Writing for a Mind at Work: Appellate Advocacy and the Science of Digital Reading

Mary Beth Beazley

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There is a lot we don't know about the future of appellate advocacy. Maybe every court will start holding holographic oral arguments.[3] Maybe standards of review will change when courts have the ability to view a crucial event on video,[4] or when counsel can embed an audio snippet of controversial testimony into a brief.[5] Maybe the technology gap between the haves and the have-nots will grow so great that courts should not only provide indigent defendants with counsel,[6] but also provide their counsel with the latest software. Maybe the short attention spans of modern readers will lead to BuzzFeed-style[7] Brief-sicles: *"Ten Exciting Reasons to Rule in Favor of My Client. You'll Gasp When You Read the Third One!"*

What I can predict with some certainty is that the future of appellate advocacy will be inextricably tied to the future of reading. In fact, you'll hear a lot about reading if you ask appellate judges about their jobs. In 2015, appellate Judge Kate Toomey described the transition from the trial court to the appellate court by observing that she spends her days "reading hundreds of pages of briefs and cases and draft opinions—far more reading than I did as a District Court judge—and devoting a great deal more time to writing

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3. *See* Peter M. Koelling, *Appellate Practice: The Next 50 Years*, Judges' J., Summer 2014, at 15 (predicting changes "over the next 30 years" such that "[e]ach courthouse will have its own holographic studio so that oral argument will have the appearance of taking place in the actual courtroom from both the judges and the advocates' points of view").

4. *E.g.*, Graham Farrell et al., *Trialling the use of Tablets in Australian Courts: The Jury is Still Out...*, OzCHI '15, PROC. OF THE ANN. MEETING OF THE AUSTRALIAN SPECIAL INT. GROUP FOR COMPUTER HUM. INTERACTION, 483, 490 (Dec. 7–10, 2015), http://dl.acm.org/citation.cfm?doid=2838739.2838779 (noting a "strong push" by the Australian judiciary for "electronic evidence presentation to be a significant part of the courtroom proceedings, as a means of utilising available forensic technologies and alleviating the reliance on the large volume of paper based evidence.").

5. *E.g.*, George Nicholson, *An Environment of Change*, 2 J. APP. PRAC. & PROCESS 229, 230 (2000) (describing an appeal in which Scotland's supreme criminal court listened to an audio recording of a jury charge and concluding that appropriate words were in a "tone of voice" that indicated a bias against the appellant).

6. *E.g.*, Ben C. Duniway, *The Poor Man in the Federal Courts*, 18 STAN. L. REV. 1270, 1270 (1966) (quoting John MacArthur Maguire, *Poverty and Civil Litigation*, 36 HARV. L. REV. 361, 362 (1923) ("A penniless suitor . . . may get into court, but be helpless because he cannot pay for a lawyer; or he may become helpless in the midst of the case because he lacks funds to bring his witnesses, to pay a stenographer, or to pay a printer. He must, in short, surmount four financial barriers: costs, fees, expense of legal services, and sundry miscellaneous expenses incident to litigation."); ADVISORY COMMITTEE ON CIVIL RULES' DRAFT AMENDMENTS TO THE ELECTRONIC DISCOVERY RULES, SL044 ALI-ABA 803, 818 (Expressing concern about a mandatory e-filing rule, arguing that "[u]nrepresented persons should be allowed to use e-filing. But they should not be required to do so. Barriers include limited English proficiency, special obstacles for incarcerated persons, costs, unfamiliarity with the process, lack of appropriate software, and the intimidating nature of the process.").

7. *See, e.g.*, *15 Fabulous Dinners Guaranteed To Impress Your Significant Other*, BUZZFEED (Jun. 23, 2016, 8:22 PM), https://www.buzzfeed.com/peasandpeonies/15-fabulous-dinners-that-will-totally-impress-your-1vim4?utm_term=.fdKXW6RKW#.dnA6Mr0LM.

and editing."[8] Another judge described the same transition, noting that in his rookie year, he "read perhaps a thousand briefs in hundreds of cases and wrote nearly 100 decisions."[9] Earlier this year, an Associate Justice of the California Court of Appeal noted that he has a "dream job," but that it is not perfect, because "there's enough reading to blind an owl."[10]

These days, that reading is being completed on a variety of platforms: paper, desktops, laptops, and even phones. This technology will have a big impact on the future of appellate advocacy, but judges and lawyers are still in the early days of the digital revolution, and we don't yet know how things are going to shake out. Right now, we are in a time of transition from paper-based documents to digital documents. That transition may never be complete—i.e., we may never completely give up paper documents—but we are certainly moving to an information society that is more focused on digital documents than on paper documents.

Understanding how that digital world affects legal reading is vital to understanding the future of appellate advocacy. Lawyers need to understand some of the science of how people read and interact with the written word; unfortunately, we have been slow to grasp the importance of this science.[11] Understanding reader behavior is also crucial, both because reading realities are relevant to the application of law to facts, and because the legal community needs to know what features to demand from their research websites, from their writing software, and in their court rules.[12] Too much of our current research technology imitates books, without compensating for the transition from hard copy to digital platforms.

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8. Judge Kate A. Toomey, *From the Trial Bench to the Appellate Bench*, UTAH B.J., Nov.–Dec. 2015, at 18.

9. Judge Samuel A. Thumma, *Writing Appellate Decisions: Observations of A Rookie Appellate Judge*, JUDGES' J., Winter 2014, at 32.

10. Justice William W. Bedsworth, *A Most Dangerous Game*, ORANGE COUNTY LAW., Apr. 2016, at 62, 63.

11. *E.g.*, James F. Stratman, *Teaching Lawyers to Revise for the Real World: A Role for Reader Protocols*, 1 LEGAL WRITING: J. LEGAL WRITING INST. 35, 35 (1991) ("Whatever lawyers know, and they must know a great deal, they often do not know much about how they or their peers read."); Mary Beth Beazley, *Hiding in Plain Sight: "Conspicuous Type" Standards in Mandated Communication Statutes*, 40 J. LEGIS. 1, 18 (2014) [hereinafter Beazley, *Plain Sight*] ("The law imposes some high expectations on readers, but both legislators and judges seem not to be aware of the impact that ineffective writing and presentation can have on whether readers will understand text—or whether they will even read it.").

12. Of course, it will also help them when they must decide cases based on "knowledge" that must be acquired by reading the written word. *See generally, e.g.*, Beazley, *Plain Sight*, *supra* note 11, at 21 (describing court reactions to "least sophisticated debtor" issues, and observing that "[i]t may be inappropriate to presume that a reader will 'read with care' when the notice provided is difficult or confusing, and courts, unfortunately, do not always recognize predictable reader weaknesses").

Likewise, too many of our format requirements—from margins to citation rules—are based on styles of presentation that are relics of the typewriter era.[13]

Fortunately, scientists and software developers are busily studying various kinds of readers and analyzing hardware and software so they can make it friendlier to digital readers. What they are discovering, not surprisingly, is that not all digital readers have the same needs. The needs of online shoppers are different from the needs of people reading the web to find out the news or the weather. Likewise, someone reading a digital book for pleasure has different needs than someone reading a book to find an answer to a legal question.

Part 1 of this article will describe some of the scientific definitions of so-called "Active Readers" and explain how lawyers and judges fit these definitions as they engage in the "Knowledge Work" that is essential to their reading and writing tasks. Part 2 will address some of the issues that arise as active readers transition from paper to digital platforms. Finally, Part 3 will describe some of the anticipated changes in hardware and software and make suggestions about changes to court rules and more.

1.   KNOWLEDGE WORKERS AND ACTIVE READERS IN THE LEGAL
PROFESSION

The term "Knowledge Workers" was created by Peter Drucker to describe those who "add[] value by processing existing information to create new information that could be used to define and solve problems."[14] Knowledge workers toil in a variety of fields, and lawyers and judges quite obviously meet this definition. The way that appellate attorneys and judges typically "process existing information," of course, is by reading it. Appellate attorneys attempt to "define and solve problems" by synthesizing written law and decided facts in order to write appellate briefs. As Jim Stratman explained in 1991, "like most of us who read on the job, lawyers do so with specific goals in mind. They read in order to accomplish cer-

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    13.   *E.g.*, Ellie Margolis, *Is the Medium the Message? Unleashing the Power of E-Communication in the Twenty-First Century*, 12 LEGAL COMM. & RHETORIC: JALWD 1, 14 (2015) ("The format of the research memorandum is based on the capabilities of the typewriter.") (citing MATTHEW BUTTERICK, TYPOGRAPHY FOR LAWYERS 180 (2010)).
    14.   Jason Coomer, Willie Buehler, Bob Binder, *The Attorney As Knowledge Worker*, 68 TEX. B.J. 794, 794 (2005) (citation omitted) (also noting that "[k]nowledge workers include lawyers, doctors, diplomats, lawmakers, software developers, managers, and bankers").

tain tasks—to prepare an answer to an interrogatory, to help a client with a problem, or to screen an argument on appeal."[15] Appellate judges, of course, must "solve the problem" of the appeal by reviewing those attorney arguments as they appear in written briefs, and by reading the relevant case law and the "cold record."[16]

It is tempting to imagine a future in which oral argument, coupled with trial videos and other audio recordings, would replace the written brief. Such a scenario, however, would be likely to significantly reduce court efficiency. Since most people read faster than they can hear the spoken word,[17] reading is generally the most efficient way to communicate legal arguments. Further, the purpose of the appeal is not to review the whole trial; rather, it is for the attorneys on each side of the case to analyze the relevant law and apply it to only the evidence that is in question or to the issues that are in controversy. Even if judges can review short video excerpts from the trial, they would still need the attorneys to research the relevant law and explain why the court should rule in favor of one side or the other. Thus, in the foreseeable future, reading will continue to be a significant part of the knowledge work for most appellate judges and appellate attorneys.

