SCREEN TIME LIMITS: RECONSIDERING PRESENTATION SOFTWARE FOR THE LAW SCHOOL CLASSROOM

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I. Introduction

PowerPoint is ubiquitous. If anything, it is now ubiquitous even to say that PowerPoint is ubiquitous.[1] Gone are the days when law professors "engaged only modestly" with PowerPoint.[2] PowerPoint now seems to be the default for many professors in law school classrooms and conferences. The problem is that we are not using PowerPoint well. We have fallen into a common PowerPoint trap: the

[1] At least as early as 2003, legal scholarship was already describing PowerPoint as "ubiquitous." *See* Paul Wangerin, *Technology in the Service of Tradition: Electronic Lectures and Live-Class Teaching*, 53 J. LEGAL EDUC. 213, 220 (2003). The term continues to be a popular adjective for PowerPoint. *See, e.g.*, Irina D. Manta & David S. Olson, *Hello Barbie: First They Will Monitor You, Then They Will Discriminate Against You. Perfectly.*, 67 ALA. L. REV. 135, 168 n.180 (2015); Diane Murley, *Technology for Everyone: Making Presentations Visual*, 99 LAW LIBR. J. 451, 451 (2007); Ammar H. Safar, *Educating with Prezi: A New Presentation Paradigm for Teaching, Learning, and Leading in the Digital Age*, 49 C. STUDENT J. 491, 491 (2015); Laurie E. Gries & Collin Gifford Brooke, *An Inconvenient Tool: Rethinking the Role of Slideware in the Writing Classroom*, COMPOSITION STUD., Spring 2010, at 11, 11; Russell Davies, *29 Reasons to Love PowerPoint*, WIRED, (May 26, 2016), http://www.wired.co.uk/article/powerpoint-birthday-defence.

[2] Deborah J. Merritt, *Legal Education in the Age of Cognitive Science and Advanced Classroom Technology*, 14 B.U. J. SCI. & TECH. L. 39, 40 (2008).

dull, bullet-point-laden, text-heavy presentation style that is the subject of comics,[3] mockery, and derision.[4] This style may be common, but cognitive science and empirical research indicate that it does not support—and even interferes with—learning.[5]

The problem is that PowerPoint was designed for sales pitches in a business setting.[6] Law professors have taken that program (and other similar visual presentation software programs) and are using it in classrooms and conferences with little change from the defaults set by the programmers. Those defaults may help sell products,[7] but they do not help foster the critical, analytical thinking necessary for learning in law school.

This Article does not argue in favor of eliminating PowerPoint and other presentation software from the classroom altogether. Such software has its strengths, and it certainly has a place in the classroom. Rather, this Article argues that its use should be drastically reduced: instead of being the primary teaching tool in the classroom, PowerPoint should be a visual aid used purposefully and even sparingly.

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[3] Dilbert is one comic that is well known for its criticism of PowerPoint culture. *See, e.g.*, Carmine Gallo, *How to Turn 'Death by PowerPoint' into a Career Advantage*, FORBES (Nov. 22, 2013, 11:29 AM), https://www.forbes.com/sites/carminegallo/2013/11/22/how-to-turn-death-by-powerpoint-into-a-career-advantage/ (describing the author's favorite Dilbert comic as one that involves someone "dropping dead of 'PowerPoint poisoning'" after a 397-slide PowerPoint).

[4] *See, e.g.*, Sean Carter, *Up Against the Wall, PowerPoint!: A Personal Crusade Against Slide-Show Stupor*, 4 NO. 21 ABA J. E-REPORT 7 (May 27, 2005) ("I will put an end to PowerPoint if it's the last thing I do. Just like Dr. King, I too have a dream; a dream deeply rooted in the CLE attendee's dream. I dream of a world where presenters will be judged not by the number of their PowerPoint slides, but for the content of their presentations. I dream of a world where plaintiffs lawyers and defense lawyers, legal practitioners and law professors, judges and sane people, will be able to take the podium side by side and sing, in the words of that great legal humorist, 'Free at last! Free at last! PowerPoint is finally a thing of the past!'"). *See generally infra* Section II.B.1.

[5] *See infra* Part III.

[6] Catherine Adams, *PowerPoint, Habits of Mind, and Classroom Culture*, 38 J. CURRICULUM STUD. 389, 391 (2006) ("[T]he PowerPoint software package is a product designed primarily for the Western corporate marketplace.").

[7] *Id.* at 406 ("PowerPoint bullets serve the sales pitch especially well by making it easy to describe things in a 'true' but conveniently abbreviated fashion.").

Part II of this Article briefly describes the development of PowerPoint and other similar programs, along with the debate about such software that began shortly after its development. Part III summarizes research on the effect of visual presentation software from both a cognitive science perspective and an empirical perspective. Given that research, Part IV highlights some of the best practices for use of the software in a law school classroom setting,[8] while Part V addresses some common objections to the scaled-back approach to PowerPoint that this Article advocates. Part VI concludes by encouraging professors to rethink their use of PowerPoint.

II. A Brief History of Presentation Software and the Debate Over It

A. How Visual Presentation Software Came to Be
1. PowerPoint
The first version of PowerPoint was released in 1987 as an application for Macintosh.[9] Shortly thereafter, Microsoft purchased the program and released a Windows version in 1990.[10] These initial versions generated slides or transparencies that needed to be printed as either transparences or handouts and then projected or distributed.[11] In 1992, version 3.0, the program most people associate with "PowerPoint," was released.[12] By 1993, PowerPoint had seized the majority of the graphic presentation market.[13]

The next version of PowerPoint, version 4.0, was released in February 1994 and included the "AutoContent Wizard" for which

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[8] This Article focuses on a classroom setting with students whose first language is English; it does not address students for whom English is a second language.

