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Mark Yates

Golden Gate University School of Law, myates@ggu.edu

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TEXT IS STILL A NOUN: PRESERVING LINEAR TEXT-BASED LITERACY IN AN E-LITERATE WORLD

Mark Yates*

INTRODUCTION

“[T]he medium is the message.”¹ The message, or maybe warning, in Marshall McLuhan’s iconic phrase is as powerful today, and as easy to ignore, as it ever was. In our excitement about the possibilities of new technology, we often overlook the profound impact of the actual medium itself on human nature and experience.² The hidden message of new media is not the content it delivers, but rather how the method of the delivery itself impacts our nature, our relation to others, and our relation to the world in general.³ Now, the form of new media is digital, and its “message” is that literacy itself is changing. Digital technology allows once separate and distinct forms of media to be combined into a new form that not only merges all forms of media, but also connects them to other sources through a vast and expanding database. It brings unprecedented access and allows unprecedented interactivity. This new media form is changing the way we read, think, manage, and seek information, as well as our attitudes about knowledge.

The new literacy is nonlinear. We are no longer limited to reading one single printed source at a time. Now, with hyperlinks and embedded content, as we read one document, we can jump from one source to another and even from one form to another. In fact, the very idea of a single document is rapidly becoming obsolete. Instead, one source of media is just a portal from which we

* © 2012, Mark Yates. All rights reserved. Professor Law and Director of Academic Support Program, Golden Gate University School of Law. Many thanks to Dr. David Kaiser for his patient help and unwavering support.

1. Marshall McLuhan, *Understanding Media: The Extensions of Man* 7 (MIT Press 1994).

2. *Id.* at 9.

3. *Id.* at 8.

begin an exploration of multiple sources and forms, all at once. Further, with the proliferation of smart phones, tablet computers, and other devices, we are not even limited to a single portal. We can simultaneously launch multiple explorations of media through multiple portals. In a sense, we are always connected and always exploring.

As has been the case with new technology, the digital revolution has sparked a debate among educators and social commentators about its costs and benefits. As I will discuss in depth below, some critics see nonlinear literacy as a sort of liberation, and they argue that new technology is creating new skills and new forms of intelligence. Others focus more on the costs, arguing that digital technology and nonlinear literacy result in superficial thinking and knowledge deficits. The debate is irresolvable because ultimately debates about the costs versus the benefits of new technology are really debates about values and how we define “intelligence.” But whether new digital technology makes us “smarter” or, as some commentators claim, “dumber,” one thing is clear: for legal educators and their students, the costs are potentially serious. Law is linear. Law students must be able to trace a single idea through a line of cases and then synthesize legal rules and principles from the factual and procedural contexts, reasoning, and holdings of those cases. They must have the skill and confidence to struggle with difficult texts and to fully grasp one concept before moving on to another. They must have patience and the ability to focus. These are precisely the skills that the digital revolution may be making obsolete. In short, as legal educators we can no longer assume that students will bring to law school the skills and knowledge that we once took for granted.

In this Article, I will argue that, as legal educators, we must balance our use of technology for pedagogical purposes against the importance of preserving linear, text-based literacy. In Part I, I examine recent works that examine the societal impact of digital technology and the Internet. Three important books in particular, by Nicholas Carr,⁴ Mark Bauerlein,⁵ and Steven Johnson,⁶

4. Nicholas Carr is an American writer who has published books and articles on technology, business, and culture. Nicholas G. Carr, *Nicholas G. Carr, Biography*, <http://www.nicholasgcarr.com/info.shtml> (accessed Feb. 28, 2013).

5. Mark Bauerlein is an English professor at Emory University. Emory U., *Department of English, People, Faculty, Mark Bauerlein*, http://english.emory.edu/people/faculty/faculty_pages/bauerlein.html (accessed Feb. 28, 2013).

warrant in-depth discussion because they frame the broader debate about the costs and benefits of new technology. In Part II, I will examine the discussion among legal educators about the use of technology in the classroom and how we have responded to perceived changes in new generations of law students. Finally, in Part III, I discuss the importance of understanding new generations of law students. We must preserve traditional literacy, not instead of the new skills and abilities, but rather alongside them. I conclude by suggesting areas in which a traditional approach to teaching is still effective, as well as ways in which professors and students can use technology as effective teaching and learning tools.

I. THE COSTS AND BENEFITS OF NEW DIGITAL TECHNOLOGY

Debate about the intellectual costs of new technology is almost as old as civilization itself. In the fifth century B.C., for example, Socrates worried that the invention of the written word would diminish human capacity for thought and wisdom:

[Writing] will atrophy people's memories. Trust in writing will make them remember things by relying on marks made by others, from outside themselves, not on their own inner resources, and so writing will make things they have learnt disappear from their minds.⁷

In the seventeenth century, following the invention of the printing press, some worried that the proliferation of books would overwhelm readers with trivial information, leading them to jump from book to book, without careful and focused attention to important ideas.⁸ Friedrich Nietzsche observed, in 1882, that using a typewriter impacted (as a friend had noted), not just his writing style, but also his actual thought process.⁹ Later, having survived the inventions of writing, the printing press, books, and typewrit-

6. Steven Johnson is a media theorist, and writes about popular science. Steven Berlin Johnson, STEVENBERLINJOHNSON.COM, *Biography*, <http://stevenberlinjohnson.typepad.com/about.html> (accessed Feb. 28, 2013).

7. Plato, *Phaedrus* 69 (Robin Waterfield trans., Oxford U. Press 2002).

8. Nicholas Carr, *The Shallows: What the Internet Is Doing to Our Brains* 168 (W.W. Norton & Co. 2010).

9. *Id.* at 18.

ers, society faced new threats in the form of newspapers and phonographs.¹⁰

In his 1955 Memorial Address, the German philosopher, Martin Heidegger examined the impact of technology on human thought.¹¹ He warned that technology is both the product and cause of a useful but superficial kind of thinking that threatens to eclipse a deeper, more profound mode of thought.¹² He called these two modes of thinking, "calculative thinking" and "meditative thinking."¹³ "Calculative thinking," he explained, "computes. It computes ever new, ever more promising and at the same time more economical possibilities. Calculative thinking races from one prospect to the next. Calculative thinking never stops, never collects itself."¹⁴ "[M]editative thinking," on the other hand, "contemplates the meaning which reigns in everything that is."¹⁵ Although calculative thinking serves valuable ends, Heidegger's concern was that the constant acceleration of technological advances distracts us from a deeper and more profound kind of thinking: "[I]t is one thing to have heard and read something, that is, merely to take notice: it is another thing to understand what we have heard and read, that is, to ponder."¹⁶ Overreliance on calculative thinking, he argued, leads to a culture of thoughtlessness: "Thoughtlessness is an uncanny visitor who comes and goes everywhere in today's world. For nowadays we take in everything in the quickest and cheapest way, only to forget it just as quickly, instantly."¹⁷

With this historical perspective, it is tempting to dismiss concerns about technology as traditionalist hand-wringing. The written word does not seem to have made us stupid or forgetful; our intellectual capacities survived the proliferation of books; and books survived the inventions of the phonograph, radio, film, and television. But, at the same time, it is also true that technological gain is often offset by a corresponding loss. Consider, for exam-

10. *Id.* at 223-224.

11. See generally Martin Heidegger, *Discourse on Thinking: A Translation of Gelassenheit* 43-57 (J. Glenn Gray ed., John M. Anderson & E. Hans Freud trans., Harper & Row 1966).

12. *Id.* at 46.

13. *Id.*

14. *Id.*

15. *Id.*

16. *Id.* at 52.

17. *Id.* at 45.

ple, how much more powerful the experience of music would have been for people who did not have the technology to play recorded music in their homes. Media technologies allow us to experience music more frequently, but they diminish its impact. Further, technology builds upon itself and accelerates the rate of change. As the pace of technological evolution speeds up, we have less time to consider its value and to weigh its benefits against its costs. Thus, it may be more important now than it ever was to be cautious in our embrace of technology, and to consider the value of what we are losing as much as we celebrate what we gain.