When we think of the act of "reading," our immediate mental image may be of someone sitting and reading a book or other document, in either paper or digital form. We probably imagine that this "reader" starts at the beginning of the document and reads until the end, discovering along the way the message that the writer was intending to convey. Of course, as you read this paragraph, you surely realize that this description does not always describe the way that lawyers read.

The description is wrong because lawyers usually do not read in a linear fashion; indeed, an appellate attorney at work on a brief, or a judge at work on an opinion, is probably juggling several documents at once. Asking for shorter briefs, Judge Lawrence W. Pierce reminded lawyers that for each appeal heard by the panel, the judges read an "enormous amount" of material: "one brief for each

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15. Stratman, *supra* note 11, at 35.

16. *See, e.g.*, Rice v. Collins, 546 U.S. 333, 343 (2006) ("Appellate judges cannot on the basis of a cold record easily second-guess a trial judge's decision about likely motivation.").

17. The average reading rate for adult college students, for example, ranges from 200–400 words per minute. Lawrence J. Lewandowski et al., *Assessment of Reading Rate in Postsecondary Students*, J. OF PSYCHOEDUCATIONAL ASSESSMENT, June 2003, at 135. The speaking rate (and thus, the listening or hearing rate), in contrast, is about half as fast, at 100 to 200 words per minute. Marion E. Haynes, *Becoming an Effective Listener, in* WRITING AND SPEAKING IN THE TECHNOLOGY PROFESSIONS: A PRACTICAL GUIDE 326–29 (David F. Beer, ed., 2003).

party, plus a joint appendix, a reply brief, and an occasional sur-reply brief, in addition to the applicable cases and statutes."[18]

Likewise, the attorneys who wrote those briefs read an enormous amount of material, including the cases that they read and rejected as they conducted their research. A recent article described the workload of new associates, and it noted that for these attorneys, "lawyering . . . was fundamentally about reading. They read constantly, in digital and hard copy form. . . . They read primary authority, but they also read more broadly, frequently accessing secondary authority and non-legal texts."[19]

Appellate judges and lawyers engage in what scholars call "Active Reading," which is described as a "a broad set of cognitive skills and activities, such as thinking, learning, note taking, annotations, searching and skimming, that enable an individual to achieve a deep level of comprehension of a document."[20] Active Reading goes by different labels, including "user-focused reading,"[21] "work-related reading," and "responsive reading."[22]

Active Reading is contrasted with "Receptive Reading," which is described as "the process of linearly progressing through the text without interruption."[23] The Receptive Reader—like the imagined reader mentioned above—starts at the beginning of a book or other document and reads it sequentially until reaching the end.[24] For active readers, however, that one word—*reading*—encompasses a very broad range of tasks. Not surprisingly, many of the active readers' tasks are precursors to, or part of, the writing process.[25]

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18. The Honorable Lawrence W. Pierce, *Appellate Advocacy: Some Reflections from the Bench*, 61 FORDHAM L. REV. 829, 836 (1993).

19. Ann Sinsheimer & David J. Herring, *Lawyers at Work: A Study of the Reading, Writing, and Communication Practices of Legal Professionals*, 21 J. Legal Writing Inst. (forthcoming) (manuscript at 13), http://ssrn.com/abstract=2747512.

20. Andrea Bianchi et al., *Designing a Physical Aid to Support Active Reading on Tablets* 699, CHI 2015, PROC. OF THE 33RD ANN. ACM CONF. ON HUM. FACTORS IN COMPUTING SYSTEMS, http://dx.doi.org/10.1145/2702123.2702303.

21. MARY BETH BEAZLEY, A PRACTICAL GUIDE TO APPELLATE ADVOCACY 227-28 (4th ed. 2014) (distinguishing between receptive "readers," and "users," who "have an agenda.").

22. Nicholas Chen et al., Designing a Multi-Slate Reading Environment to Support Active Reading Activities, ACM TRANSACTIONS ON COMPUTER-HUMAN INTERACTION, Oct. 2012, at 18:1 n.1 (citations omitted), http://doi.acm.org/10.1145/2362364.2362366.

23. *Id.* at 18:4 (citations omitted).

24. Kentaro Takano, *Microscopic analysis of document handling while reading paper documents to improve digital reading device*, OZCHI '14 PROC. OF THE 26TH AUSTRALIAN COMPUTER-HUM. INTERACTION CONF. ON DESIGNING FUTURES: THE FUTURE OF DESIGN, 559, 560 (Dec. 02-05, 2014) [hereinafter *Microscopic*] (citation omitted) ("Reading for leisure is characterized as reading during which readers often turn pages one-by-one from the start to the end. In contrast, readers often move back and forth between pages for work-related reading").

25. *See, e.g.*, Chen et al., *supra* note 22, at 18:4 ("[R]eading happens more frequently with writing than without.") (citation omitted).

The active reader usually has a crowded agenda. Judges may
have a variety of reasons for reading briefs, cases, and other court
documents. Broadly stated, they may be preparing for oral argu-
ment, preparing for a conference, or working on writing or editing
an opinion. Attorneys, likewise, may have a variety of goals for
their reading. As one study showed, attorneys had to read legal and
non-legal materials "broadly and strategically" in order "to learn, to
educate themselves and inform themselves so that they could han-
dle situations or solve problems, which at times were situations or
problems that had no immediate solutions."[26]

Scientists who have observed active readers in a variety of set-
tings have identified several behaviors with various purposes,
many of which judges would recognize as being vital to appellate
courts. For example, researchers identified the significance of
"cross-reference reading, reading to answer questions, reading to
support discussion, skimming, and reading to edit or critically re-
view text."[27]   Some readers conduct a kind of document triage,
"where they read from a large collection of documents to select rel-
evant documents."[28]

Active Reading itself "combines activities such as thinking, learn-
ing, note taking, annotations, searching or skimming to gain a deep
understanding of a written text."[29]   Some scientists describe a
"three-pass" method, of "skimming, in-depth reading, and review-
ing."[30]   Others speak of "tasks" that are not necessarily used in a
sequence, describing "skimming" as "rapid scanning with the goal
of gaining an overview of a document"; "understanding," described
as having the goal of "achieving comprehension of a text," and "dis-
cussing" described as "the deep reading required to be able to ana-
lyze or criticize" the relevant material.[31] They also note three kinds
of "activities" that active readers engage in: (1) "managing," (2) "an-
notating & extracting," and (3) "exploring."[32]

Further sub-dividing these activities, scientists describe "manag-
ing activities" as "navigating around, adding, deleting or re-order-
ing sets of pages, documents, notes or other material." Likewise,

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26.   Sinsheimer & Herring, *supra* note 19, at 15, 14.

27.   *Microscopic*, *supra* note 24, at 561.

28.   *Id*.

29.   Bianchi et al., *supra* note 20, at 700 (citations omitted).

30.   *Id*. at 702 (citing S. Keshav, *How to Read a Paper*, ACM SIGCOMM COMPUTER
COMM. REV., July 2007, at 83).

31.   Bianchi et al., *supra* note 20, at 702.

32.   *Id*. at 702 (citing Kenton O'Hara & Abigail Sellen, *A Comparison of Reading Paper
and Online Documents*, CHI'97 PROCEEDINGS OF THE ACM SIGCHI CONFERENCE ON HUMAN
FACTORS IN COMPUTING SYSTEMS, at 335-42).

"annotating and extracting activities" include "creating and linking notes to content and capturing or retrieving content for subsequent (potentially external) sharing or use." Lastly, "exploring activities" include "visualizing, searching or comparing different parts [of] the document in order to better understand particular points or extract key information."[33]

This chart shows the way that Bianchi and her co-authors have tried to capture some of the various categories of active reading behavior and to note the relationships between and among those categories:

	Managing content	Annotations & Extractions	Exploring
Skimming	Quick navigation among pages. View document overviews.	Add/delete memo-style notes. Notes that link to source material.	Rapid access to content on other document pages.
Understanding	Organize content by priority. Store and manage content.	Capture excerpts for reference. Writing annotations on original file and control its visibility.	Highlighting text. Tools to analyze content (e.g. measure, isolate or increase prominence).
Discussing	Categorize annotations automatically (e.g. time) & manually (e.g. tagging). Easy sharing of notes.	Show and hide notes. Manage captured excerpts and notes.	Flexibly make, show and hide highlights and text.

Identifying and labeling various categories of active reader tasks is important because the categories help writers—and hardware and software designers—who want to support Active Reading. We must understand *what* active readers are doing so that we can then study *how* they try to accomplish those goals in paper and digital platforms.

2.   CHANGING PLATFORMS: WHAT HAPPENS WHEN WE MOVE FROM HARD COPY TO DIGITAL DOCUMENTS?

The digital revolution is drastically changing the way we read. In the past, we read (and wrote) on paper. Now, we do much of our reading on desktops, laptops, tablets, and phones. In the past, we reviewed case law by reading books; now, most attorneys turn to their desktops or tablets to conduct legal research and to review the results of that research. The gains from reading on digital devices are obvious: we gain mobility, portability, accessibility, and searchability. What is less obvious, however, is what we *lose* when we read on digital devices.

Receptive Reading on digital devices may feel like reading on hard copies. But the devices that we use to read—and the bells and whistles that are part of those devices—have an inevitable impact

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33.   All quotes in this paragraph from Bianchi et al., *supra* note 20, at 703.

on the way in which we engage with and understand the information that we read. As Nicholas Carr has observed in his germinal work, *The Shallows*, "[a] page of online text viewed through a computer screen may seem similar to a page of printed text. But scrolling or clicking through a Web document involves physical actions and sensory stimuli very different from those involved in holding and turning the pages of a book."[34] These impacts are highlighted for active readers.

