLOOMBERG LAW, BLOOMBERG LAW OVERVIEW GUIDE 9 (2015), available at http://www.bna.com/uploadedFiles/BNA_V2/Legal/Products/Subscriptions/Bloomberg_Law/10898_04-1100-blaw-overview-brochure.pdf [hereinafter BLOOMBERG LAW OVERVIEW GUIDE]. Bloomberg Law calls its history function the "Research Trail." *Id.*

280. FASTCASE, FASTCASE USER GUIDE 10 (2010), available at <http://www.fastcase.com/wp-content/uploads/2010/07/Fastcase-Guide-2010v2.pdf>. Thompson Reuters Westlaw calls these "Jump To" tools. THOMPSON REUTERS, SEARCHING CASES ON WESTLAW 4 (2016), available at http://static.legalsolutions.thomsonreuters.com/product_files/westlaw/wlawdoc/web/wlncases.pdf. Westlaw uses Search Term arrows, while LexisAdvance uses navigation arrows at the top of each document. *See id.*; *see also Using the LexisNexis Toolbar*, LEXISNEXIS, <http://www.lexisnexis.com/hottopics/Intoolbar/using.htm> (last visited Sept. 12, 2016).

281. Trafton & Monk, *supra* note 218, at 121-23.

282. COMPARING WESTLAW AND WESTLAWNEXT, *supra* note 276, at 6; *Lexis, What is the History Feature?*, *supra* note 276; CASEMAKER USER GUIDE, *supra* note 277, at 19; Callan, *Research Center*, *supra* note 278; BLOOMBERG LAW OVERVIEW GUIDE, *supra* note 279, at 9.

283. *See* THOMPSON REUTERS, SEARCHING WITH BOOLEAN TERMS AND CONNECTORS 6 (2016) (look under "Narrowing A Search Result"), available at http://static.legalsolutions.thomsonreuters.com/product_files/westlaw/wlawdoc/web/wlnterms.pdf.

284. *Searching within Your Results*, LEXISNEXIS, http://www.lexisnexis.com/help/global/US/en_US/gh_narrowsearch.asp (last visited Sept. 12, 2016).

285. CASEMAKER USER GUIDE, *supra* note 277, at 11.

286. *E.g.*, COMPARING WESTLAW AND WESTLAWNEXT, *supra* note 276, at 6; *Lexis, What is the History Feature?*, *supra* note 276; CASEMAKER USER GUIDE, *supra* note 277, at 19.

287. *Law Students Guide to Adding Favorites to WestlawNext*, THOMPSON REUTERS (Jun. 13, 2013), <http://blog.legalsolutions.thomsonreuters.com/law-school-1/law-students-guide-to-adding->

function in Thomson Reuters Westlaw and Lexis Advance,²⁸⁸ and Casemaker.²⁸⁹ Bloomberg Law allows users to save similar retrieved documents together. Its Queue feature, which is a handy research organization tool, allows for mass e-mailing, downloading, and printing of documents therein.²⁹⁰ Bloomberg also offers a Workspace feature that collects documents related to a project, allows users to upload their personal documents, and permits users to share their Workspace with others who may add notes and tags to those documents.²⁹¹ Fastcase also offers a queue feature.²⁹²

Saving relevant retrieved documents to folders allows for easy retrieval. Some services also give users the ability to save annotated and highlighted text to folders,²⁹³ which allows one to focus their research when accessing the folders at a later time in an efficient and cost-effective manner.²⁹⁴ Google's new note-taking app is a promising new research tool.²⁹⁵ Its ability to save relevant portions of a document and annotate your saved text allows you to save time and organize search results. This lifts the research process to a higher level.²⁹⁶ Students should be required to practice saving documents and annotated notes to folders in order to utilize these useful functions.

favorites-to-westlawnext/; *New Ways to Organize Your Favorite Documents on Fastcase*, FASTCASE (Oct. 23, 2014), <https://www.fastcase.com/new-ways-to-organize-your-favorite-documents-on-fastcase/>; *Favorites*, LEXISNEXIS, http://help.lexisnexis.com/tabula-rasa/newlexis/favoritetips-field?lbu=US&locale=en_US&audience=all (last visited Sept. 12, 2016).