In his recent book, *The Shallows: What the Internet Is Doing to Our Brains*, Nicholas Carr warns of the potentially serious harm the Internet and digital technology may be doing to our ability to focus, to read, and even to learn, at least according to traditional conceptions of what those terms mean.¹⁸ Digital media and the Internet, he argues, are not only changing the way we think; they are literally changing the anatomy of the human brain.¹⁹ For much of our history, neuroscientists assumed that the developmental stage of the brain ended at adulthood.²⁰ Since the 1970s, however, that long accepted view has slowly changed.²¹ Neuroscientists now understand that our brains remain “plastic” throughout our lives.²² In other words, the actual anatomy of the brain is never “set,” rather, it continues to evolve, adapt, and respond to experience.²³ In the 1990s, for example, researchers found that, compared to a control group, the brains of London cab drivers were enlarged in the area devoted to “storing and manipulating spatial representations of a person’s surroundings.”²⁴ Furthermore, the results were more pronounced for drivers with more years of experience.²⁵ Another study found physical neurological changes in subjects with no previous musical experience after learning and practicing a simple piano melody.²⁶ Many other studies of both human and animal subjects have not only es-

18. See generally Carr, *supra* n. 8.

19. *Id.* at 194.

20. *Id.* at 20.

21. See *id.* at 24–26 (discussing the scientific community’s reaction to Michael Merzenich’s 1968 brain mapping experiment that showed evidence of neuroplasticity).

22. *Id.* at 26.

23. *Id.* at 26–27.

24. *Id.* at 33.

25. *Id.*

26. *Id.*

tablished that the brain retains its plasticity throughout our lives, but also that it responds and adapts to both physical and purely mental activity.²⁷

Given these relatively new insights in neuroscience, Carr argues that immersion in digital technology and the Internet is changing the way we think and process information.²⁸ In part, this is happening simply because of the increased time we spend online and with other forms of screen-based digital technology. Numerous studies show a dramatic increase in the time spent with various forms of digital media, especially among teenagers and young adults. For example, in 2005, The Kaiser Family Foundation found that children between the ages of eight and eighteen lead media saturated lives, spending over six hours per day using digital media.²⁹ Further, because they use multiple forms of media simultaneously, the actual exposure time is over eight hours per day.³⁰ A 2007 Pew Research Center report found that 93 percent of teens between the ages of twelve and seventeen use the Internet, and that their online time is increasing dramatically.³¹ Texting and other forms of mobile communication have also increased dramatically in recent years.³² In 2010, the average American teen was sending or receiving 3,339 texts per month.³³ Further, increased Internet time has not resulted in decreased television time.³⁴ In 2008, the average American, of any age, devoted more than eight hours per day to either television, computers, or mobile phones, often using all three at once.³⁵

27. *Id.* at 26.

28. *Id.* at 90–92.

29. Donald F. Roberts et al., *Generation M: Media in the Lives of 8–18-Year-Olds* 36 (Kaiser Family Found. Study 2005) (available at <http://www.kff.org/entmedia/upload/Generation-M-Media-in-the-Lives-of-8-18-Year-olds-Report.pdf>).

30. *Id.* at 36.

31. Amanda Lenhart et al., *Teens and Social Media* 2, http://www.pewinternet.org/~media/Files/Reports/2007/PIP_Teens_Social_Media_Final.pdf.pdf (Dec. 19, 2007).

32. Nielsen Co., *U.S. Teen Mobile Report: Calling Yesterday, Texting Today, Using Apps Tomorrow*, http://blog.nielsen.com/nielsenwire/online_mobile/u-s-teen-mobile-report-calling-yesterday-texting-today-using-apps-tomorrow/ (Oct. 14, 2010); *see also* Lenhart et al., *supra* n. 31, at 17–24 (discussing the results of a survey taken in 2006 of teenagers and their parents regarding the teenagers' communication patterns).

33. Nielsen Co., *supra* n. 32.

34. Nielsen Co., *A2/M2Three Screen Report*, <http://i.cdn.turner.com/cnn/2009/imagenes/02/24/screen.press.b.pdf> (4th qtr. 2008) (stating that the number of hours the average television viewer watches per month is at “an all-time high”).

35. Council for Research Excellence, *Video Consumer Mapping Study: Key Findings Report* 21–22, http://www.researchexcellence.com/VCMFINALREPORT_4_28_09.pdf (Mar.

Use of printed media, including newspapers, magazines, and books, on the other hand, has decreased significantly since 2004.³⁶ The decrease has been most significant for adults between the ages of twenty-five and thirty-four.³⁷ Another recent study found that young Americans are increasingly using the Internet as their main source of news.³⁸ Even public libraries are changing to accommodate the public appetite for digital content. Indeed, Internet access is becoming one of the most popular public library features.³⁹ Ninety-nine percent of the public libraries in the United States provide Internet access, and the average branch has eleven computers.⁴⁰ Libraries are re-allocating space, with computers taking a more central position, while books are “pushed to the margins.”⁴¹

Not only has there been a decrease in use of printed media, the quality of its content is changing as well. Newspapers and magazines are redesigning graphics and layouts to mimic web design.⁴² Articles are getting shorter to accommodate decreased attention spans, and pages are cluttered with “easy-to-browse blurbs and captions.”⁴³

Furthermore, even when people do read books, more and more they are reading them in digital form. From 2008 to 2010, sales of digital readers rose from one million to roughly twelve million.⁴⁴ The experience of reading digital books, however, is qualitatively different from reading them in printed form. “When a printed book—whether a recently published scholarly history or a two-hundred-year-old Victorian novel—is transferred to an electronic device connected to the Internet,” Carr writes, “it turns into something very like a Web site. Its words become wrapped in all

26, 2009).

36. Carr, *supra* n. 8, at 87–88 (discussing the decrease between 2004 and 2008 in the amount of time Americans over the age of fourteen spend reading printed works, as reported by the United States Bureau of Labor Statistics).

37. *See id.* (noting that adults between the ages of twenty-five and thirty-four spent 29 percent less time reading printed works in 2008 than they did in 2004).

38. Pew Research Ctr., *Internet Gains on Television as Public's Main News Source: More Young People Cite Internet Than TV*, <http://pewresearch.org/pubs/1844/poll-main-source-national-international-news-internet-television-newspapers> (Jan. 4, 2011).

39. Carr, *supra* n. 8, at 97.

40. *Id.*

41. *Id.* at 98.

42. *Id.* at 94.

43. *Id.*

44. *Id.* at 101.

the distractions of the networked computer.”⁴⁵ Perhaps more importantly, the new digital medium will inevitably change the way books are published and the way we read them. Digital books will incorporate links, videos, and other content that fundamentally changes the reading experience.⁴⁶

Even with digital books without these distractions, the reading experience is different. One study found that different parts of the brain are engaged when reading books in printed form than when reading digital content.⁴⁷ Reading printed content stimulates activity in the areas of the brain associated with memory, language, and visual processing, while readers of digital content showed more activity in brain areas associated with decision making and problem solving.⁴⁸ In another study, website design consultant Jakob Nielsen used eye-tracking technology to analyze the way people read online content.⁴⁹ He discovered that most people read an online page differently than they would read a printed page.⁵⁰ Rather than reading line by line, their reading pattern followed the shape of an F.⁵¹ Most of the participants quickly read the top line, and then rapidly skimmed through the rest of the page.⁵² Further, other studies have found that when people read digital content with embedded hyperlinks, they retain less information than those who read the same material in printed form.⁵³ Even when readers don't click the embedded links, they still retain less.⁵⁴ The very presence of the links is a distraction because the reader must evaluate whether to click them.⁵⁵ Another study indicates that the digital revolution may lead to more reading on more topics, but that the topics are explored much more superficially.⁵⁶ Overall, the research indicates that digital

45. *Id.* at 104.

46. *Id.* at 102–103.

47. *Id.* at 122.

48. *Id.*

49. Jakob Nielsen, *F-Shaped Pattern for Reading Web Content*, http://www.useit.com/alertbox/reading_pattern.html (Apr. 17, 2006).

50. *Id.*

51. *Id.*

52. *Id.*

53. Diana De Stefano & Jo Anne LeFevre, *Cognitive Load in Hypertext Reading: A Review*, *Computers in Human Behavior*, 23 *Computers in Human Behavior* 1616, 1635–1636 (2007).