When I do CLE's for judges, I ask them about how they *actually* read, and about how they *prefer* to read. Almost all of the judges report that they do a significant amount of their reading on digital devices: desktops, laptops, tablets, and even phones.[35] Most of these same judges, however, admit that they *prefer* to read paper documents, and research among academics has yielded similar results.[36] The reasons for this preference are more than sentimental. Researchers are studying the ways in which active readers engage with paper so that they can develop hardware and software that will make up for the functionality that readers lose when they move from paper to screen. This research is particularly relevant to appellate lawyers, because they *are* active readers and they write for active readers.

2.1 This Is Your Brain on Paper: Active Readers and the Physical World

We use more than our eyes when we read, and Active Reading tasks include a wide variety of physical interactions with paper. Perhaps surprisingly, our comprehension is affected by how we touch and move around the documents we read, and by the physical spaces in which we read and organize our paper materials. Scientists studying active readers have found that "the spatial layout of . . . materials in the workspace served an important role in supporting readers' mental organization of the material. Spatial layout of

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34. NICHOLAS CARR, THE SHALLOWS: WHAT THE INTERNET IS DOING TO OUR BRAINS 90 (W.W. Norton & Co. 2011).

35. *See generally*, Mary Beth Beazley, *Writing (and Reading) Appellate Briefs in the Digital Age*, 15 J. App. Prac. & Process 47 (2014) [hereinafter Beazley, *Digital Age*], http://law-repository.ualr.edu/appellatepracticeprocess/vol15/iss1/5.

36. Bianchi et al., *supra* note 20, at 699 ("[I]t has long been reported that people prefer to perform active reading with physical paper rather than on personal computers [24] and recent updates to this literature indicate the same holds true for tablet computers [19, 27].") (citations indicated by bracketed numbers are omitted); Sinsheimer & Herring, *supra* note 19, at 27 (describing attorney reading behaviors and noting that "they all accessed material in hard copy forms on a regular basis, often expressing a preference to read information from books or to print out information").

documents has additional significance when we consider reading activities that occur across multiple sessions."[37] In other words, if we put all the cases for the first issue in one pile, and all the cases for the second issue in another pile, our brain "feels" the organization in a way that it doesn't when we create digital folders. Likewise, when we go home at night, leaving those piles of cases in their assigned places, and a book open to page 323 with a post-it note on the line where we stopped, we save on cognitive energy when we return to the office the next morning and are able to start reading exactly where we left off.[38]

For decades, scientists have been studying the ways that active readers interact with paper, and how physical interactions affect mental processes. When we use paper, for example, we can easily view multiple documents concurrently.[39] Researches have also found that "layout structures like files and piles" help us to find and access documents, and also remind us about documents that we need to review.[40] Active readers who are interacting with paper use physical space in other ways that can help the brain to organize the information and to see more easily the relationships between and among the documents. Scientists have noted that "[u]tilizing the three-dimensional space is one of the advantages of tangible media."[41]

Using our hands and our bodies to interact with physical documents seems to spread some of the cognitive load from our brains to our bodies, making it easier to spend more cognitive energy on thinking, analyzing, and other cognitive steps. Actions that hardcopy readers take almost subconsciously often represent mental efforts to organize and synthesize information, and these actions are (currently) easier to take with paper documents. For example, one group of researchers observed active readers were "frequently" "piling documents with the same category to organize information and putting documents [aside after] they [had] finished reading" them.[42]

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37. Chen et al., *supra* note 22, at 18:4.
38. *See* Sinsheimer & Herring, *supra* note 19, at 28 (In study of attorney work, noting in reference to a participant that "a characteristic of all the attorneys was L's need to pick up where she left off after constant interruptions.").
39. *See, e.g.*, Chen et al., *supra* note 22 at 18:4 (citing O'Hara et al., *Understanding the Materiality of Writing From Multiple Sources*, 56 INT'L. J. HUM.-COMPUTER STUD. 269 (2002)).
40. *Id.* at 18:4 (citing T.W. Malone, *How Do People Organize Their Desks?: Implications for the Design of Office Information Systems*, 1 ACM TRANSACTIONS ON OFFICE INFO. SYSTEMS 99 (1983).
41. *Microscopic, supra* note 24, at 565 (citing Terrenghi et al., *Affordances for Manipulation of Physical versus Digital Media on Interactive Surfaces*, *in* PROC. CHI 2007 1157-166 (ACM Press, 2007).
42. *Microscopic, supra* note 24, at 565.

Readers spent a greater amount of time "lifting and moving" documents when they were engaged in "document triage."[43]

Researchers report that "readers are able to read from paper more efficiently" than from electronic media, and that they use methods such as frequent page turning and moving documents to cross-reference and look for answers.[44] One group of researchers did a "microscopic" analysis of reader behaviors and considered the thought processes and purposes behind the behavior.[45] They conducted "think-aloud" protocols with the readers, asking them to explain certain behaviors.[46] For example, when readers were "reading to learn," they were more likely to tap the paper than when they were reading for other purposes.[47] As one reader explained, "'It felt like I could memorize it better [while tapping] than [by] keeping still.'"[48]

A recent reading study shows contexts in which attorney-active readers prefer hard-copy documents. For example, one attorney printed out detailed emails, and then lined the print-outs up on her desk, telling an observer "that is the order [in which] she will respond to them."[49] Likewise, although the attorneys did significant amounts of online reading, "they all accessed material in hard copy forms on a regular basis, often expressing a preference to read information from books or to print out information. . . . Often the attorneys turned to books or printed text to read in detail or when they needed to annotate a document."[50] That is, when they needed to engage in active reading, they tended to prefer reading in hard copy format.

Scientists have also noted that readers of tangible media engage in a wide variety of page-related behaviors, many of which have a conscious or subconscious cognitive purpose. Many hard-copy readers engage in "various types of page turning actions, such as taking a peek at the next page and riffling through pages."[51] Further, while many digital functions may have only one purpose, hard-copy actions are different: "one action was adaptively used for different

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43. *Id.* at 564.
44. *Id.* at 559 (citing H. Shibata and K. Omura, *Comparing Paper Books and Electronic Media in Reading to Answer Questions, in* Proc. Int'l Conf. on Digital Printing Tech. 28, 43-46 (2012)); Shibata et al., *Impact of the Use of a Touch-Based Digital Reading Device in Immersive Reading, in* Proc. SID (2013)).
45. *Id.* at 560.
46. *Id.*
47. *Id.* at 565.
48. *Id.*
49. Sinsheimer & Herring, *supra* note 19, at 21.
50. Sinsheimer & Herring, *supra* note 19, at 27.
51. *Microscopic, supra* note 24, at 560.

purposes, or done to achieve several goals at once on papers. For example, finger bookmarking can be used to flip between two remote pages as well as to return from over-flipping."[52]

While these activities may seem trivial, different methods of physical interaction can provide different cognitive benefits. Active readers navigate through their documents to find previously reviewed information, to find information that would fulfill a reading or researching goal, or to preview information so that they can incorporate it into their mental map of the information they are synthesizing. This navigation is easier when readers have several physical documents in view as they are conducting the navigation. Researchers have observed that active readers using paper exploit both the physical space in which they work and the mobility of the various paper documents:

[O]ne critical way paper supports active reading is by allowing the reader to work with a large amount of information simultaneously. Tasks like glancing back to re-read, comparing documents, and interleaving reading and writing all benefit from the fact that content is distributed across several sheets of paper. Since sheets of paper are thin and lightweight, they can be picked up, laid out, and rearranged effortlessly.[53]

As another set of researchers observed, use of physical space can be particularly relevant to organization: "spatial arrangement becomes a way of sketching the structure of the document before it is done."[54] These researchers studied how collaborative groups used paper and digital documents. They noticed that "spatial arrangement of multiple documents on a surface . . . was very common with paper—we observed this [behavior] in all tasks where paper was present."[55]

Likewise, the low cognitive cost of paper navigation is a significant benefit that many active readers take for granted. One group of researchers studied how active readers used various media to answer questions, and they noted that "[w]e perform page navigation almost unconsciously without using any mental resources with paper books. Therefore, we can do it while speaking, listening to, or

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52. *Microscopic, supra* note 24 at 565.
53. Chen et al., *supra* note 22, at 18:2.
54. Jonathan Haber et al., *Paper vs. Tablets: The Effect of Document Media in Co-located Collaborative Work*, AVI '14 PROC. OF THE 2014 INT'L WORKING CONFERENCE ON ADVANCED VISUAL INTERFACES 89-96, 93 (2014), http://dl.acm.org/citation.cfm?doid=2598153.2598170.
55. *Id.*

thinking something without disturbing these actions."[56] Others describe the "almost subliminal actions" such as "folding, spreading, and flipping of pages [that] require minimal cognitive attention from the user."[57] Even so, seemingly small physical actions can have a significant cognitive impact. For example, active readers make very conscious choices when they decide whether to place documents side by side or on top of each other;[58] the physical location of the document(s) then communicates meaning to the reader when the reader looks at those documents.

In sum, paper lets us use our hands and bodies to share the cognitive burden of organization, navigation, and other Active Reading tasks. As researchers have noted, "if electronic devices are to more fully support the reading activities of knowledge workers and students, they must provide similar capabilities that will enable readers to spread out, navigate through, and work with multiple documents or pages at the same time."[59] Thus, if we wish to abandon paper, or even greatly reduce its use, we must learn how to change our digital platforms, and our use of those platforms, to attain cognitive benefits that are similar to those provided by tangible media.