288. THOMSON REUTERS, USING FOLDERS TO ORGANIZE YOUR WESTLAW RESEARCH 1 (2016), available at http://static.legalsolutions.thomsonreuters.com/product_files/westlaw/wlawdoc/web/wlnfoldr.pdf; *What Are Folders?*, LEXISNEXIS, http://help.lexisnexis.com/tabula-rasa/newlexis/myfolders_cpt-concept?lbu=us&locale=en_us&audience= (last visited Sept. 12, 2016).

289. CASEMAKER USER GUIDE, *supra* note 277, at 17.

290. *Using Queue*, BLOOMBERG LAW, <http://www.bna.com/using-queue/> (last visited Sept. 12, 2016).

291. *Workspace Overview*, BLOOMBERG LAW, <http://www.bna.com/workspace-overview/> (last visited Sept. 12, 2016).

292. *Fastcase Research Tip: Save Time with Your Print Queue*, FASTCASE, <https://www.fastcase.com/fastcase-research-tip-save-time-with-your-print-queue/> (last visited Sept. 10, 2016).

293. *Westlaw Next Tip of the Week: Add Your Notes to Documents*, THOMSON REUTERS (Nov. 21, 2011), <http://blog.legalsolutions.thomsonreuters.com/legal-research/reference-attorney-tips/westlaw-next-tip-of-the-week-add-your-notes-to-documents/>; *How Do I Add a Note to an Item in One of My Folders?*, LEXISNEXIS, http://help.lexisnexis.com/tabula-rasa/newlexis/addnote_hdi-task?lbu=us&locale=en_us&audience= (last visited Sept. 12, 2016); CASEMAKER USER GUIDE, *supra* note 277, at 18; Will Callan, *How Do I Highlight and Annotate a Case?*, RAVEL (Oct. 29, 2015, 4:50 PM), <https://ravellaw.zendesk.com/hc/en-us/articles/213291897-How-do-I-highlight-and-annotate-a-case-> [hereinafter Callan, *Highlight and Annotate*].

294. THOMSON REUTERS, COST-EFFECTIVE RESEARCH TIPS 1, 4-5 (2016), available at http://static.legalsolutions.thomsonreuters.com/product_files/westlaw/wlawdoc/web/wlncost.pdf; LEXISNEXIS, TOP 10 COST-EFFECTIVE RESEARCH TIPS (2012), available at http://lexisnexis.com/documents/pdf/20120308094017_large.pdf.

295. See generally GOOGLE KEEP, <https://www.google.com/keep/> (last visited Sept. 12, 2016).

296. See Evan Dashevsky, *7 Reasons You Might Actually Want to Use Google Keep*, PC MAG. (May 12, 2015), <http://www.pcmag.com/article2/0,2817,2483841,00.asp>.

A basic coping strategy for information overload is to be sure that law students get the most out of their search engine of choice, because they will use the “free web” for at least some of their legal research.²⁹⁷ As Palfrey and Gasser observe, using a search engine is one way to reduce information overload by making order out of chaos.²⁹⁸ We can apply this principle and show students the best way to use their favorite search engine.²⁹⁹ For instance, teach your students to take advantage of Google’s ability to customize a search by limiting the number of retrieved results per page,³⁰⁰ or by searching: (1) within webpage titles; (2) for exact phrases; (3) through specific domains; (4) by excluding terms;³⁰¹ (5) for related sites and with a term wildcard;³⁰² or (6) through current news or images from the top of a results page.³⁰³ Using some of these advanced search techniques, or others, will greatly limit the millions of retrieved documents one normally sees when searching.³⁰⁴ A search engine called Yippy orders search results into practical clusters (you can remix the clusters), making the plethora of retrieved links much more manageable.³⁰⁵ You can limit the number of clusters (called “clouds”) as well.³⁰⁶

Another means of combating information overload is to teach students how to manage information with technology. As Palfrey and Gasser note, RSS (Rich Site Summary/Really Simple Syndication) tools automatically find articles that meet preset search criteria and deliver those articles to an e-mail inbox, and are especially useful if you need to track a certain issue

297. AM. BAR ASS’N, 2016 LEGAL TECHNOLOGY SURVEY REPORT V-24 (Joshua Poje ed., 2016) (over 58 percent of attorneys regularly use free legal Web research sources); see Lee, *supra* note 247, at 227 (noting that free research options are becoming more available and are covering more legal information); *Tips to Effective Internet Searching*, S. OR. U., <http://hanlib.sou.edu/searchtools/searchtips.html> (last visited Sept. 10, 2016) (offering tips on using the Internet more effectively in search directories and engines).