54. Carr, *supra* n. 8, at 128.

55. *Id.*

56. *Id.* at 137–138.

media is changing our reading habits. We are reading more material in digital form, but we don't read closely or linearly.⁵⁷ Instead, we browse. We skim topics and click hyperlinks, jumping from one topic to another, and we retain much less. "What is different, and troubling," Carr writes, "is that skimming is becoming our dominant mode of reading."⁵⁸

Beyond reading, the digital revolution may also be changing the way we think and learn. Memory is key to intelligence and learning.⁵⁹ In particular, the process of transferring information from working memory to long-term memory is directly related to our ability to learn.⁶⁰ When we transfer information from working memory to long-term memory, we are not simply "filing" data.⁶¹ The information is actually organized into "schemas" or patterns of knowledge.⁶² This process is how we make connections between otherwise disparate "bits" of information.⁶³ In other words, it is how we learn.⁶⁴ Working memory, however, has a limited "cognitive load."⁶⁵ One researcher observed that working memory can hold only seven "elements" of information at any one time, and more recent evidence suggests that the capacity is as low as two to four elements.⁶⁶ When we overload our working memory, the process is interrupted, and our ability to learn is diminished.⁶⁷ Because we read printed content more slowly than digital material, information in printed form provides a steady flow of information at a pace that does not exceed our processing capacity.⁶⁸ Digital information, on the other hand, cluttered with hyperlinks and other data, overloads our working memory.⁶⁹ Carr compares the process to filling a tub with water, one thimbleful at

57. *Id.*

58. *Id.* at 138.

59. *Id.* at 123–124.

60. *Id.*

61. *Id.* at 124.

62. *Id.* at 123.

63. *Id.*

64. *See id.* (discussing John Sweller's theory that "[o]ur intellectual prowess is derived largely from the schemas we have acquired over longer periods of time").

65. *Id.* at 125.

66. *Id.* at 124.

67. *Id.* at 125.

68. *Id.* at 124–125.

69. *Id.* at 125.

a time.⁷⁰ When we get too much information, the thimble overflows and we lose content:

With the Net, we face many information faucets, all going full blast. Our little thimble overflows as we rush from one faucet to the next. We're able to transfer only a small portion of the information to long-term memory, and what we do transfer is a jumble of drops from different faucets, not a continuous, coherent stream from one source.⁷¹

Consistent with the discovery of neuroplasticity, extensive research on memory indicates that the exchange between short and long-term memory results in both biochemical as well as anatomical changes in the brain.⁷² Storing information into long-term memory requires the synthesis of new proteins, which are used to generate new synaptic terminals.⁷³ Furthermore, the exchange between short- and long-term memory works in both directions. Recalling information puts it back into short-term memory.⁷⁴ That information is then reconsolidated, establishing new connections and creating new contexts, generating new proteins and new synaptic terminals.⁷⁵ Biological memory, in other words, is alive and active, and its active use is critical to learning and to our depth of understanding.⁷⁶ As Carr explains, "We don't constrain our mental powers when we store new long-term memories. We strengthen them. With each expansion of our memory comes an enlargement of our intelligence."⁷⁷

The science of biological memory appears to be unknown to, or at least ignored by, those who celebrate the Internet's capacity to liberate our minds from the burdens of memorization. By outsourcing memory, proponents argue, we free up "space" for imagination.⁷⁸ Indeed, commentators routinely equate artificial memory with biological memory.⁷⁹ This idea is consistent with the general trend in education to dismiss memorization as an

70. *Id.* at 124–125.

71. *Id.* at 125.

72. *Id.* at 185.

73. *Id.* at 184–185.

74. *Id.* at 191.

75. *Id.*

76. *Id.* at 191–192.

77. *Id.* at 192.

78. *Id.* at 182.

79. *Id.*

outdated approach to learning.⁸⁰ Educators point to studies showing that using of calculators in math classes, for example, allowed students to gain a deeper understanding of the underlying mathematical principles.⁸¹ However, Carr argues that the analogy to use of the Internet is flawed. The use of calculators freed working memory, which actually facilitated more abstract reasoning.⁸² Calculators do not store ideas and information; they merely allow students to shift their focus from routine calculations to larger principles.⁸³ The Internet, on the other hand, overloads working memory, which *interferes* with the learning process.⁸⁴ “The calculator,” Carr writes, “a powerful but highly specialized tool, turned out to be an aid to memory. The Web is a technology of forgetfulness.”⁸⁵ The popular notion that the Internet and digital media free our minds by outsourcing memory is flawed because it is based on a fundamental misconception of how biological memory works. Unlike a hard drive, the brain does not have limited space. Our ability to learn is actually enhanced by remembering and, conversely, harmed by outsourcing the process: “when we start using the Web as a substitute for personal memory, bypassing the inner processes of consolidation, we risk emptying our minds of their riches.”⁸⁶

The Shallows is an important book for anybody who is concerned about the impact of digital technology and the Internet, but Carr’s research is especially important for law students and legal educators. The Internet and Google give us access to information, but they don’t teach us what to do with it. Instead, we are encouraged to simply acquire information without connecting various sources to a single idea. Furthermore, the relatively new discovery of brain plasticity suggests that, as we increasingly immerse ourselves in the digital world, our minds become physically adapted to outsourcing of memory. We don’t need to remember information because it is enough just to see it. In other words, our minds are becoming more adapted to finding information than they are to understanding what it means within a

80. *Id.* at 179.

81. *Id.* at 180, 192.

82. *Id.*

83. *Id.*

84. *Id.* at 193.

85. *Id.*

86. *Id.* at 192.

particular context. Internet-adapted minds may have an especially hard time in law school because, although they are used to view large volumes of information, they are not accustomed to internalizing and synthesizing it into larger ideas.

Besides harming our ability to learn, it appears that outsourcing memory may also diminish our desire to learn, and this is especially true for people born after 1980, the first generation to grow up with the Internet.⁸⁷ In *The Dumbest Generation: How the Digital Age Stupefies Young Americans and Jeopardizes Our Future (or, Don't Trust Anyone under 30)*, Professor Mark Bauerlein argues that commentators and educators who celebrate the benefits of digital technology have ignored or dismissed its costs.⁸⁸ While younger generations may be gaining "new literacies," many studies indicate that they are losing knowledge in the areas of civics, art, literature, history, and world affairs.⁸⁹ Testing of high school seniors reveals a decline in student knowledge of basic history and civics, and, perhaps more importantly, the same is true for college graduates.⁹⁰ Further, the knowledge deficit has grown in spite of the fact that students spend more time in school and have more access to information and cultural resources than at any other time in our history.⁹¹ Bauerlein blames it on the digital revolution. "The Internet doesn't impart adult information," he writes, "it crowds it out."⁹²

It does this, in part, according to Bauerlein, because immersion in the digital world engenders an anti-intellectual and anti-book spirit. Young adults born after 1980 not only read fewer books, they also regard traditional literacy as outdated.⁹³ "Earlier generations resented homework assignments, of course," Bauerlein observes, "and only a small segment of each dove into the intellectual currents of the time, but no generation trumpeted *a-literacy* (knowing how to read but choosing not to) as a valid behavior of their peers."⁹⁴ Students still read in school, of course,

87. Mark Bauerlein, *The Dumbest Generation: How the Digital Age Stupefies Young Americans and Jeopardizes Our Future (or, Don't Trust Anyone under 30)* 108 (Jeremy P. Tarcher/Penguin 2009).

88. *Id.* at 9.

89. *Id.* at 26.

90. *Id.* at 18–20.

91. *Id.* at 35.

92. *Id.* at 32.

93. *Id.* at 40.