2.2 *What We Lose on the Digital Platform: Out of Sight, Out of Mind*

This essay is too short to analyze all of the costs of moving Active Reading to the digital platform.[60] Active readers have commented in various studies on the reasons that they may prefer paper to digital documents. A 2015 study, for example, reported that "[t]he most common reasons survey respondents gave for choosing paper over digital reading were: ease of annotation, physical comfort and tangibility, portability, ease of navigation and better comprehension. Similar findings are also reported by other research."[61]

Many active reading tasks are more difficult on the digital platform because the active reader moves from seeing a desk-full of different documents (or stacks of documents) to seeing one or at most

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56.   Hirohito Shibata et al., *Page Navigation on Paper Books and Electronic Media in Reading to Answer Questions*, OZCHI '15 PROC. OF THE ANN. MEETING OF THE AUSTRALIAN SPECIAL INT. GROUP FOR COMPUTER HUM. INTERACTION, 526-34, at 533 (Dec. 07–10, 2015), http://dl.acm.org/citation.cfm?doid=2838739.2838747.

57.   *Microscopic, supra* note 24, at 559.

58.   *Id.* at 562–63.

59.   Chen et al., *supra* note 22, at 18:2.

60.   *See generally*, Beazley, *Digital Age, supra* note 35, at 51-58.

61.   Juliane Franze et al., *Does a Split-View Aid Navigation Within Academic Documents?* DOCENG '15 PROC. OF THE 2015 ACM SYMP. ON DOCUMENT ENGINEERING, 211-14, 211 (Sept. 8-11, 2015), http://dx.doi.org/10.1145/2682571.2797093.

two screens.[62] The reader has to maintain a mental landscape with greatly-reduced physical or visual cues, and has to adapt his or her movements in the digital landscape to what the hardware and the software will allow.[63] At least three issues seem particularly significant for active readers working with digital platforms: (1) Increase in cognitive load caused by lack of context, (2) Change in ability to navigate between and among multiple documents, and (3) Change in ability to annotate.[64]

2.2.1   Loss of Context and Increase in Cognitive Load

Scientists describe the limits on our mental bandwidth by using the term "cognitive load," which refers to "the mental burden that performing a task imposes on the learner."[65] Although cognitive load is relevant to many different active reader tasks, with digital devices, cognitive load is particularly relevant as it relates to context. Any of us with a smartphone has probably observed something about cognitive load when we went to work and accidentally left our smartphone at home. At first, we may have been dismayed to be without our "right arm" or our "assistant brain." But as the day progressed, we probably felt some relief that we were freed from the FOMO,[66] the subconscious thought that we should be using the

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62. *See* Sinsheimer & Herring, *supra* note 19, at 29 (noting that two screens were used by 60% of lawyers at one of the firms studied, and by "all" attorneys who did document review at another firm).

63. *See generally* Shibata et al., supra note 56, at 532 (Noting that hard-copy navigation is easier because "the manner of interacting [with] paper books does not change throughout our lives. In contrast, different electronic book applications provide [a] different look and feel and different way[s] of handing electronic books. Therefore, it seems to be difficult to get accustomed to handling electronic books to the level that it is unconsciously performed like handling paper books.").

64. *See generally* Bianchi et al., *supra* note 20, at 699 (noting that "O'Hara and Sellen [21] suggest that design efforts should be directed towards aiding three key tasks: annotation, effortless navigation, and flexible spatial layout," and that others have identified the importance of advanced software interfaces to improve tasks such as page navigation [28], copy/paste [29], annotations [14] and information gathering") (citations indicated by bracketed numbers are omitted).

65. Pavlo D. Antonenko & Dale S. Niederhauser, *The Influence of Leads on Cognitive Load and Learning in a Hypertext Environment*, 26:2 COMPUTERS IN HUM. BEHAV. 140, 141 (2010).

66. FOMO is an acronym for "Fear Of Missing Out." One definition at UrbanDictionary.Com defines "FOMO" as "[t]he intensely annoying act of being psychologically and physically compelled to open social networking or email applications at [inappropriate] times. Significantly, the FOMO phenomena generally occurs during mid-conversation with friends and loved ones, usually resulting in the individuals involved in the conversation, that are not afflicted with FOMO, experiencing isolated incidents of intense rage." *FOMO*, Definition 4, URBAN DICTIONARY.COM, http://www.urbandictionary.com/define.php?term=fomo (last visited Sept. 11, 2016).

phone to check email, social media, or the news. Thus, when we leave our smartphones at home, we lighten our cognitive load.

Likewise, some scientists hypothesize that digital devices impose more of a burden on our cognitive load simply due to the need to pay attention to the many functions of those devices. In a study of collaborative knowledge workers who worked with both tablets and paper documents, researchers observed "difference in gaze behavior and . . . reduced speaking time of groups with tablets (almost 50% more speech with paper than with tablets)."[67] These observations led them to suggest that "digital devices capture more visual and cognitive resources, which force participants to pay less attention to each other and results in noticeably compromised collaboration."[68]

As Nicholas Carr has observed, "[t]here are many possible sources of cognitive overload, but two of the most important, according to [Australian psychologist John] Sweller, are 'extraneous problem-solving' and 'divided attention.' Those also happen to be two of the central features of the Net as an informational medium."[69] Researchers have found even short interruptions can have a "jarring" effect on our train of thought, because we are "taken out of the moment and [then] landed back in a slightly different place."[70]

It is tempting to think that as long as we are disciplined, we can avoid those "jarring" distractions, and stay focused on the task at hand. For the digital active reader, however, these interruptions—and the lack of context that accompanies them—are part and parcel of the Active Reading process. Active readers often juggle multiple documents; a study of attorney reading behaviors noted that "several of the attorneys had two computer screens and kept multiple documents open at a time."[71] Each separate document, each leap from one location to another, adds to the cognitive load in a variety of ways, requiring the active reader to find or develop the needed context.

Hard copy active readers can't avoid context, even when they are moving from one document to another to find information, answer questions, or achieve deep comprehension. They see and feel the

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67. Haber et al., *supra* note 54, at 94.

68. *Id.* at 94 (Also noting that this hypothesis is "consistent with previous research on the distribution of visual feedback in co-located collaborative environments.") (citation omitted).

69. CARR, *supra* note 34, at 125.

70. Erik M. Altmann, J. Gregory Trafton, David Z. Hambrick, *Momentary Interruptions Can Derail the Train of Thought*, 143(1) J. OF EXPERIMENTAL PSYCHOL.: GENERAL 215-26, at 225 (2014), http://psycnet.apa.org/?&fa=main.doiLanding&doi=10.1037/a0030986.

71. Sinsheimer & Herring, *supra* note 19, at 29.

documents they are moving from and to, and their bodies and brains know the reason that each document is in each physical location: the physical locations have a substantive meaning. Likewise, when reaching for a particular document and turning to (or searching for) the physical page that may contain the relevant information, the active reader often cannot help but encounter context visually, by seeing the title of the document itself, seeing other internal headings, or seeing other text within the document.

In contrast, when active readers click on a link, or jump from search term to search term in a database, they are beamed up to a new cognitive landscape, a landscape that often provides no contextual clues to the substance or organization of the information that they are reading.[72] The physical cues have been stripped away, and most digital platforms have not yet determined the best ways to replace those lost signals. When context is missing, active readers must scan the material and try to fill in the gaps, determining where they are and what they need from the document. As Nicholas Carr has noted, "juggling" between different documents imposes "switching costs" because "[e]very time we shift our attention, our brain has to reorient itself, further taxing our mental resources."[73]

Writers can use some types of software, and some writing and typographic methods, to help provide context for digital readers. For example, some software allows the writer to install bookmarks that display in outline form on the left hand side of the page, a "guide on the side" that can both ease navigation and provide context.[74] Further, writers can provide needed "text structure" by including in-text contextual cues in positions of emphasis, such as roadmap paragraph and topic sentences.[75] By using these techniques, writers can affirmatively provide the context that the digital platform tends to strip away.

2.2.2   *Impact on Navigation Ability Among Multiple Documents*

Active readers use navigation in many ways; they must navigate within documents that they are writing or reading, and they must

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72. *E.g.*, Kirsten K. Davis, *"The Reports of My Death Are Greatly Exaggerated": Reading and Writing Objective Legal Memoranda in A Mobile Computing Age*, 92 OR. L. REV. 471, 514 (2013) ("[T]he literature suggests that one of the most significant issues with on-screen reading is likely the reader's lack of context for the content that often comes with the paper text.").

73. CARR, *supra* note 34, at 133.

74. *E.g.*, Beazley, *Digital Age*, *supra* note 35, at 66.