298. See PALFREY & GASSER, *BORN DIGITAL*, *supra* note 42, at 196-97.

299. See generally Margolis & Murray, *supra* note 228 (encouraging reform in legal research pedagogy and a movement toward instruction in Internet literacy).

300. *Search Settings*, GOOGLE, <https://www.google.com/preferences?hl=en&fg=1> (last visited Sept. 12, 2016).

301. *Advanced Search*, GOOGLE, https://www.google.com/advanced_search?hl=en&fg=1 (last visited Sept. 12, 2016).

302. *Search Operators*, GOOGLE, https://support.google.com/websearch/answer/2466433?p=adv_pages_similar&hl=en&rd=1 (last visited Sept. 12, 2016).

303. These options are at the very top of a Google search results page, before the results are listed. The full options include News, Books, Images, Videos, Maps, and others.

304. See Judith Lewis, *Google Advanced Search: A Comprehensive List of Google Search Operators*, BEYOND (Apr. 15, 2015), <https://bynd.com/news-ideas/google-advanced-search-comprehensive-list-google-search-operators/> (providing a list of Google Advanced Search query operators and techniques to narrow a search).

305. YIPPY, <http://www.yippy.com/> (last visited Oct. 18, 2016). As an example, run a basic search for “three strikes” AND non-violent. Cluster Results for Three Strikes and Non-Violent. *Id.* (type “three strikes AND non-violent” in search bar, then observe concept cluster results in the left-hand column of results page).

306. *Id.*

for a client.³⁰⁷ Some RSS feeds, such as the popular Jurist Paper Chase (supported by the University of Pittsburgh School of Law),³⁰⁸ populate websites that may be visited at the user's discretion, obviating inbox clutter. The beauty of RSS feeds is that once your search criteria are set, the technology does the rest.³⁰⁹ Specifically, once you have conducted thorough background research on a topic, RSS feeds can serve as a crucial updating tool, and saves the time and effort of having to conduct similar detailed research as had been done in the past. The use of RSS tools should be taught on the high quality, free legal websites that allow for these services. In addition, we should stress the availability of alert tools on Thomson Reuters Westlaw,³¹⁰ Lexis Advance,³¹¹ Casemaker,³¹² Fastcase,³¹³ and Bloomberg Law,³¹⁴ which allow users to set up automatic current awareness searches. Alerts may be set up for any type of document to include pending legislation or Shepard's³¹⁵ or KeyCite reports³¹⁶ as a means of keeping tabs on updates to the law.

Once an area of law is mastered, and once a student knows the seminal cases, a service like Ravel Law can be useful in identifying additional relationships between cases.³¹⁷ Although Ravel Law does not yet have access to a named legal publisher's secondary sources, it provides a novel way to visualize how cases relate over time.³¹⁸ Ravel Law also provides visuals for opinions by a judge, so that patterns may be identified in their decision-making.³¹⁹ Fastcase also utilized data visualization via its interactive timeline.³²⁰ Teaching databases such as Casemaker³²¹ (which is free for members of about twenty-five state bar associations)³²² or

307. See PALFREY & GASSER, BORN DIGITAL, *supra* note 42, at 198-99.

308. *Paper Chase*, JURIST, <http://jurist.org/paperchase/> (last visited Sept. 8, 2016).

309. See RSS, WIKIPEDIA, <https://en.wikipedia.org/wiki/RSS> (last visited Oct. 25, 2016).

310. See generally THOMSON REUTERS, ALERTS ON WESTLAW NEXT (2013) [hereinafter ALERTS ON WESTLAW NEXT], available at https://info.legalsolutions.thomsonreuters.com/pdf/wln2/L-381793_Alerts_brochure2.pdf.

311. See generally LEXISNEXIS, USING LEXIS ADVANCE ALERTS (2013) [hereinafter USING LEXIS ADVANCE ALERTS], available at http://www.lexisnexis.com/documents/pdf/20130603102247_large.pdf.

312. See generally CASEMAKER USER GUIDE, *supra* note 277.

313. See generally FASTCASE, FASTCASE USER GUIDE (2016) [hereinafter 2016 FASTCASE USER GUIDE], available at <http://www.fastcase.com/wp-content/uploads/2015/10/2016-User-Guide.pdf>.