94. *Id.* (emphasis in original).

but, since the early 1980s, voluntary reading of books has declined significantly for young adults between the ages of 18 to 24.⁹⁵ Besides the obvious benefits in the areas of cultural literacy, voluntary reading is critical because it is linked to performance in education.⁹⁶ Not surprisingly, some studies show that more time spent on leisure reading leads to better scores on reading comprehension tests.⁹⁷ Other studies show only a slight improvement for college students as well as college graduates.⁹⁸ Instead of books, more and more young adults do their reading online.⁹⁹ The Net generation prefers multitasking over close reading—traditional literacy is rejected in favor of “viewer literacy” and “e-literacy.”¹⁰⁰ And traditional views of education have changed as well. In 1971, only 44.6 percent of college freshman reported attending college to increase earning potential, but that number rose to 71 percent in 2005.¹⁰¹

New literacies, however, have not led to better performance in school or the workplace.¹⁰² Students are masters at finding information online, but they lack the ability to evaluate its quality.¹⁰³ In one recent study, a group of 6,300 high school and college students were given a series of tasks designed to measure their ability to research, to evaluate the relevance and objectivity of their sources, and to organize material into categories.¹⁰⁴ Eighty percent of the test takers mixed relevant with irrelevant information, and eight percent relied on entirely irrelevant sources, leaving only twelve percent who were able to focus on information directly related to the assigned task.¹⁰⁵ Other studies found similar results.¹⁰⁶ “Students can image and browse and post and play,” Bauerlein writes, “but they can’t judge the materials they process, at least not in the intellectual or professional terms of college classes and the workplace.”¹⁰⁷ More importantly, a host of

95. *Id.* at 46.

96. *Id.* at 51.

97. *Id.*

98. *Id.* at 55.

99. *See id.* at 64.

100. *Id.* at 66.

101. *Id.* at 67.

102. *Id.* at 114.

103. *Id.*

104. *Id.* at 113–114.

105. *Id.* at 114.

106. *Id.* at 115.

107. *Id.*

studies measuring the effectiveness of the digital revolution in the classroom have shown disappointing results.¹⁰⁸ Since 1996, educational foundations, school officials, and politicians have called for integration of the Web and digital media into all levels of education, and schools across the country have enthusiastically responded to that call.¹⁰⁹ In some cases, schools sacrificed other areas of their curricula to make their technology reforms possible.¹¹⁰ In 2006, public schools nationwide spent \$1.9 billion on electronic educational materials.¹¹¹ Although initial assessments reported favorable results in the areas of student attitudes toward school, more recent studies indicate that technology in the classroom has not enhanced student achievement.¹¹² In fact, by 2007, some schools began reversing course, ending their various technology programs in favor of a more traditional approach.¹¹³ The overall trend in education, however, is still moving toward even further integration of technology, despite the disappointing results.¹¹⁴

Notwithstanding the provocative—and perhaps misleading—title for his book, Bauerlein does not blame “the dumbest generation” or even technology per se for the decline in knowledge and traditional literacy. “Young Americans are no less intelligent, motivated, ambitious, and sensitive than they ever were,” he explains,

and they are no less adolescent and fun-loving, either. It's not the under-30-year-olds who have changed. What has changed is the threshold into adulthood, the rituals minors undergo to become responsible citizens, the knowledge and skill activities that bring maturity and understanding.¹¹⁵

Instead, he blames the “custodians of culture.”¹¹⁶ Educators and intellectuals have been seduced by technology as much as recent generations, he argues, and, as a result, they have be-

108. *Id.* at 117.

109. *Id.* at 113–116.

110. *Id.* at 117.

111. *Id.*

112. *Id.* at 120–124.

113. *Id.* at 124.

114. *Id.* at 125.

115. *Id.* at 160.

116. *Id.* at 161.

trayed younger generations who look to them for guidance, as well as society in general.¹¹⁷ He acknowledges the potential of the Internet, but he argues for balance.¹¹⁸ When educators and commentators uncritically endorse digital learning and other forms of digital media, they abandon their roles as mentors, leaving adolescents and young adults to form their identities within an increasingly autonomous and youth-centered digital world:

Maturity comes, in part, through vertical modeling, relations with older people such as teachers, employers, ministers, aunts and uncles, and older siblings along with parents, who impart adult outlooks and interests. . . . The Web (along with cell phones, teen sitcoms, and pop music), though, encourages more horizontal modeling, more raillery and mimicry of people of the same age, an intensification of peer consciousness.¹¹⁹

Google, and other online services, are tailored to personalize information.¹²⁰ The Internet provides us with information we want but, without adult mentoring, especially in education, there is nothing to guide young minds toward the information they need.¹²¹ "This is precisely why young adults claim technology as their own," Bauerlein writes,

and why we should reconsider the basic premise of digital learning: that leisure time in front of screens forms an educational progress. Not reject the premise, but examine it again, slow it down, set it in light not only of the promise of technology, and its inevitability, but in light of a demonstrable and all-too-frequent outcome.¹²²

Taken together, Carr and Bauerlein make powerful arguments that we should be concerned about the potentially harmful effects of digital technology and the Internet on our ability to think, read closely, and evaluate the quality of information and its impact on education and basic foundational knowledge. Not everybody, however, shares those concerns. Some writers argue

117. *Id.*

118. *Id.* at 160.

119. *Id.* at 136.

120. *Id.* at 137.

121. *See id.* at 138.

122. *Id.* at 139.

that the demands of modern technology benefit our intellectual processes in ways that outweigh the costs.

Steven Johnson, in his book, *Everything Bad Is Good for You: How Today's Popular Culture Is Actually Making Us Smarter*, argues that new technology and the Internet actually make us smarter.¹²³ Johnson identifies a trend in popular media that indicates increasing complexity in even the lowest forms of popular culture, like television sitcoms, prime time soap operas, and video games. He calls this trend a "sleeper curve."¹²⁴ Television, he argues, demands the same mental faculties as reading: attention, patience, and the parsing of narrative threads.¹²⁵ Since the 1960s, the plotlines of television shows have been increasing in complexity.¹²⁶ Programs from the 60s and 70s, for example, contained only a single narrative thread, while more modern shows employ "multiple threading" of plotlines. Instead of following only a single plot, viewers of modern television shows must manage and track multiple narrative lines.¹²⁷ This trend, he argues, suggests that consumers of popular culture have developed greater cognitive capacity: "In a sense, this is as much a map of cognitive changes in the popular mind as it is a map of onscreen developments, as though the media titans had decided to condition our brains to follow ever larger numbers of simultaneous threads."¹²⁸ He sees the same trend in video games, which have vastly increased in their complexity since they first became available.¹²⁹ Johnson emphasizes that it is not the content of television shows and video games that are demanding more cognitive ability.¹³⁰ Their content may be simple or even objectionable, but their more complex structure stimulates collateral learning.¹³¹ "It's not *what* you're thinking about when you are playing a game," he explains, "it's *the way* you're thinking that matters."¹³²

123. Steven Johnson, *Everything Bad Is Good for You: How Today's Popular Culture Is Actually Making Us Smarter* (Riverhead Bks. 2005).

124. *Id.* at 9.

125. *Id.* at 64–65.

126. *Id.* at 64.

127. *Id.* at 68–71.

128. *Id.* at 70.

129. *Id.* at 30.

130. *Id.* at 40.

131. *Id.*

132. *Id.* (emphasis in original).

Johnson sees the same benefits in the Internet. Online interactivity, he argues, stimulates our intellectual capacities in three ways. It requires a steep learning curve to use; it is interactive; and it creates new channels for social interaction.¹³³ Importantly, he also recognizes that the Internet is changing the way we think and read. Documents with embedded hyperlinks allow us to “explode the restrictions of the linear sentence and the page bound book.”¹³⁴ Although nonlinear reading was once thought of as an avant-garde idea, he explains, the Internet has made it a dominant mode of reading: “exploring nonlinear document structures becomes as second nature as dialing a phone for hundreds of millions—if not billions—of people.”¹³⁵ Unlike Bauerlein and Carr, however, Johnson celebrates this new literacy. The cognitive benefits gained from the increasing complexity of technology and popular cultures are different, he argues, but just as valuable as those gained from traditional reading.¹³⁶

Other critics celebrate nonlinear reading as well. In a recent address at the University of Toronto, researcher Mark Federman proclaimed that traditional literacy is nothing but an outdated, “quaint notion.”¹³⁷ Tracing the history of literacy from ancient oral traditions to text-based literacy, Federman argues that text led to a kind of tyranny: “Literacy separated the knower from that which was to be known, and inserted both a proxy representation in the form of words, and an author who asserted his authority with respect that representation, between the knower and the known.”¹³⁸ According to Federman, the printed word and the authority of authorship institutionalized knowledge by installing an intermediary, the author, between a reader and his subject.¹³⁹ Thus, he argues, literacy fundamentally changed our relationship with knowledge.¹⁴⁰ The Internet, and particularly Google, he explains, is releasing us from this tyranny. When we do a Google

133. *Id.* at 118.