75. *E.g.,* Davis, *supra* note 72, at 516 ("Text structures give 'form' to the text and assist readers with text navigation, critical reading, and comprehension.") (citation omitted).

navigate among various documents that they are using to support reading, decision-making, or other kinds of knowledge work. Franze and her co-authors have observed that "intra-document navigation . . . is of particular importance in academic reading [because] documents are most often read non-linearly with readers jumping back and forth to find particular information or figures."[76]

Some researchers identify as crucial the ability to place-hold while navigating; just as television watchers use a "last" button when they are channel-surfing, Active readers can benefit by being able to "return to start" after rummaging through one or more digital documents. Shibata and his co-authors argue that "a system to support page navigation should allow one to easily return to the start position of a series of page navigation."[77] They designed two experiments; one allowed participants to return to the table of contents easily, while the other let them return to the page on which they started their navigation.[78] This kind of design, the researchers argue, allows "bold and flexible navigation."[79]

Lack of easy navigation is one of the major complaints that active readers have about the switch to the digital platform. Judges have complained to me about this problem, and researchers note that "experiments quantitatively show that readers are able to read from paper more efficiently than from electronic media," and that they both move pages and whole documents as they navigate.[80] Likewise, Nicholas Carr has observed that digital navigation often has cognitive costs, because "[e]valuating links and navigating a path through them . . . involves mentally demanding problem-solving tasks that are extraneous to the act of reading itself."[81]

Chen and his co-authors have concluded that on "[e]xisting electronic reading devices, . . . [m]anaging, locating, and navigating between documents are all poorly supported."[82] Participants in their multi-tablet study commented that "navigating with [a space-filling

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76. Franze et al., *supra* note 61, at 211 (citations omitted).
77. Shibata et al., *supra* note 56, at 532.
78. *Id.*
79. *Id.; see also* Franze et al., *supra* note 61, at 211 (Referencing the development of "a split-view based hyperlink navigation model in which the reader has both a primary reading view of the document and a contextual view beside it. When a hyperlink is activated in the reading view the referenced element will be shown in the contextual view. There is no need for additional user interaction to return to the original reading position [because] the reading view remains visible while allowing a side-by-side examination of the two parts of the document.").
80. *Microscopic, supra* note 24, at 559 (citation omitted).
81. CARR, *supra* note 34, at 126.
82. Chen et al., *supra* note 22, at 18:29.

thumbnail] was bearable but that for their writing and review activities, they frequently needed to consult disparate information found in the other chapters, and it was simply easier to perform that type of navigation with the paper book."[83] The researchers concluded that a good digital reading system would support "not only . . . rapid non-sequential navigation within a single document, but also . . . quick access across different documents."[84]

Spatial relationships seem to be particularly significant in relationship to navigation. With hard copy knowledge work, active readers can stand over the books and other documents they are using, and that they have placed in particular locations. This process provides them with a true "over view," a physical map that translates into a mental map. The mapping process not only helps active readers to find relevant information; it also seems to help them use that information by allowing them to create an organizational system that relates to the physical layout.[85]

Designers who are trying to support navigation observe that readers use navigational tools for "moving between pages, storing content and providing overviews."[86] Researchers who used a thumbnail method to provide mapping reported that every participant but one "mentioned that navigation would be very useful for working with multiple documents or locations in tasks such as writing papers, comparing articles, and browsing lecture notes."[87] Similarly, Professor Ellie Margolis advocates for greater use of the "bookmarks bar," a "guide on the side" that is useful to the reader "both for understanding the overall structure and for navigating to particular sections."[88] As noted above, this technique enhances both context and navigation.

Tellingly, study participants "favored rapid access to document overviews that would enable them to quickly jump to specific pages to support skimming style reading. They also reported a desire to mark or store particular pages for later reference, such as during subsequent viewing for clarifying or discussing content."[89] These attitudes show that "word search" ability in digital documents does not compensate for the ease of physical navigation that is lost in the digital platform; active readers sometimes need to look at the whole before they can decide which parts they are interested in.

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83. *Id.* at 18:12.
84. *Id.*
85. *See id.* at 18:2, 18:12, 18:29.
86. Bianchi et al., *supra* note 20, at 703.
87. Chen et al., *supra* note 22, at 18:25.
88. Margolis, *supra* note 13, at 20.
89. Bianchi et al., *supra* note 20, at 702.

Further, we should not presume that "digital natives" will be better able to use single-screen, non-paper documents. In studying how collaborative groups used both paper and digital documents, researchers observed that active readers liked using physical arrangement of various paper documents to symbolize the structure of their documents, and that they "seemed to more easily recognize their ability to do this with paper documents than with tablets."[90] The researchers speculated that the participants were hindered by the "physical constraints" of the digital platform, even though participants had access to multiple tablets that they could use simultaneously.[91]

The first wave of the digital revolution focused mainly on moving text onto digital platforms. As will be discussed further below, future enhancements to digital reading should focus on ways that hardware and software can replicate the navigational benefits inherent in tangible media.

2.2.3   Impact on Annotations and Use of Annotations

Annotation is one of the "essential processes" of Active Reading.[92] Active readers value annotations as a way of "[m]arking (for subsequent viewing) the perceived relevance and importance of particular content" and as a task that is "vital" for "achieving deep comprehension."[93]

Researchers have observed that "[a]nnotating and extracting activities relate to creating and linking notes to content and capturing or retrieving content for subsequent (potentially external) sharing or use."[94] Active readers create annotations in a variety of ways and use them for a variety of purposes:

Users valued annotations for all three of the reading processes we identified. During skimming, notes serve as quick reminders. During understanding readings, notes link to and are used to clarify

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90.   Haber et al., *supra* note 54, at 93.
91.   *Id.*
92.   Fabrice Matulic & Moira C. Norrie, *Supporting Active Reading on Pen and Touch-Operated Tabletops*, AVI '12: PROC. OF THE INT'L WORKING CONFERENCE ON ADVANCED VISUAL INTERFACES 612–19, 612 (May 21–25, 2012) [hereinafter Matulic & Norrie] (These authors also mentioned as essential "smooth navigation" and "rapid searching."); *see also, e.g.*, Bianchi et al., *supra* note 20, at 699 (Describing Active Reading as encompassing "a broad set of cognitive skills and activities, such as thinking, learning, note taking, annotations, searching and skimming, that enable an individual to achieve a deep level of comprehension of a document.").
93.   Bianchi et al., *supra* note 20, at 702.
94.   *Id.*

content. In discussion readings, notes are collated, sorted, categorized and potentially shared with others. Users also identified two broadly different classes of notes—those that refer to particular content specifically (and typically are written directly over that content) and over-arching comments that refer to a document in a general sense, rather than any specific point, region or section (a distinction previously characterized as inter-page versus intra-page annotations).[95]

Knowledge work is about defining and solving problems by "processing existing information to create new information,"[96] and annotation is a vital part of that process. Annotation is how active readers move from the reading process to the writing process. By noting reactions to and relationships between the documents they read, active readers begin to make meaning and generate knowledge. Ease of annotation, therefore, is crucial.

Active readers have expressed concerns about adapting note-taking to the digital platform. In a study of collaborative work, participants complained that when using the tablet, they wished for a "separate [physical] sheet of paper (tablet) to write notes as you are reading."[97] Participants made these complaints even though the users were sophisticated users of technology and even though "such concurrent usage and separate note taking was possible by way of using multiple digital tablets simultaneously."[98] In other words, while some useful technology is currently available, it is too complicated or demanding to effectively replace physical annotation.

In one study, active readers were concerned that "notes might obscure the original content, making it hard to view or access" that content.[99] This concern would seem to be most significant in reference to writing notes "directly linked to (and typically written over) specific portions of text in the document."[100] In another study, participants expressed concern about callout notes that "occluded the main text," and appreciated software and devices that "[showed] all of the notes at once on the second screen[, which] made it easy to find pertinent notes."[101]

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95. *Id.* (citation omitted).

96. Jason Coomer, Willie Buehler, Bob Binder, *The Attorney As Knowledge Worker*, 68 TEX. B.J. 794, 794 (2005) (citation omitted) (also noting that "[k]nowledge workers include lawyers, doctors, diplomats, lawmakers, software developers, managers, and bankers").

97. Haber, et al., *supra* note 54, at 94.

98. *Id.*

99. Bianchi et al., *supra* note 20 at 702.

100. *Id.* at 705.

101. Chen et al., *supra* note 22, at 18:25.

Active readers also found it important to be able to edit, sort, delete and re-order their notes.[102] Finally, perhaps as a result of experiences taking notes on paper, participants were "very positive" about using a stylus, which allowed them to integrate content such as "drawings, expressions (e.g. exclamation marks, emoticons) and spatial information (e.g. arrows)."[103] Other researchers have observed that the lack of "free-form ink annotation capabilities" in some types of e-books "severely limited students' abilities to read responsively," i.e., to take notes while reading.[104]

Digital platforms allow writers to type annotations that can usually be created more quickly and legibly than hand-written ones. Software that allows isolated searching of annotations could enhance reorganization and revision of annotation. It remains to be seen, however, whether new software and hardware can compensate for some of the limits that the digital platform places on annotations.

3.   THE FUTURE OF THE DIGITAL BRIEF

Changes in the digital reading behaviors that will be crucial to appellate advocacy will likely proceed down at least two paths. One path is technology-related: scientists must design hardware and software that will promote the engagement of active readers with the text. This path is, in some ways, external to legal practice. One would hope, of course, that scientists will benefit from interactions with and scholarship by lawyers, judges, and law faculty (especially those faculty who study legal communication). But the second driver of change, of course, is the human driver: the judges and practitioners who work in and before appellate courts. To direct the future of how appellate knowledge workers and active readers write and read digital cases, statutes, and briefs, judges and practitioners must decide how to change the way they present the written word. While lawyers and judges have been famously resistant to change,[105] this is a time to abandon typewriter-era rules and practices and to adopt procedures that are appropriate for the twenty-first century.

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102.   Bianchi et al., *supra* note 20 at 702.
103.   *Id.*
104.   Chen et al., *supra* note 22, at 18:5.
105.   *E.g.,* Margolis, *supra* note 13, at 2 ("[It is no surprise that the legal profession's reaction to change has mirrored the reaction of society at large. Change is hard, and with every new technology, there has been resistance."); *see also* Randy L. Dryer, *Litigation, Technology & Ethics: Teaching Old Dogs New Tricks or Legal Luddites Are No Longer Welcome in Utah*, UTAH B.J., May/June 2015, at 12 (describing the judicial system as "historically resistant to rapid change," and the legal profession as "notoriously technophobic").