314. See generally BLOOMBERG LAW OVERVIEW GUIDE, *supra* note 279.

315. USING LEXIS ADVANCE ALERTS, *supra* note 311.

316. ALERTS ON WESTLAW NEXT, *supra* note 310.

317. RAVEL LAW, RAVEL LAW QUICK START GUIDE, available at https://d2xkcp20fm9wy8.cloudfront.net/downloads/Ravel_QuickStart_Guide_V2.pdf.

318. *Id.*

319. *Judge Analytics*, RAVEL LAW, <https://www.ravellaw.com/judges> (last visited Oct. 6, 2016).

320. 2016 FASTCASE USER GUIDE, *supra* note 313, at 30-32.

321. CASEMAKER, <http://www.casemaker.us> (last visited Oct. 6, 2016).

322. *Bar Association Consortium*, CASEMAKER, <http://www.casemaker.us/ProductsStateBarConsortium.aspx> (last visited Oct. 6, 2016). There are approximately twenty-five state bar associations that provide members with free access to Casemaker. *Id.*

Fastcase³²³ (which offers New York state law, Second Circuit Court of Appeals cases, and United States Supreme Court cases to members of the New York State Bar Association for free³²⁴) will be helpful for the practice of law. Having acquired LoisLaw, Fastcase has the added benefit of offering the Aspen and CCH secondary source treatise libraries.³²⁵

Additionally, we can bring closure to the research process by being sure that students take full advantage of citation services in order to verify that the law in question is still on point. A critical step in bringing closure to the research process, while simultaneously combating information overload, is to properly KeyCite or Shepardize primary authority. It is important to do so correctly, since primary authority from all jurisdictions that negatively affects your citation will be listed in a KeyCite³²⁶ or Shepard's Report.³²⁷ This often leaves users with dozens of extra documents to weed through, which can greatly increase the chance of misreading the report. When confronted with a deluge of authority, students struggle to keep their focus on the point at hand and often overlook the fact that the relevant issues only concern a portion of a case or particular code subsection.³²⁸ By initially focusing on the relevant headnotes or subsection, students can quickly identify whether that portion has incurred any negative or potentially negative treatment, thus allowing them to identify and avoid unrelated primary authority that can greatly confuse and compromise the process. Therefore, the best and only valid way to start the process is by identifying the relevant case headnotes or code subsections. The beginning process is easiest to do in Lexis Advance (because you may Shepardize individual case headnotes³²⁹) as opposed to having to KeyCite the whole case before focusing on the proper headnotes in the KeyCite Report. Either way, the focus must be on the appropriate headnotes when KeyCiting or Shepardizing. Shepard's also allows you to manipulate the Shepard's Report to analyze negative treatment associated with individual code subsections, which cannot be done in the KeyCite Report.³³⁰ Although this

323. FASTCASE, <http://www.fastcase.com/> (last visited Oct. 6, 2016).

324. *NYSBA Member Benefits*, FASTCASE, <http://www.fastcase.com/loislaw/nysba-member-benefit/> (last visited Oct. 6, 2016).

325. *LoisLaw Libraries on Fastcase*, FASTCASE, <http://www.fastcase.com/loislaw/> (last visited Oct. 6, 2016).

326. *See generally* THOMSON REUTERS, KEYCITE ON WESTLAW NEXT (2012), *available at* <https://info.legalsolutions.thomsonreuters.com/pdf/wln2/L-356347.pdf>.

327. *Shepard's Citations Service*, LEXISNEXIS, <http://www.lexisnexis.com/en-us/products/shepards.page> (last visited Oct. 6, 2016).

328. I see students struggle with this every time I teach citator service research.

329. *See* LEXISNEXIS, SHEPARD'S CITATIONS SERVICE 3 (2014), *available at* <http://www.lexisnexis.com/pdf/Shepards-Citation-Service-Overview.pdf>.

330. For instance, if one Shepardizes 42 U.S.C. § 2000e-16c and then clicks on the top link titled "Subsection reports by specific court citation," one will see a break down of citations by subsection.

should greatly reduce the number of primary authority documents that must be examined, there is much more work to complete.³³¹ In carefully scrutinizing the Shepard's or KeyCite Reports, students must pay attention to the jurisdiction of the negative documents and determine whether negative cases are officially published. Often, the documents are from an unrelated jurisdiction or are unpublished opinions, in which case they have no effect on your issues, and can be ignored. Most importantly, students must also be sure to consult the full text of the relevant negative primary authorities in order to understand: (1) why they have treated your headnotes or subsections negatively; and (2) if your issues are affected by the negative treatment. Often times, a careful analysis of the negative cases results in discovering substantial factual differences that render the "negative" cases irrelevant to your issue. This step is where the bulk of time and energy is spent on this process, and there is no substitute to carefully analyzing your negative cases. Take advantage of the navigation arrows at the top of the document. Using the navigation arrows is a quick way to navigate to the appropriate portions of the document, which helps combat information overload.