134. *Id.* at 117.

135. *Id.*

136. *Id.* at 23.

137. Mark Federman, *Why Johnny and Janey Can't Read, and Why Mr. and Mrs. Smith Can't Teach: The Challenge of Multiple Media Literacies in a Tumultuous Time* 1, <http://individual.utoronto.ca/markfederman/WhyJohnnyandJaneyCantRead.pdf> (accessed Mar. 1, 2013).

138. *Id.* at 5.

139. *Id.* at 6.

140. *Id.*

search, ranking of results is based, not the approval of an authoritative panel of experts, but rather on an algorithm that ranks WebPages according to a kind of collective knowledge based, more or less, on popularity.¹⁴¹ In other words, sites that have been “clicked” on more often are treated as more relevant. “What is significantly different between a literate framing of research, and the emergent information seeking model,” he argues, “is the influence of multiple, overlapping and intertwined contexts on the research process itself.”¹⁴² Thus, our modern relationship with knowledge, according to Federman, is no longer guided—or rather, limited—by an intermediary or by learning institutions. Students will still learn to read, he argues, but the challenge of teachers is to recognize how their literacy has changed. Traditional literacy, or, as he puts it, “pedagogical art[i]facts of a literate world,” are no longer consistent with how knowledge is acquired in a “ubiquitously connected and pervasively proximate world.”¹⁴³

Neither Johnson nor Federman refutes the claims made by Carr and Bauerlein. They agree that the Web and digital technology are changing the way we think, read, and acquire information. Their differences are really about values. Critics of new technology worry that we are losing traditional literacy skills, while those who celebrate technology focus on the skills we gain in their place. Even critics who have responded directly to Carr agree that the Internet and digital technology are changing the way we read and think. In a recent Pew Research Center survey of 900 Internet stakeholders, 81 percent claimed that access to more information through the use of the Internet will increase overall intelligence.¹⁴⁴ Most of the specific responses, however, acknowledged that we tend to skim when reading online, and that literacy itself is changing.¹⁴⁵ And in another recent book length report sponsored by The John D. and Catherine T. MacArthur Foundation, a group of researchers concluded that,

141. *Id.* at 8.

142. *Id.* at 10.

143. *Id.* at 11.

144. Janna Quitney Anderson & Lee Rainie, Pew Internet & Am. Life Project, Pew Research Ctr. Publications, *Does Google Make Us Stupid?* <http://pewresearch.org/pubs/1499/google-does-it-make-us-stupid-experts-stakeholders-mostly-say-no> (Feb. 19, 2010).

145. *Id.*; see also Jonah Lehrer, Science Blogs, The Frontal Cortex, *Review of The Shallows*, http://scienceblogs.com/cortex/2010/06/the_shallows.php (June 6, 2010).

While standards for literacy are constantly under negotiation in any community of practice, we do believe that the relative newness of digital production and online communication means that we are in a moment of interpretive flexibility, where values, norms, and literacy are particularly malleable.¹⁴⁶

II. USE OF TECHNOLOGY IN LAW SCHOOL

For legal educators, research on the impact of digital media suggests both bad news and good news. First, the bad news. It is probably impossible to determine whether the Internet and digital media make people more or less intelligent, but some evidence suggests that the unique skills essential to law school and to the practice of law are diminished by immersion in the digital world. In addition to the ability to read closely, law students must also be able to manage a large volume of information, reduce it to a manageable level without losing the central concepts, and be able to sort critically relevant from less relevant information. They must organize the rules and principles they learn into hierarchical schemas. Critically, because they are learning new and complex information, law students must acquire information gradually, or as Carr puts it, one “thimbleful at a time.”

The good news is that, no matter what their previous experience, people can adapt their brains to new activities throughout their lives. The brain’s plasticity diminishes with age, but it is never completely lost.¹⁴⁷ Students can and do adapt their minds to law school, but, as new generations of students matriculate, it will increasingly require a conscious effort. As Carr explains, “the vital paths in our brains become . . . the paths of least resistance. They are the paths that most of us will take most of the time, and the farther we proceed down them, the more difficult it becomes to turn back.”¹⁴⁸ The critical task for legal educators is to understand the important differences between previous and modern generations of students. We must adapt our pedagogical approach in a way that affirms the strengths that new students bring to law school and at the same time accounts for the widen-

146. Mizuko Ito et al., *Hanging Out, Messing Around, and Geeking Out: Kids Living and Learning with New Media* 342 (MIT Press 2010).

147. *Id.* at 35.

148. Carr, *supra* n. 8, at 35.

ing gap between the traditional literacy that is crucial for success in law school (as well as the practice of law) and the new “screen-based” literacies that will be more familiar to current and future generations of law students.

Many legal scholars and educators, of course, have already engaged this process. Much of the discussion involves the various concerns raised by use of laptop computers in the classroom. Many professors, for example, complain that their students are merely transcribing information, more or less taking dictation during class rather than concentrating on and engaging the discussion. This may exacerbate the problem of information overload. Much of the discussion in a law school classroom is intended to stimulate critical thought. It is not necessarily meant to impart information that needs to be recorded. When students simply transcribe the discussion on their computers the critical points are often buried in the minutiae. As discussed above, information overload can hamper students’ ability to effectively sort information. Taking hand-written notes, on the other hand, forces students to engage the discussion more actively and, thus, make critical decisions about what to write down. Another well known complaint is that laptops create inevitable distractions—many students play computer games during class, access email, send messages, and even update their various social networking sites. Also, when students are focused on a screen, they seem generally disconnected from the discussion.¹⁴⁹

Other professors support and encourage the use of laptops. They argue that students are comfortable with technology and that laptops can actually facilitate note taking. Further, because students will have to use technology in practice, they should learn to use it effectively in law school.¹⁵⁰ In general, those who support the use of laptop computers seem to emphasize the benefits of technology overall, and those who oppose them, while not necessarily anti-technology in general, are more concerned about the potential costs of technology in the learning environment.¹⁵¹

149. See e.g. Kevin Yamamoto, *Banning Laptops in the Classroom: Is It Worth the Hassle?* 57 J. Leg. Educ. 477, 483 (2007).

150. See e.g. Kristen E. Murray, *Let Them Use Laptops: Debunking the Assumptions Underlying the Debate over Laptops in the Classroom*, 36 Okla. City U. L. Rev. 185, 192 (2011).

151. See e.g. Diana R. Donahue, *An Autobiography of a Digital Idea: From Waging War against Laptops to Engaging Students with Laptops*, 59 J. Leg. Educ. 485 (2010);

Some scholars argue for a complete integration of digital technology into the classroom and into the legal curriculum generally, while others take a more conservative approach. Professor Lasso, for example, arguing for more integration of technology into legal education, criticizes traditional text-based instruction and the Socratic Method as outdated: “[traditional] law school teaching generally rewards only our outmoded type of literacy: printed text literacy.”¹⁵² He suggests posting outlines, pre-reading summaries, and other course material online; using listservs and email to facilitate discussion outside of class; and using slides, videos, and transparencies during class to in order to more effectively engage students “who were raised on television and computer screens.”¹⁵³ As an example, he describes his own use of electronic quizzes in class, which are presented in a television game show format, complete with theme music.¹⁵⁴ He reports that 90 percent of his students found the summary slides and quizzes to be the most helpful of his innovations, and overall his end-of-semester evaluations improved significantly.¹⁵⁵

Professor Donahoe calls for even more radical changes. She argues for the use of digital textbooks that accommodate student preference for “nonlinear” reading, multitasking, and “telescoping.”¹⁵⁶ In the classroom, she suggests the use of multi-media computer graphics, video, and animation.¹⁵⁷ Students need to “power up,” she argues, but “without interactivity, students feel as if they have to ‘power down’ or worse, like the ‘airplane mode’ on their cell phones, they turn off their functioning for learning.”¹⁵⁸ Furthermore, with an eye to the future, she envisions an “immersive digital environment,” that would include the use of video games and digital simulations where students actually cre-

Yamamoto, *supra* n. 149. Professor Donahoe argues that legal education should conform to the preferences of “digital learners,” while Professor Yamamoto is more concerned about engaging text in a more traditional way. *Id.*

152. Rogelio Lasso, *From the Paper Chase to the Digital Chase: Technology and the Challenge of Teaching 21st Century Law Students*, 43 Santa Clara L. Rev. 1, 23 (2002).