3.1 In the Pipeline: Software and Hardware to Look for

As noted above, many researchers are now working to understand "the operability of paper [because it] is a key determinant of reading performance," and because it is therefore relevant to the design of digital reading devices.[106] Scientists are learning that "physical aspects of the reading experience—the multiple surfaces available and the hand manipulations that can be performed—are important, valuable and worth conserving in the digital domain."[107]

The physical domain is rich in feedback: tactile, auditory, visual, and even olfactory. The digital platform, however, gives most or all of its feedback visually. Many of us have likely had the experience of accidentally changing pages on a digital document, with perhaps dozens of pages zooming by while we looked away. As researchers recognize, visual aids are often the main or only way that digital platforms provide navigation feedback, and they are seeking to add "tactile or auditory feedback in electronic page turning" as is available in paper books.[108] This type of feedback would lessen our cognitive load because it would allow us to turn pages without using our vision, and to recognize (through touch or sound) when we have turned pages by mistake.[109]

Further, software that provides more visual cues can promote reader comprehension by creating opportunities for more neuro-spatial relationships between readers and their texts. Even now, some documents allow writers to embed linked tables of contents in their documents, and allow readers to display that linked table of contents as a "guide on the side" as they read. Scientists are studying various ways in which text display—and display of outlines and other navigation tools—can promote reader comprehension.

As the previous paragraphs indicate, scientists have made some crucial observations about important features of the relationship between knowledge workers and paper. Touching and physical manipulation of documents are related in some way to cognitive processing; when we place documents in a certain physical location, we often assign cognitive meaning (consciously or unconsciously) to its placement in relationship to us or to other documents.[110] The ability

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106. *Microscopic, supra* note 24, at 559.
107. Bianchi et al., *supra* note 20, at 700.
108. Shibata et al., *supra* note 56, at 532.
109. *Id.*
110. *E.g.*, Chen et al., *supra* note 22, at 18:2. (Noting that when "content is distributed across several sheets of paper, . . . [the papers] can be picked up, laid out, and rearranged effortlessly[,]" and that "[t]hese operations provide organizational and cognitive benefits." (citing O'Hara et al., *Understanding the Materiality of Writing From Multiple Sources*, 56 INT'L. J. HUM.-COMPUTER STUD. 269 (2002)).

to have various types of overviews—to see several different pages of one document or of several documents at once—helps us both to navigate and to understand relationships between and among the ideas we are working on.[111]

Currently, most digital readers use one or more of four types of digital devices: desktops, laptops, tablets, and smartphones. Scientists are studying the ways that people use each of these devices, alone and in concert. Further, they are studying the ways in which active readers might use new variations of current devices, or new devices entirely. Two hardware studies illustrate (but do not encompass) the breadth of current exploration. In one study, researchers gave each study participant a set of thin, lightweight, "moderately sized but highly portable slate devices."[112] In the other, investigators explored the use of "pen-and-touch operated tabletops for performing essential processes of [Active Reading] such as annotating, smooth navigation and rapid searching."[113] The descriptions below are not meant to promote or endorse either of these systems, but merely to indicate the existence of a wealth of possibilities for active readers.

3.1.1   Multiple Slates

As part of a study whose results were published in 2012, researchers analyzed how active readers interacted with reading materials when they were given multiple slates to work with. The researchers were inspired by the "diverse" behaviors of active readers, including "linear reading, skimming, annotating, interleaving reading and writing, and switching between documents that are used simultaneously."[114] A goal of the devices, designed to "more fully support the reading activities of knowledge workers and students," was to "enable readers to spread out, navigate through, and work with multiple documents or pages at the same time."[115]

The system is designed to allow active readers to switch rapidly between pages and across documents, and allow "quick side-by-side comparison of documents," cross-device operations, portability, and

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111.   Overviews help navigation and other active reading behaviors. *E.g.*, Bianchi et al., *supra* note 20, at 702 (in one study, users "favored rapid access to document overviews that would enable them to quickly jump to specific pages to support skimming style reading."); Chen et al., *supra* note 22, at 18:25 ("Every participant except for P8 mentioned that overview navigation would be very useful for working with multiple documents or locations in tasks such as writing papers, comparing articles, and browsing lecture notes.").
112.   Chen et al., *supra* note 22, at 18:2.
113.   Matulic & Norrie, *supra* note 92, at 612.
114.   Chen et al., *supra* note 22, at 18:1.
115.   *Id.* at 18:2.

"federation with other electronic devices, such as PCs."[116] Many attorneys use two screens, and many more have probably opened a tablet, laptop, or smartphone to use in conjunction with a desktop. The goal of hardware like this system is to "[have] more displays available," to allow "new functionality [to] be gained from the electronic connectivity between devices[,]" and to "[lower] the barriers of working in a multi-device environment."[117]

The illustration below, from Chen et al., shows several ways that a multi-slate system could support active readers at both the page level and the document level, and in tasks as diverse as skimming or reviewing text and adding annotations:

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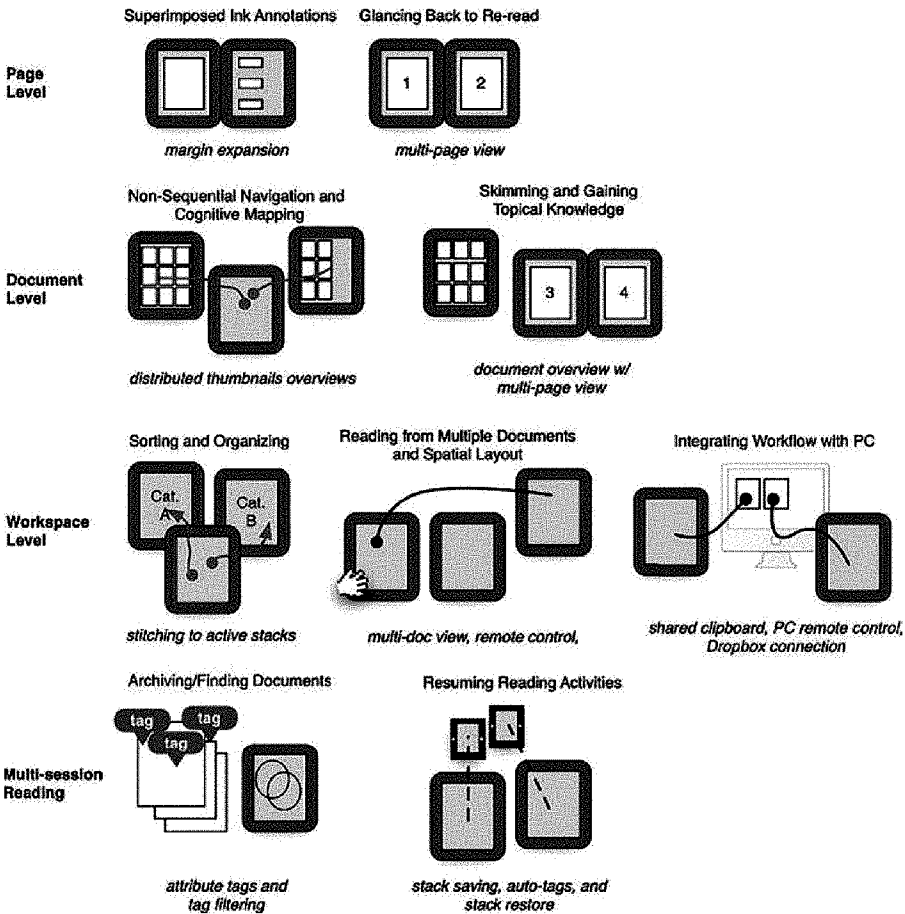
116.   *Id.* at 18:3.
117.   *Id.*

By studying mental and physical behaviors with multiple slates, researchers hope to learn how to design "more interactive displays [that could] translate to more visualization possibilities for improving users' cognitive awareness of the state of the document, stack, or reading environment."[118] Notably, the authors of the study did not see the multi-slate hardware as a substitute for the personal computer. The participants indicated that they preferred to use the PC for concentrated writing tasks, but they "expressed great enthusiasm about the ability to copy and paste between the slates and the PC."[119]

Thus, lawyers might soon be able to replace stacks of papers and print-outs with a simpler, neater, stack of slates. We don't yet know, of course, how this change in writing and reading tools might result in a change in thinking.

3.1.2   Digital Desk

While mobility and portability are major benefits of digital devices, some researchers are exploring how to use a very non-portable digital desktop as a way for active readers to display multiple documents or stacks of documents at once.[120] This option would allow digital readers to mimic sorting and stacking behaviors that use physical organization to help mental organization and processing.

This illustration from Matulic and Norrie shows how a user can change from a two-page display to a multi-page display, a functionality that significantly expands the typical two-screen view of the knowledge worker.