Information overload is a concern with any web-based reading assignment or document that you provide to your students. For instance, recall Zhu's aforementioned experiment that demonstrated how viewing the fewest number of hyperlinks equated to the highest scores on the test.³³² Zhu recommends limiting both the number of hyperlinks in any online reading assignment and the size of online assignments.³³³ By extension, this not only applies to any webpage assignment, but also applies to any document that is posted online or sent as an e-mail attachment. Leysen suggests that in order for students to improve their concentration, we should teach them how to work with hyperlinks and either provide short, focused reading assignments, or divide a longer assignment into many short pages.³³⁴

Website designers can enhance our online documents that contain hyperlinks. Antonenko and Niederhauser suggest that a web document with hyperlinks should be designed so that when one hovers the cursor over the link, a popup message appears that succinctly summarizes the website the user is about to access (called a "lead").³³⁵ They found that EEG measures

331. Of the 184 total Shepard's citations to 42 U.S.C. § 2000e-16c, subsection (a)(1) has four citations and (a)(2) has two citations. If you are only interested in subsections (a)(1) and (a)(2), limiting the Shepard's results to just those few citations is crucial.

332. See generally Zhu, *supra* note 112.

333. *Id.* at 352.

334. Leysen, *supra* note 217, at 278-79.

335. Pavlo D. Antonenko & Dale S. Niederhauser, *The Influence of Leads on Cognitive Load and Learning in a Hypertext Environment*, 26 COMP. IN HUMAN BEHAVIOR 140, 142-43, 147 (2010).

of the subjects who used leads showed less cognitive load and higher knowledge acquisition than non-lead subjects.³³⁶

Palfrey and Gasser state that librarians should continue to guide students on how to choose appropriate information from the excess of information that is available.³³⁷ An example of how librarians guide student learning is by creating web-based guides called LibGuides, where a topic is divided into many discrete parts that are each accessible by tabs.³³⁸ Each part is adequately explained, and hyperlinks are often provided for additional information.³³⁹ Students can self-regulate their learning by clicking onto the appropriate tabs in the order that makes most sense to them. They can review information on the LibGuide as necessary. For instance, one of the University of Detroit Mercy's LibGuides on using the Bluebook has tabs titled "Bluebook Layout," "Cases," "Constitutions," "Statutes," "Books and Non-Periodic Materials," "Periodicals," and "Electronic Sources."³⁴⁰ Many of the tabs have a convenient dropdown menu.³⁴¹ For instance, the Periodicals tab contains these menu items: Author, Title, Publication, and Short Form for Title.³⁴² This granularity leaves no doubt in the reader's mind as to what they are learning.

Multitasking

It is rather obvious that students who multitask find those distractions more compelling than paying attention to a lecture or studying. This fact may initially bring a foreboding feeling of helplessness to the professor. But remember that we do not have to eliminate the source of the distractions from our students' lives. We just need to give students tools to help control when they multitask. Leysen has identified many useful techniques³⁴³ to combat multitasking, which include turning off digital devices while studying, studying for ninety to 120 minutes without interruption before taking a break (but, by this point, multitask away before resuming study), and identifying ways in which we partake in technology-based

336. *Id.* at 144, 146-47.

337. Palfrey & Gasser, *Reclaiming*, *supra* note 107, at 54.

338. *LibGuides*, SPRINGSHARE, <http://springshare.com/libguides/> (last visited Oct. 6, 2016).