153. *Id.* at 44–45.

154. *Id.* at 50.

155. *Id.* at 51.

156. Donahoe, *supra* n. 151, at 488–489. (“Telescoping” refers to the process of delving deeper and deeper into a topic through the use of multiple screens.).

157. *Id.* at 490.

158. *Id.*

ate “lawyer avatars” and “immerse themselves in a legal environment that seems realistic.”¹⁵⁹

Many other legal educators call for similar innovations. Chicago-Kent College of Law, for example, has been experimenting with digital casebooks since the 1990s.¹⁶⁰ Other professors argue that reading in digital format is inevitable.¹⁶¹ In general, those who call for more integration of technology into legal education suggest, besides digital textbooks, the use of online course management; use of listservs, blogs, and email to facilitate collaboration and communication outside of class; and the use of video-based instruction and electronic legal research aids. They virtually all agree that the traditional, purely text-based, Socratic approach to instruction is outdated and mostly ineffective for modern generations of law students.¹⁶²

On the other hand, although not many professors write to oppose the use of technology, some at least call for moderation in its use. Professor Yamamoto, for example, bans laptops in his classroom, but still uses other forms of technology to supplement his teaching and communication with students.¹⁶³ Professor Merrit encourages the use of technology in the classroom, but she warns against using it in a way that creates information overload.¹⁶⁴ Working memory, or “cognitive load,” she explains, has limited capacity, and thus, providing too much information at once interferes with the learning process.¹⁶⁵ Overtaxing cognitive load is

159. *Id.* at 511–512.

160. Richard A. Matasar & Rosemary Sheils, *Electronic Law Students: Repercussions on Legal Education*, 29 Val. U. L. Rev. 909, 921 (1995).

161. See Matthew Bodie, *The Future of the Casebook: An Argument for an Open Source Approach*, 57 J. Leg. Educ. 10, 11 (2007); Debra Moss Curtis & Judith R. Karp, *In a Case on the Screen, Do They Remember What They've Seen?: Critical Electronic Reading in the Law Classroom*, 30 Hamline L. Rev. 247, 250 (2007); Robert Lawrence, *Casebooks Are Toast*, 26 Seattle U. L. Rev. 1 (2002).

162. See generally Camille Broussard, *Teaching with Technology: Is the Pedagogical Fulcrum Shifting?* 53 N.Y. L. Sch. L. Rev. 903 (2008/2009); Kristin B. Gerdy et al., *Expanding Our Classroom Walls: Enhancing Teaching and Learning through Technology*, 11 Leg. Writing 263 (2005); Robert E. Oliphant, *Using “High Tech” Tools in a Traditional Classroom Environment—A Two Semester Experiment*, 9 Rich. J.L. & Tech. 5 (2002/2003); Shelley Ross Saxer, *One Professor's Approach to Increasing Technology Use in Legal Education*, 6 Rich. J.L. & Tech (1999/2002); Marie Stefannini Newman, *Not the Evil TWEN: How On-Line Course Management Software Supports Non-Linear Learning in Law Schools*, 5 J. High Tech. L. 183 (2005).

163. See Yamamoto, *supra* n. 149, at 479–480.

164. Deborah J. Merrit, *Legal Education in the Age of Cognitive Science and Advanced Classroom Teaching*, 14 B.U. J. Sci. & Tech L. 39 (2008).

165. *Id.* at 45.

especially detrimental when teaching novel and complex material.¹⁶⁶ Professor Merrit suggests reducing cognitive load in the classroom by avoiding tangential information, such as jokes and anecdotes that are only marginally related to the topic under discussion; by relating new information to concepts already stored in long-term memory; and by providing complementary material, such as diagrams or demonstrations, through working memory's separate audio and visual channels.¹⁶⁷ Power Point presentations can be an especially effective way to deliver complimentary information, but she recommends using more images than text.¹⁶⁸

Most of the scholarship on using technology in legal education embraces its use in one form or another. This suggests that, at least among those professors who feel strongly enough to write about it, there is a general consensus that legal education should incorporate technology into both the classroom and in its overall curricula to some degree. Obviously, information technology is here to stay, and it makes little sense to oppose its use in law school.

On the other hand, as discussed above, overreliance on technology may be seriously detrimental to the learning process. Current and future generations of law students are also the future generation of practitioners, policy makers, and educators, and it may be that the "new literacies" emerging from the digital world will change the way that law is practiced and taught.¹⁶⁹ But for now and the foreseeable future, effective advocacy requires, at a minimum, the ability to closely read and analyze text. Thus, as legal educators, we must learn to use technology effectively, not simply to engage students in ways they are accustomed to, but rather to facilitate the acquisition of skills that are still essential to the practice of law. And we must learn to effectively engage students whose life and educational experiences before law school were radically different than our own. Unfortunately, it is not clear that we know how to do that. As Professor Lasso observed,

166. *Id.*

167. *Id.* at 45–47.

168. *Id.* at 51; see also M. H. Sam Jacobson, *Paying Attention or Fatally Distracted? Concentration, Memory, and Multitasking in a Multi-Media World*, 16 *Leg. Writing* 419 (2010).

169. Indeed, this issue raises important questions about the impact of technology on the future of policy making and concepts of justice.

"most law professors are 20th century learners."¹⁷⁰ A critical step toward the effective use of technology, then, is to educate ourselves on who our students are, how they are different from the previous generations, and whether our assumptions about them are accurate.

III. LOOKING AHEAD: BALANCING THE USE OF TECHNOLOGY WITH TRADITIONAL TEACHING METHODS

Every generation is different from previous generations in some ways, but every "generation gap" is not the same. In the past few decades we have read about "Generation X," "Generation Y," "Millennials," and now we have "the "Dot Net Generation," or, as some writers call them, "Digital Natives."¹⁷¹ Indeed, one gets the impression that human generations become outdated almost as quickly as the latest version of computers, cell phones, and other high-tech gadgets. Change has always been a reality, of course, but technology is accelerating that process, which leads to widening gaps between human generations.¹⁷² In *Born Digital: Understanding the First Generation of Digital Natives*, John Palfrey and Urs Gasser observe that we are living in "the most rapid period of transformation ever, at least when it comes to information."¹⁷³ Significant technological change once took centuries, whereas now it happens in decades.¹⁷⁴ In just a few years, the digital revolution has transformed the way we live. Business, politics, and even religion have been impacted, but most significant "is the way the digital era has transformed how people live their lives and relate to one another and to the world around them."¹⁷⁵ These changes are not limited to new generations—older people, "Digital Settlers" and "Digital Immigrants," have adapted to the digital era, but they also continue to rely on more

170. Lasso, *supra* n. 152, at 23.

171. The terms, "Dot Net Generation" and "Digital Natives," refer to people born after the 1980s or, in other words, people who have never known a nondigital world.

172. See Mizuko Ito et al, *supra* n. 146, at 343.

173. John Palfrey & Urs Gasser, *Born Digital: Understanding the First Generation of Digital Natives* 3 (Basic Bks. 2008). Palfrey and Gasser are Professors of Law at Harvard Law School and co-directors of the Berkman Center for Internet and Society.

174. *Id.*

175. *Id.*

traditional forms of interaction.¹⁷⁶ Digital Natives, however, have never known a nondigital world: "The young people becoming university students and new entrants in the workforce, while living much of their lives online, are different from us in many dimensions."¹⁷⁷ Digital Natives form identities both online and in the "real world," and they don't distinguish between them.