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118. *Id.* at 18:31.
119. *Id.* at 18:30.
120. Matulic & Norrie, *supra* note 92.
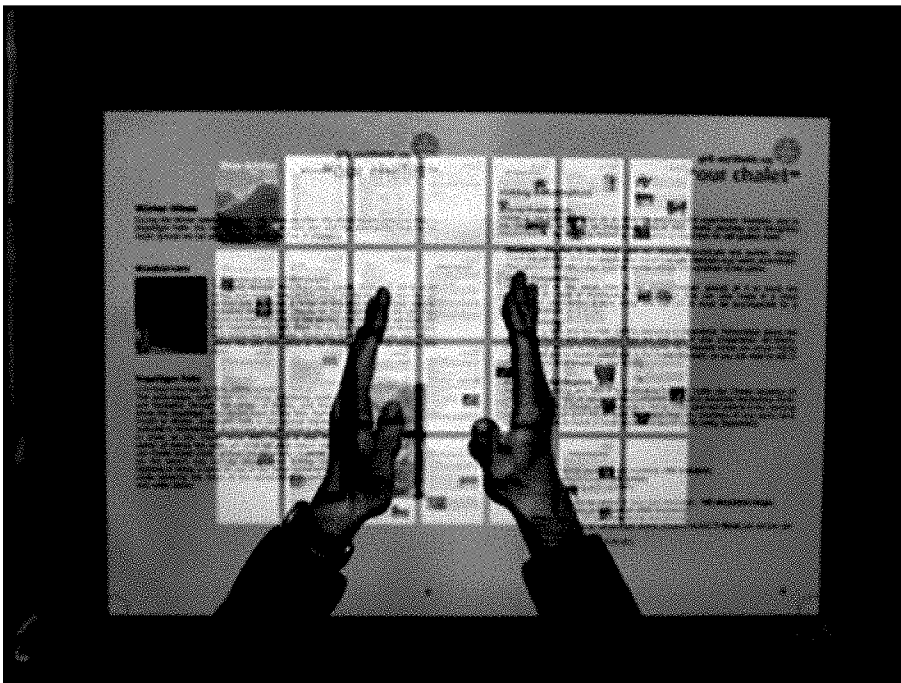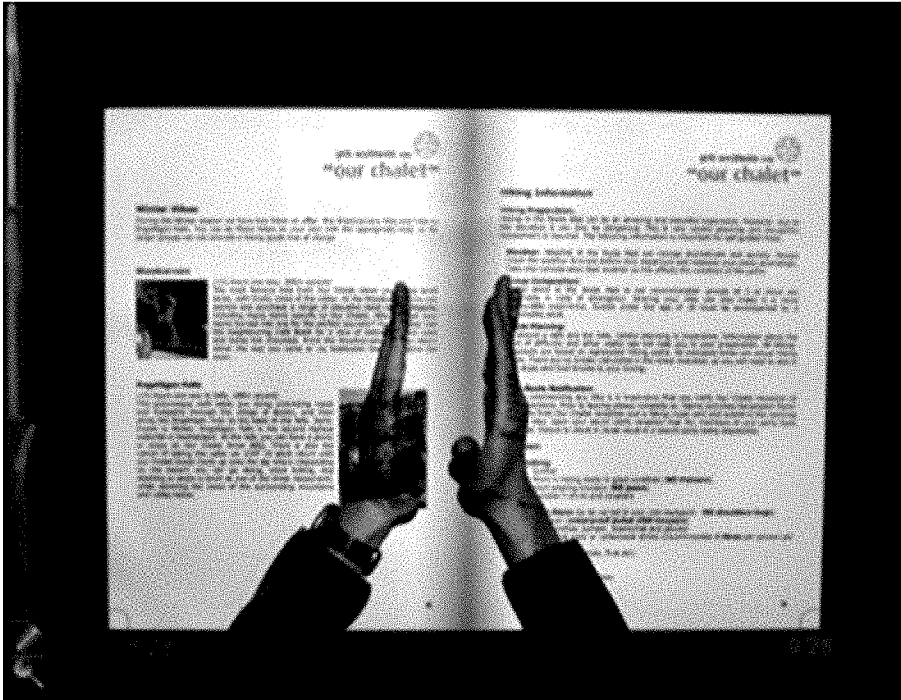
The researchers developed the tabletop prototype as a "first at-
tempt to sound out the potential of interactive pen and touch tab-
letops."[121] The application was designed to allow a variety of pen
and touch interactions, including touch and drag and use of a stylus
to write in search terms.[122] The designers explain that these inter-
actions bring several advantages that can be extended to other doc-
ument-centric scenarios. Although there is still "much work to be
done to further the cause of digital tabletops as virtual work desks,"
designers have now identified some of the functions that users like
and do not like, use and do not use, in tabletop devices.[123]

Thus, we may someday be using a virtual desktop screen to stack
and sort documents in the same way that hard-copy researchers
have stacked books and papers on their physical desktops or their
office floors.

3.2 Changing the Written and Unwritten Rules

The paths for change described in the previous section rely on
scientists or computer experts. Another path relies on judges, at-
torneys, and other legal writers to make the changes. Currently,
lawyers as writers are still too wedded to typewriter-based design
features, disregarding both advances in software and in scientific
knowledge about how readers read. As Ellie Margolis and others
have noted, we still write memos and briefs with the same format-
ting that we were using in the 1950's.[124] We still use one-inch mar-
gins and only one column of text. Most courts still require double-
spacing, and many still require all caps text for headings, even
though science tells us that double-spaced text is usually harder to
read,[125] and that all-caps text always is.[126] We insist on citing to
pages in books that most writers never look at, ignoring the para-
graphs that are stable across all media.[127] We hesitate to violate

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121. *Id.* at 618.
122. *Id.* at 615.
123. *Id.* at 619.
124. Margolis, *supra* note 13, at 14 ("The format of the research memorandum is based on
the capabilities of the typewriter.") (citing MATTHEW BUTTERICK, TYPOGRAPHY FOR LAWYERS
180 (2010)).
125. BUTTERICK, *supra* note 13, at 140.
126. Beazley, *Plain Sight*, *supra* note 11, at 32-33 (explaining why all-caps text is more
difficult to read).
127. Margolis, *supra* note 13, at 32. Of course, some jurisdictions, like Ohio, do require
citation to paragraphs rather than pages. Ohio's Supreme Court Writing Manual provides
that, for cases published after May 1, 2002, "Paragraph numbers, not page numbers, are used
to pinpoint text." THE SUPREME COURT OF OHIO, WRITING MANUAL: A GUIDE TO CITATIONS,
STYLE, AND JUDICIAL OPINION WRITING pt. I, § 1.1(C), at 13 (2d ed. 2013), https://www.su-
premecourt.ohio.gov/ROD/manual.pdf.

outdated mores, and we remain fearful of diagrams, pictures, and videos, even though modern technology would allow all to be inserted in digital documents.[128]

When making writing decisions, we must consult not only past practices, but also current knowledge of modern writing technology and of the needs and capabilities of active readers.

Active readers are frequently focused on two main tasks: *finding* the information they are looking for, and understanding that information in its proper *context*. Writers must write their documents to include and highlight the appropriate substance; they must design and format their documents to highlight context, making it easier for active readers to find and comprehend that substance.

As noted above, active readers are readers with an agenda. They need to find particular information, an answer to a particular question, or support for a particular point. Broadly speaking, they may encounter this information in a variety of ways. First, active readers may read the document, or sections of the document, in a linear way, sampling various sentences and paragraphs to see if they include the needed information. Second, they may pop into a document after clicking on a link, or they may hop around within a document, looking at various uses of key terms that are the focus of a search. To meet the needs of any reader, writers must always consider what they say; for active readers, however, writers must also consider how they format their writing—that is, they must consider where they say it and how they use the space around it.

As Kirsten Davis has observed, traditional text structures such as headings, topic sentences, and roadmap paragraphs can be useful to both digital and hard copy readers.[129] When these items are effectively written, they provide targets for the active reader who is foraging through the document in a somewhat linear way. Fortuitously, they also provide context for the linear readers and for readers who have been dropped into the middle of a new document (or a new location in a current document) by a hyperlink or a keyword search. The white space that surrounds the heading and that precedes the topic sentence makes that language easy for both linear

128.   Steve Johansen & Ruth Anne Robbins, ART-ICULATING THE ANALYSIS: SYSTEMIZING THE DECISION TO USE VISUALS AS LEGAL REASONING, 20 J. Leg. Writ. 54, 62 (2016) ("Anyone with a basic understanding of Word or a similar word processing program can incorporate visuals into a document").
129.   Davis, *supra* note 72, at 514-15; *see also* Beazley, *Digital Age*, *supra* note 35, at 66-67.

and non-linear readers to see; when they are well-written, they pro-
vide context that speeds the comprehension of the relevant section
or paragraph.

Thus, headings, topic sentences, and roadmap paragraphs pro-
vide useful structural cues for active readers, provided we write and
format them effectively. Structural cues are written effectively
when they include key terms (such as the language at issue in a
rule) and when they signal connections to those key terms and to
the overall thesis of the paragraph, section, or document.[130] In this
way, these items provide needed context to active readers, answer-
ing their common questions: "Does this paragraph, section, or doc-
ument address my agenda? Is it worth reading? Does it include
relevant information?" Readers need to answer these questions
easily so they can accurately decide whether to continue reading a
given section or paragraph.

Writers format structural cues effectively by making those cues
easy for active readers to see or to find by (1) placing structure cues
where readers expect to find them; and (2) "cushioning" structural
cues on one or both sides with appropriate white space.

These formatting requirements are relatively easy to meet when
writing headings and topic sentences. Headings should be num-
bered, should appear in bold-faced type, and should be separated
from surrounding text by white space. Topic sentences should al-
ways be the first sentence of a paragraph, because active readers
expect the first sentence of the paragraph to highlight the para-
graph's thesis: readers often use the first sentence to decide
whether or not they are going to read the rest of the paragraph.
Writers can make topic sentences easy to find by single-spacing par-
agraphs, and double-spacing between paragraphs. If all para-
graphs are double-spaced, with no added spacing between para-
graphs, the only white space available is an indentation, and forag-
ing active readers may find it hard to locate the topic sentences. If
paragraphs are single-spaced, then double-spacing and indenta-
tions make topic sentences easy to find because they will always
have a cushion of white space above them.