339. For example, see Jennifer Hostetler, *Introduction to "The Bluebook: A Uniform System of Citation"*, U. DET. MERCY. (2015), <http://libguides.udmercy.edu/bluebook>. One sees an introductory statement about the Bluebook, several tabs at the top of the page (Layout, Cases, Constitutions, Statutes, Books, Periodicals, Electronic Sources) and links along the left side of the page to descriptions of other sources that can help explain the Bluebook, such as *The Bluebook Uncovered*. *See id.*

340. *See id.*

341. *Id.*

342. *Id.*

343. Leysen, *supra* note 217, at 274-80.

procrastination so that we may avoid it.³⁴⁴ You can also apply these techniques in the classroom.³⁴⁵

Along the same lines as Leysen's advice on identifying technology-based procrastination, Hembrooke and Gay suggest that students should become more cognizant of their browsing behavior so they may be better able to limit extraneous actions.³⁴⁶ Although teaching students to become self-aware will be all it takes for some students to stop multitasking, it may not be the case for many others.³⁴⁷ Remember how the Gingerich and Lineweaver study found that students who knew that texting during class would inhibit their learning nonetheless continued to text?³⁴⁸ Gingerich and Lineweaver suggest that telling students how texting in class negatively affects their grades may in fact encourage them to stop texting in class.³⁴⁹ Results of the two experiments conducted by Gingerich and Lineweaver show that, on average, undergraduate student scores fell from 81.11% to 66.78% if they texted during an upper-level class on cognitive processes.³⁵⁰ One can reasonably make the argument that since studying the law is likely much more difficult than the cognitive processes class, law students may experience even worse results if they multitask.

A third method of alerting students to the problem of in-class multitasking is to have a discussion as to the reasons why students text during class.³⁵¹ Simply having the discussion may help curtail texting. Or maybe the discussion will inspire us to change our teaching methods, if appropriate.

Although those methods have some merit, many of us who have unsuccessfully employed these techniques should consider limiting the use of technology in our classrooms. Hembrooke and Gay conclude that professors should set boundaries for individual technology usage in class.³⁵² Expect pushback from your students: Weiyu found that although her

344. *Id.* at 274-75.

345. Kuznekoff et al., *supra* note 171, at 361. Kuznekoff et al. suggest taking breaks in the classroom so students can compose messages (and presumably engage in social media or whatever else they can fit in). *See id.* The authors noted that allowing for a break gives students the chance to singularly focus on their multitasking efforts while no lecture is taking place. *See id.*

346. Hembrooke & Gay, *supra* note 166, at 16.

347. *See* Gingerich & Lineweaver, *supra* note 170, at 49.

348. *Id.*

349. *Id.*

350. *Id.*

351. Kuznekoff et al., *supra* note 171, at 347 (discussing the fact that the majority of students acknowledge that using their cell phones in class causes them to not pay attention and thus miss information); McCoy, *supra* note 174, at 15. McCoy suggests that professors find new and better ways to engage students in the classroom. *See generally id.* It would seem to be a necessary first step to find out why students find class to be boring enough to multitask—to find out what specifically makes them multitask.

352. Hembrooke & Gay, *supra* note 166, at 16.

subjects were aware of the pitfalls of multitasking, they opposed use restrictions that would curtail multitasking.³⁵³ Nonetheless, there are several different classroom technology strategies in use.³⁵⁴ The one that makes the most sense is what Eisenstat suggests—that laptops can be used in class only when necessary to complete in-class course work that is of sufficient difficulty so as to keep students busy, and that instructions are given to put laptops away immediately when finished.³⁵⁵ Since this would preclude the use of laptops to type lecture notes, Eisenstat also recommends that students be instructed in proper note-taking techniques.³⁵⁶

In accordance with Eisenstat's conclusions,³⁵⁷ I also think that laptop usage should be limited to necessary class-related work, which excludes typing lecture notes. Not only will limiting laptop usage in this way lead to improved concentration, but it also sends the correct message to students on how technology should be viewed.³⁵⁸ The multitasking issue, which is especially problematic for all but the highest performers, will be addressed by this limitation.

Although a professor may choose to limit laptop usage during class time, doing so does not address students' study habits outside of class, or the surreptitious use of handheld devices in the classroom.³⁵⁹ Because of this, students would benefit from receiving training on self-control.³⁶⁰ In order to develop self-control, today's connected students need to know how the brain works differently in the online learning environment and must be made aware of how multitasking affects memory.³⁶¹ Students will be more successful learners when they are aware of what tasks interfere with the

353. Weiyu, *supra* note 200.

354. See Eisenstat, *supra* note 201, at 99-111. Professors have employed a number of strategies to combat laptop abuse in class. See *id.* Eisenstat discusses them all, and they include: doing nothing, shutting off internet access in the classroom, creating laptop-free zones, monitoring laptop use during class, threatening demerits or lower grades for offenders, having an outright ban of laptops, or limiting laptop use only for class-related exercises. See *id.*

355. *Id.* at 84, 108-09.