They are joined by a set of common practices, including the amount of time they spend using digital technologies, their tendency to multitask, their tendency to express themselves and relate to one another in ways mediated by digital technologies, and their pattern of using technologies to access and use information and create new knowledge and art forms.¹⁷⁸

In general, for a Digital Native, the line between "real world" and "virtual world" is fuzzy at best, and, thus, they perceive information and their overall environment as malleable.¹⁷⁹

As learners, although they learn differently than previous generations, Digital Natives are as active and as energetic as young people always have been.¹⁸⁰ According to Palfrey and Gasser, they are no more or less intelligent than previous generations.¹⁸¹ But there are some reasons for concern. First, they multitask. The distractions that come from constant connectivity divide their attention and their learning suffers.¹⁸² This is of special concern in law school.¹⁸³ A second and related problem is that younger generations have shorter attention spans. Digital Natives prefer to read shorter works online, and they are accustomed to a "sound-bite" culture.¹⁸⁴ Further, text messaging, instant messaging, and email tend to encourage "sound bite" communication.¹⁸⁵ Third, information technology encourages a "copy and paste" culture, which has led to an increase in incidents of

176. *Id.* at 3–4. "Digital Settlers" are people who took to technology and helped shape it from the start, while "Digital Immigrants" are people who learned to use it later in life.

177. *Id.* at 4.

178. *Id.*

179. *Id.* at 5–6.

180. *Id.* at 241.

181. *Id.* at 244.

182. *Id.* at 244–245.

183. *Id.* at 246.

184. *Id.* at 245.

185. *Id.* at 245.

cheating.¹⁸⁶ Perhaps the most serious area of concern, at least for legal educators, is that the tendency of Digital Natives to get their information from the Web leads to information overload.¹⁸⁷ More information usually leads to better decision making, but too much can hinder a student's ability to organize and select the most relevant information.¹⁸⁸ Further, in response to the overwhelming volume of information on any given topic, Digital Natives tend to avoid websites with more text, even though those sites often contain more accurate information.¹⁸⁹

Every critic agrees that Digital Natives are as intelligent as previous generations, but, as discussed above, they are increasingly acquiring new literacy skills at the expense of the more traditional literacy that is essential in legal education. The dominant literacy is rapidly becoming nonlinear and, because that mode of reading jumps from one source to another, it is directly related to information overload and the distractions associated with multitasking. These are serious liabilities in law school, where students are required to engage in close and intense linear reading and to cope with large volumes of information. Legal educators must take into account that new generations of law students may need more time to adapt to the demands of law school. Furthermore, where we use technology as a teaching tool, we must be careful to avoid using it in a way that interferes with traditional linear reading skills.

Despite these concerns—or perhaps because of them—Palfrey and Gasser recommend a cautious approach to technological reforms in education.¹⁹⁰ “There is a temptation among those who love technology,” they write, “to promote radical changes in the way we teach our students. It’s easy to fetishize technology. That instinct is wrong.”¹⁹¹ They use the example of an experiment at Harvard Law School to illustrate the problem. In the 1990s, Harvard Law School launched a program to modernize its classrooms. The improvements included installing Ethernet jacks at each seat. Immediately after they were installed, however, the law faculty became uneasy about students connected to the Internet

186. *Id.*

187. *Id.* at 190.

188. *Id.* at 192.

189. *Id.*

190. *Id.* at 246.

191. *Id.*

during class discussion and ordered the jacks turned off.¹⁹² Other schools have had similar experiences.¹⁹³ This does not mean that educators should avoid technology altogether, but it does suggest that we have not yet learned how to use it effectively: "Forward looking schools know that technology infrastructures are likely to be worthy investments over time. But very few have any idea how to use them—and, just as important, when *not* to use them—at the present time."¹⁹⁴ Technology, they argue, should only be utilized when it serves clear pedagogical goals, and it should not eclipse what teachers have always done best.¹⁹⁵ Further, we should not assume that students always prefer a high-tech approach. Some studies indicate that modern students prefer only moderate use of technology in the classroom.¹⁹⁶ The most difficult task for teachers, they write, is "how to avoid the trap of shunning technology, on the one hand, and embracing it in places where it does not belong, on the other."¹⁹⁷

Palfrey and Gasser suggest several guidelines for educators to consider. First, we should not abandon traditional teaching. Students often learn best from "old fashioned dialogue, with people exchanging views and looking in depth at a topic, questioning and exploring issues in a face-to-face, real life setting: Our teaching, in such cases, should not necessarily be mediated by new technologies."¹⁹⁸ Thus, they support banning laptops in law school classrooms.¹⁹⁹ On the other hand, technology is most effective, they argue, in applied or experiential learning classes.²⁰⁰ Schools should also adopt programs to make sure that non-Digital Natives can use new technology effectively.²⁰¹ Furthermore, technology can be used to encourage team-based learning. This would include use of various online resources that would facilitate and supplement learning outside of the classroom.²⁰² Many Digital Natives are already expert at building online communities around

192. *Id.* at 237–238.

193. *Id.*

194. *Id.* at 238 (emphasis in original).

195. *Id.* at 246; see also Gerdy et al., *supra* n. 162, at 276.

196. Palfrey & Glasser, *supra* n. 173, at 246.

197. *Id.* at 247.

198. *Id.* at 246–247.

199. *Id.* at 246.

200. *Id.* at 247.

201. *Id.*

202. *Id.* at 247–248.

ideas, and they are comfortable with online collaboration.²⁰³ In addition, to help ensure that technology is used effectively, schools should educate their teachers on the use of technology and reward innovation.²⁰⁴ We should also learn from the students themselves.²⁰⁵

Although Palfrey and Gasser are both law professors, their recommendations are not intended for law schools in particular, but rather for education in general. Nevertheless, we can use their guidelines to help determine the best way to utilize technology in legal education. At the outset, we should start with a few basic premises. First, the practice of law, and thus, legal education, requires expert, text-based literacy. The research by Carr, Bauerlein, and even their critics, indicates that we can no longer assume students entering law school will have acquired the kind of close-reading skills they will need to succeed. Carr's research in particular suggests that, because their minds have already been adapted to nonlinear literacies, they will need time and practice to acquire these skills. Second, as legal educators, we should not use technology in a way that exacerbates the already serious issues raised by multitasking and information overload. Third, use of technology for its own sake, or just because we assume that it is what are students are accustomed to, may only serve to undermine our educational goals.²⁰⁶ We should also assume that our students want to learn and that they look to us to guide them. They may not like to "power down" in the classroom (although that is by no means certain), but they will gladly do it if they understand why it is necessary. Finally, we should also keep in mind the important distinction between instruction on the use of technology for the practice of law and using technology as a learning tool. Once students have mastered important legal analysis skills, they can then learn how to use technology to enhance their advocacy skills. With these premises in mind, we can identify several areas where incorporating technology into law school curricula may serve important pedagogical purposes, as well as some areas where a more traditional, face-to-face approach might be best.

203. *Id.*

204. *Id.*

205. *Id.* at 250.

206. See e.g. Gerdy et al., *supra* n. 162, at 273.

A. Use of Technology in Doctrinal Classes

In traditional doctrinal classes, technology should be used cautiously. Digital textbooks, for example, may not be effective. Carr's research and other studies suggest that students read more quickly and retain less when they read content in digital form than they do when reading printed text.²⁰⁷ That is especially true for digital books with hyperlinks and other embedded content.²⁰⁸ In general, printed text seems to deliver information at a slower rate.²⁰⁹ This is critical in law school, where students are being introduced to novel and complex material. Further, one of the most important messages we convey to entering law students is that they are learning new skills that require a new way of thinking. To the extent that new students are increasingly accustomed to reading digital content, teaching with printed text will actually enhance that message. Current generations of law students, of course, will have read plenty of traditional text before law school—it's not obsolete just yet—but that may not be as true in the future. For future generations, an emphasis on text in printed form will itself be different and it will encourage a different approach to reading. Thus, traditional textbooks still serve an important purpose in law school, especially during the first year, and they are one of the tools that we should preserve.

Some use of technological tools, on the other hand, may be effective to enhance and supplement teaching in doctrinal classes. Use of Power Point to supplement lecture and class discussion can be an effective tool, but only if it is presented in a way that avoids causing distractions and information overload.²¹⁰ As explained by Professor Merrit, Power Point slides with images are more effective because they supplement the discussion, whereas too much text may divide students' attention and cause distractions.²¹¹ Course websites and listservs can also be effective.²¹² These tools provide a way to encourage the collaboration and team-based learning suggested by Palfrey and Gasser.²¹³

207. Carr, *supra* n. 8, at 90–91; Nielson, *supra* n. 49.

208. See Carr, *supra* n. 8, at 121–123.

209. See *id.* at 138.

210. See Merrit, *supra* n. 164, at 50–66.

211. *Id.* at 51.