Roadmap paragraphs present a slightly different challenge. Tra-
ditionally, roadmap paragraphs have appeared at the beginning of
a document that includes multiple sections, or at the beginning of a
section that includes multiple sub-sections.[131] They often follow one

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130.   *E.g.*, Beazley, *Digital Age*, *supra* note 35, at 70 (describing use of key terms in topic
sentences).
131.   *E.g.*, MARY BETH BEAZLEY, A PRACTICAL GUIDE TO APPELLATE ADVOCACY 239-40 (dis-
cussing placement of roadmap paragraphs).

or more paragraphs of introductory material that provide needed factual or legal context. The best roadmap paragraphs number the items in the roadmap to provide explicit signals to the reader. To make those signals easier to see when we write for active readers, writers should consider separating, or "breaking out," the enumerated items to provide more white space and thus make the roadmap easier for an active reader to find.

A roadmap that is not broken out and that uses textual enumeration of a list may be substantively valid, and it will be useful for a linear reader, as in this example from an appellate brief:

Roadmap A:

Public policy favors liberal disclosure of documents related to [Nutrient Management Plans] NMPs. First, the citizens of Maryland have a strong interest in transparency regarding regulatory compliance and the disbursement of government funds. Second, extending the Statute to include the universe of NMP-related documents beyond the summaries maintained by MDA for three years or less requires a massive expenditure of state resources to provide any public access to nutrient management information. Third, expanding the scope of the Statute contradicts other statutes that allow public access to information regarding NMPs and water pollution control.[132]

That same paragraph, however, will be much more visible to an active reader if the roadmap is broken out, with enumeration and white space:

Roadmap B:

Public policy favors liberal disclosure of documents related to [Nutrient Management Plans] NMPs for three reasons:

(1) The citizens of Maryland have a strong interest in transparency regarding regulatory compliance and the disbursement of government funds.

(2) Extending the Statute to include the universe of NMP-related documents beyond the summaries maintained by

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132. Brief of Appellants, Waterkeeper Alliance, Inc. v. Md. Dept. of Agriculture, 65 A.3d 708 (2013) (No. 01289), 2012 WL 2153756 (Md. App.).

MDA for three years or less requires a massive expendi-
ture of state resources to provide any public access to nu-
trient management information.

(3) Third, expanding the scope of the Statute contradicts
other statutes that allow public access to information re-
garding NMPs and water pollution control.

An active reader who is foraging through the text, looking for par-
ticular content, will be much more likely to notice and review
Roadmap B than Roadmap A.

In addition to writing and highlighting structural cues, writers
must use software that best promotes active reading, and they must
be sure to use that software to its best effect. Some software, for
example, allows writers to insert bookmarks at each heading, and
then to display the resulting de facto outline on the left side of the
screen, as a "guide on the side."[133] Unfortunately, many legal writ-
ers don't take advantage of this software: it requires the writer to
insert or tag bookmarks, and many writers do not bother. As a re-
sult, their documents are not as helpful as they could or should
be.[134]

Writers and software designers should also consider whether
other uses of software or formatting could better accommodate ac-
tive readers. For example, perhaps writers could create an abbre-
viated "running heading" that would appear at the top of each page
in the brief, the way chapter titles do in books, or article titles in
law reviews. Imagine a reader, dropped into a new paragraph of a
new document, who sees a bold-faced heading at the top of the
screen that reads, e.g., "**3.1: Expanding the Scope of the Statute
Thwarts Government Transparency.**" This heading would tell
newly-arrived readers that they are reading portions of the first
subsection of the third major section of the document, and it would
signal the substance of that section as well. The combination of sci-
entific numbering and a running head therefore provides meaning-
ful organizational and substantive context to linear and active read-
ers alike.

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133. Currently, this outline is displayed only if the reader "asks" for it by clicking on the
appropriate icon. Brief-writers can facilitate the display of the outline by saving, closing, and
filing their briefs with bookmarks on display. Likewise, courts can facilitate the use of book-
marks by requiring writers to bookmark all headings.

134. *E.g.*, Margolis, *supra* note 13, at 20 (Noting that "[bookmarking] has not been widely
adopted throughout the legal profession and is not being taught in legal writing courses."").
My own experience supports this observation.

Of course, writers can use other formatting techniques to improve the comprehension of active readers. Writers should consider using bulleted lists, boxes, or other graphic devices to make information more visually accessible. Steve Johansen and Ruth Anne Robbins, for example, ask writers to consider using a variety of visual devices, including *Organizational Visuals*, *Interpretive Visuals*, and *Representative Visuals*.[135] These devices do not necessarily replace text, but they can increase understanding by connecting content to different parts of the brain[136] or "orient the reader and reinforce the structure of the discussion."[137]

Many graphic devices create a beneficial cushion of white space, but there are other ways to bring more white space into the document and to make it easier for active readers to find crucial information. For example, judges and lawyers are needlessly wedded to the one-inch margin. Many graphic experts recommend leaving a wide left or right-hand margin.[138] Doing so would allow space for notes and pop-ups that would not obscure the text; it would also shorten the number of characters-per-line, which would also help comprehension.[139]

These and other techniques are relatively simple, but they will require courts and writers to overcome the "weight of tradition."[140] Attorneys will be hesitant to embrace change when judges have not yet done so. Courts can take the first step by setting up committees to review current research and recommend changes in rules and practices. Some easy rule changes would require attorneys and courts to do the following:

> (1) **Require scientific numbering**. Most briefs use a roman numbering system, moving from Roman numerals to Roman letters to Arabic numerals. When beginning a sub-section, writers traditionally use only the most narrow designator (e.g., **"C."**). This method does little to provide context for active

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135.   Johansen and Robbins, *supra* note 128, at 67.

136.   *Id.* at 60, n. 6 ("Visuals aid in our recollection: much of our sensory cortex is devoted to image processing, whereas a much smaller portion of our brain processes words").

137.   *Id.* at 99.

138.   THE OFFICE OF INVESTOR EDUCATION AND ASSISTANCE, U.S. SECURITIES AND EXCHANGE COMMISSION, A PLAIN ENGLISH HANDBOOK: HOW TO CREATE CLEAR SEC DISCLOSURE DOCUMENTS 44 (1998), https://www.sec.gov/pdf/handbook.pdf (noting that "designers think carefully about white space" and that a "wide left or right margin can make the document easier to read").

139.   OFFICE OF INVESTOR EDUCATION & ASSISTANCE, *supra* note 138, at 47 ("A comfortable line length for most readers is 32 to 64 characters.").

140.   Margolis, *supra* note 13, at 16–17 (noting that courts have not "comprehensively addressed typography issues," although court rules in some jurisdictions may impose limits on typography choices).

readers who are dropped into the middle of a document. A better rule would require scientific numbering (e.g., **"2.3"**); an acceptable rule would require the writer to include the relevant "chain" of numbers with each heading (e.g., **"II.C."**).

(2) **Require pagination that includes the total number of pages.** Most commonly-used software programs would allow page numbers to say, e.g., "Page 30 of 33" with very little effort.

(3) **Require numbered paragraphs; in court opinions, use the paragraph numbers to indicate non-majority opinions.** Ohio's state court opinions, among others, now include paragraph numbers before every paragraph, and its formal citation rules require citations to those paragraphs. All courts should adopt this practice, and should go one step farther: any paragraph that is part of a non-majority opinion should be indicated by a paragraph number that includes an appropriate letter designation, such as "C" for Concurrence, "D" for Dissent, and "P" for Plurality. For example, if the last paragraph of the majority opinion is designated as {¶ 24}, the first paragraph of the concurrence could be either {¶ 25C} or {¶ 1C}. If a court opinion is a plurality, all paragraphs would be numbered to so indicate: {¶ 3P}. In this way, active readers who are dropped into a paragraph of a non-majority opinion would recognize that fact immediately.

(4) **Impose character limits rather than page limits or word limits.** Many courts have already recognized that page limits lead some writers to use font sizes and other techniques to maximize the amount of text that appears on every page. Character limits would encourage the use of white space while respecting limits on court time and energy.

Like digital designers, legal writers need to understand how readers behave, because that knowledge can help them to design their briefs and other documents to have maximum impact. Legal writers also need to understand and exploit the capabilities of available software. Courts should consider adopting the many recommendations that legal writing scholars and others have made about content, organization, and document design. And, as scientists learn more about how readers are adapting to new digital platforms, those recommendations will have to change as well.

4.   CONCLUSION

The future of appellate advocacy is tied intimately to active read-
ing and knowledge work. Judges and attorneys engage in active
reading when they write court opinions and briefs, as do those who
read and use those documents. Thus, it is important for appellate
advocates to be mindful of active reader behaviors and, more im-
portantly, of how modern reading and writing technology affect
those behaviors. Finally, judges and court administrators must rec-
ognize how their policies and procedures may encourage or discour-
age lawyers who want to use reader-friendly typography and docu-
ment design.

In addition, those of us who engage in active reading as we create
legal documents should strive to be aware of our own cognitive lim-
itations. We must remember that when we multi-task at the soccer
game by using our smartphones to read briefs or cases, we do more
than cut into our family time; we may also be hurting our efficiency
and our effectiveness. We now know that the distractions and de-
sign of platforms can interfere with reader comprehension. Next,
we need to find out how it may affect clarity and depth of thought.

As active readers, we have welcomed the mobility and 24/7 access
provided by our digital devices. Recent advances in technology,
however—like multiple slates and desk-sized screens—indicate
that our writing and our thinking may benefit from spending more
limited working hours in an up-to-date, permanent workspace. As
knowledge workers, we must recognize that it is more important to
promote deep thinking and mental engagement than it is to be able
to work anywhere at anytime. While some types of work can be
conducted out of the office, other more mentally demanding tasks
may best be conducted at a work-like setting that has sufficient
physical space; we now know that physical space enhances mental
space and allows us to accomplish that work effectively.

Thus, even as we write for readers who may be reading carelessly,
we must conduct our own active reading with care to promote our
own comprehension and the effective analysis of the rule of law.