356. *Id.* at 113. In fact, the major point in his article is supported, in large part, from a 2014 study conducted by educational psychology professionals Pam Mueller and Daniel Oppenheimer, showing that those who type lecture notes understand less than those who handwrite their notes. See generally Pam A. Mueller & Daniel M. Oppenheimer, *The Pen is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking*, ASS'N FOR PSYCHOL. SCI. (2014).

357. Eisenstat, *supra* note 201, at 111.

358. *Id.* at 109.

359. McCoy, *supra* note 174, at 4 (citing to a study that suggests student use of social media inside and outside of the classroom is prominent, and suggesting that we should address this issue with our students).

360. JACKSON, *supra* note 75, at 232-33 (stating that by learning self-control, one avoids distractions while learning how to focus on and engage in an activity, which will lead to self-regulated learning).

361. See *id.* at 230-31 (stating how crucial self-control is in the digital environment, and supporting my claim that students need to be trained to develop their self-control).

learning process because they will then, hopefully, routinely avoid them. At the beginning of each course, we should include a summary of how the brain works when reading online, as well as the effects of multitasking. For the latter, if you only want to take the time to summarize one study, you can use the Gingerich and Lineweaver study, where grades fell over fourteen percent when students texted in class.³⁶²

We must model professional behavior for our students.³⁶³ For instance, to model the due diligence legal research obligation owed to clients, we should show our students what an acceptable secondary source looks like in terms of depth of coverage and number of citations. In legal practice, it will do no good to find a source that is very short and which only addresses one or two very broad issues on a topic. This is a waste of time (and possibly a waste of clients' money), and could lead to relying on erroneous information that can harm clients and expose practitioners to professional discipline. But reliance on an incomplete source is exactly what students will do if they have not been shown what constitutes a usable secondary source. Further, I find that merely showing students is not enough, even if repeated throughout the semester. Therefore, I am sure to administer this task as part of a graded assignment, which typically serves as an adequate learning strategy.

Finally, there is still a place for some print-based research instruction when law students are first being introduced to the subject of legal research.³⁶⁴ In order for students to become literate in the law, they must learn the law's structure.³⁶⁵ Many sources show this structure best in the print format.³⁶⁶ Three types of print sources that have such structure are secondary sources, digests, and legislative codes.

CONCLUSION

As the world continues to embrace the online environment, it is important to address both the strengths and the weaknesses of this environment. My experience is that although our students would prefer to conduct legal research online, they have ill-developed methods to

362. Gingerich & Lineweaver, *supra* note 170, at 49.

363. Melissa L. Breger, Gina M. Calabrese & Theresa A. Hughes, *Teaching Professionalism in Context: Insights from Students, Clients, Adversaries, and Judges*, 55 S.C. L. REV. 303, 307-09 (2003) (recognizing that modeling professionalism is one aspect of a professor's duties).

364. *See generally* Patrick Meyer, *Law Firm Legal Research Requirements and the Legal Academy Beyond Carnegie*, 35 WHITTIER L. REV. 419 (2014); Patrick Meyer, *Law Firm Legal Research Requirements for New Attorneys*, 101 LAW LIBR. J. 297 (2009).

365. Ian Gallacher, *Forty-Two: The Hitchhiker's Guide to Teaching Legal Research to the Google Generation*, 39 AKRON L. REV. 151, 179 (2006).

366. *See* Yasmin Sokkar Harker, "Information is Cheap, But Meaning is Expensive": *Building Analytical Skill into Legal Research Instruction*, 105 LAW LIBR. J. 79, 83-84 (2013).

effectively do so. It is up to each of us to educate our students on how to properly learn and research in the online environment.

My review of literature and my experiences over the past eighteen years have identified a plethora of tactics we can employ to best teach our students. Although one could spend a lifetime trying to employ a large number of these solutions, focusing on a handful of them will go a long way in addressing our students' needs.

My hope in writing this article is to bring attention to cognitive deficiencies associated with learning in the online environment and to bring together the various training suggestions and techniques that can be used to remedy the situation. In this age of digital media, we must be able to prepare our students to effectively research, read, and learn in the online environment. At the same time, we must also show them how to access many of the tried-and-true structural cues that have traditionally been used to develop higher-level learning and that are so necessary when students are initially introduced to a difficult subject.