212. See generally *supra* n. 155 and accompany text.

213. See Palfrey & Gasser, *supra* n. 173, at 248.

As discussed above, student use of laptops in traditional classes raises several concerns. In addition to the problem of transcribing information instead of more selective note taking, laptops also have the potential to create distractions, especially in classrooms with wireless access to the Internet. Modern students habitually multitask by accessing email, instant messages, and other online content during class. Many legal educators worry that these distractions interfere with the learning process, and a recent Stanford study confirms those fears.²¹⁴ Furthermore, although laptops should make information management more efficient, they often have the opposite effect. Students who are accustomed to seeking information online have not learned the skills they need to organize information in an effective way.²¹⁵ Creating course outlines is one of the most effective ways to synthesize large volumes of information into a manageable form. Laptops, however, allow students to format their notes into a course outline without actually engaging and internalizing the material. Notes typed into a word processing program can be moved and formatted without reading them or, more importantly, thinking about how the individual notes and topics relate to each other. In other words, misuse of laptops allows students to format their notes without synthesizing the information. This is especially problematic in light of recent research indicating that people do not remember information when they know it can be easily accessed later.²¹⁶ Internet-adapted minds are more likely to use course outlines as repositories of information rather than seeing the creation of outlines as a learning process.

On the other hand, laptops can be effective note taking and information management tools if students learn to use them effectively. Banning them altogether simply avoids the problem rather than confronting it. Indeed, the entire laptop debate simply highlights the need for legal educators to recognize that the skills students acquire from using technology are not necessarily the same skills they will need for success in law school or the practice

214. Eyal Ophir et al., *Cognitive Control in Media Multitaskers*, <http://www.pnas.org/content/early/2009/08/21/0903620106.abstract> (July 20, 2009) (The study found that media multitaskers are more easily distracted by irrelevant information.).

215. See Bauerlein, *supra* n. 87, at 108; Sharon Begley, *I Can't Think*, *Newsweek* 30 (Mar. 7, 2011); Palfrey & Gasser, *supra* n. 173.

216. Betsy Sparrow et al., *Google Effects on Memory: Cognitive Consequences of Having Information at Our Fingertips*, 333 *Sci. Mag.* 776, 778 (Aug. 5, 2011).

of law. Those skills have to be taught. Effective information management is an essential skill for both law school and, ultimately, the practice of law. Thus, instead of prohibiting their use, we should teach students how to use laptops to manage large volumes of information. As I will discuss below, academic support programs are well suited to teach effective use of technology in law school, and professors can also address this issue in class. At a minimum, we should have strict policies against Internet access during class discussion.²¹⁷ Another approach may be to emphasize the importance of active engagement in class discussion by requiring students to close their laptops during part of the class. The need to reduce and manage information could also be emphasized through the Socratic Method. For example, when calling on students, we could ask them to summarize the previous class. This approach would require students to synthesize their class notes between classes and to learn how to take more effective notes during class.

Finally, in light of the recent research on the impact of the Internet on memory and learning, we should reconsider the idea of giving open-book exams.²¹⁸ Many professors allow students to bring notes and other material to exams because that approach emphasizes that we are testing skills, not just knowledge of legal rules. We hope to discourage students from simply memorizing rules without learning how to apply them to a set of facts. But, even in an open-book exam, some knowledge of the law is essential. Because students are less likely to learn information when they know it can be easily accessed, and because memorizing is an important part of the learning process, open-book exams may actually discourage learning. Furthermore, closed-book exams will encourage students to engage course material more thoroughly during the outlining process.

Overall, doctrinal classes are the best place to teach the literacy skills that are fundamental to the practice of law. In these classes, traditional teaching methods are still important, and they can be effective if we understand that the literacy skills we once took for granted now have to be taught. This is especially true during the first year of law school because, once students enhance

217. Enforcement of Internet access policies can be difficult, but students will be more likely to avoid Internet use if it is clear that doing so is a violation of class rules.

218. See e.g. Carr, *supra* n. 8; Sparrow et al., *supra* n. 216.

their ability to read closely, think critically, and to effectively organize information, they can then learn to use technology in ways that serve those ends, instead of distracting from them.

B. Technology in Applied Learning Courses

Technological tools may be most useful in classes that use experiential learning. In writing and research classes, for example, online research tools are essential. Digital books, with links to cases, videos, citation exercises, and other instructional material, like the digital textbook described by Professor Donahoe, may also be very effective.²¹⁹ Beyond writing classes, digital technology may be very useful in other applied learning courses that teach, for instance, trial advocacy, appellate advocacy, negotiation, lawyering skills, and ethics. Furthermore, skill-based courses offer the opportunity to teach effective use of technology in practice. As future trial lawyers, students will present their cases to jurors who are increasingly likely to be Digital Natives themselves, and thus, effective advocacy skills will involve use of technology in the courtroom. Finally, use of technology in skills courses makes sense because most of them are upper-division classes, and, assuming our first-year programs are effective, students will have already developed the important literacy skills they need.

Even in experiential learning classes, however, it is important to focus on teaching traditional linear reading skills. The regular feedback students receive in first-year writing courses enables students to practice application of case law. Writing classes provide legal educators the opportunity to demonstrate exactly what we mean by “critical” reading and synthesizing case law. In upper-division skills classes, we can build on the foundations established during the first year by continuing to teach reading and application, and at the same time, we can teach students how to use technology to enhance those skills. Indeed, because of the potential costs of technology discussed above, experiential learning classes may be more important now than ever before. These classes may be the best way to effectively integrate the skills students acquire before law school with the new skills they will need for effective practice.

219. See Donahue, *supra* n. 151.

C. The Role of Academic Support Programs

One of the most important things we can do is to educate our students about the ways in which technology can impede their success in law school. This, of course, is easier said than done, because entering law students may not be receptive to what they perceive as an anti-technology message. But as they gain experience in law school, as they begin to see for themselves how law school is different than their previous educational experiences, students will gain a new appreciation for problems associated with information overload and multitasking. Academic support programs are well suited to take on this role, because academic support instructors can advise students about the use of technology in the context of their actual and ongoing legal education. Advisors can discuss specific experiences with students and illustrate both how the use of technology has contributed to success, as well as how its misuse may have imposed obstacles. Those teaching in Academic Support Programs can also provide note taking and outlining classes and workshops that help students learn to use laptops more effectively. In many schools, this would require an expanded role for academic support programs that have focused mostly on remedial instruction for struggling or “high risk” students. But, as new generations of students are increasingly adapted to new literacies, academic support can be an ideal resource that is well worth the additional investment.

Overall, as we consider ways in which to adapt legal pedagogy to the needs of future generations of law students, our focus should be on curricular reforms that teach and preserve the skills that are still crucial to the practice of law. Integrating technology into our teaching will be an important part of future legal education, but we must approach our use of technology cautiously. And we must also understand how future law students will be different from previous generations of law students. They will certainly be skilled in the use of technology, but our task will be to teach them to use it effectively as law students and as lawyers. Even in the digital world, law students will still need to read and analyze cases. They will need to synthesize the holdings of a line of cases into coherent rules and concepts, and they will need to manage and sort information into hierarchical schemas. In other words, while law is still linear, future law students increasingly will be nonlinear readers and thinkers. They will be adapted to out-

sourcing memory and multitasking. Thus, our curricular reforms must take these differences into account. We should embrace the use of technology in areas where it serves these purposes, but we should also consider where more traditional teaching methods may still be the best approach. Ironically, the “message” of new technology—at least for legal educators—may be that non-technological teaching methods are more important now than ever.

CONCLUSION

The meaning of literacy is changing, and the “new literacies” that are emerging from the influence of digital and online technology may have useful applications in advocacy and in the practice of law generally. But lawyers still need traditional linear, text-based, literacy skills as well. There is no reason that they cannot learn both. In fact, the best lawyers of the future will be masters of all literacy forms; they will understand the differences between them, and they will know how to adapt their skills to the demands of their practice. This is the task for modern legal educators—we must recognize that future law students may not have the same literacy skills that we have always expected them to acquire before law school, and thus, we must learn to teach and preserve the skills that new lawyers still need, even in an increasingly digital, e-literate world.