[9] FRANCK FROMMER, HOW POWERPOINT MAKES YOU STUPID: THE FAULTY CAUSALITY, SLOPPY LOGIC, DECONTEXTUALIZED DATA, AND SEDUCTIVE SHOWMANSHIP THAT HAVE TAKEN OVER OUR THINKING 15 (George Holoch trans., 2012).

[10] *Id.* at 15, 21. Microsoft purchased PowerPoint for $14 million. *Id.* at 21.

[11] *Id.* at 15.

[12] *Id.* The first PowerPoint presentation—using a laptop to project the presentation onto a screen—was given on February 25, 1992. *Id.* (quoting Robert Gaskins). The creator of PowerPoint, Robert Gaskins, made the presentation in Paris, France, using PowerPoint 3.0 to introduce PowerPoint 3.0 to a group of Microsoft employees. *Id.* at 15-16 (quoting Robert Gaskins).

[13] *Id.* at 24.

PowerPoint is now well-known.[14] "This new functionality won approval from thousands of amateurs who had no idea of how to construct a presentation, either a simple lecture or a more graphically sophisticated show."[15] The 1994 release is also notable because at that point, PowerPoint was redesigned to integrate with the other programs in the Microsoft Office bundle.[16]

PowerPoint's usage only continued to grow from there, gaining 95% of the graphic presentation market by 2001.[17] The program is now on its thirteenth major version, and some estimate that it has as many as a billion users.[18]

2. *Other Software*

Over a decade after PowerPoint's initial release, Apple released its own presentation software for Mac users. Apple released Keynote in January 2003,[19] after PowerPoint had firm control of the market. Like PowerPoint, Keynote included pre-loaded themes and allowed users to import and export PowerPoint files.[20] Keynote is now on its eighth version.[21]

In 2009, Prezi, a new presentation software program, was developed.[22] Prezi markets itself as "a very different kind of

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[14] *Id.* at 22-23. According to Frommer, the term "AutoContent Wizard" implies mockery of its customers and was coined by "facetious technicians." *Id.* at 23.

[15] *Id.* Frommer reports that Gaskins was not pleased with how his program developed, stating that Gaskins thought the AutoContent Wizards "seriously limit[ed] the possibilities open to creators of presentations." *Id.* at 24. Gaskins also disliked "excessive and systematic use of the program" and urged users to limit use of images and effects—particularly animated transitions with sound. *Id.*

[16] *See* Alan Fridlund, *PowerPoint 4.0 Makes It into the Big Time*, INFOWORLD, June 6, 1994, at 95.

[17] FROMMER, *supra* note 9, at 24.

[18] Susan Adams, *How Prezi's Peter Arvai Plans to Beat PowerPoint*, FORBES (June 7, 2016, 7:00 AM) https://www.forbes.com/sites/forbestreptalks/2016/06/07/how-prezis-peter-arvai-plans-to-beat-powerpoint.

[19] *Apple Unveils Keynote*, APPLE (Jan. 7, 2003), https://www.apple.com/newsroom/2003/01/07Apple-Unveils-Keynote/.

[20] *Id.*

[21] *Keynote on the Mac App Store*, APPLE, https://itunes.apple.com/us/app/keynote/id409183694?mt=12 (last visited Oct. 17, 2018).

[22] Prezi, *Visualizing Great Things*, PREZI, https://prezi.com/about/ (last visited Oct. 17, 2018).

presentation software."[23] Unlike PowerPoint and other traditional presentation software, which moves from slide to slide in a purely linear format, Prezi provides "a limitless zoomable canvas and the ability to show relationships between the big picture and fine details."[24] Users have a blank canvas—essentially a map—where they can zoom in to reveal particular details of a topic but then zoom out to show a larger context.[25] Prezi can be used entirely on the web,[26] which means that users do not need to take any additional steps to make the presentation portable beyond the office computer;[27] instead, they can simply log on to the Prezi website from any computer[28] to access their presentations.[29]

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[23] *Id.*

[24] *Id.*

[25] Prezi, *What Makes Prezi So Unique*, PREZI, www.prezi.com/product/ (last visited Oct. 17, 2018). This zooming feature is also often described as a drawback of Prezi for its potential to cause nausea or seasickness in some viewers. *See, e.g.*, Jeff Bennion, *Switching from PowerPoint to Prezi for Trial Presentation*, ABOVE THE LAW (July 1, 2014, 3:14 PM), https://abovethelaw.com/2014/07/switching-from-powerpoint-to-prezi-for-trial-presentation/ ("Don't make your audience seasick. Just because you can zoom in and out and make things spin doesn't mean you should go crazy with it."); Clare Brandt, *Prezi Desktop Review: Animate Your Presentations, Even When You're Away from the Cloud*, PCWORLD (Oct. 28, 2013, 6:00 AM), https://www.pcworld.com/article/2057343/prezi-desktop-review-animate-your-presentations-even-when-youre-away-from-the-cloud.html ("[Y]ou may want to stick to a very basic Prezi if you're presenting to the National Association of Motion Sickness Sufferers, because the flow of the presentation can be disconcerting.").

[26] Prezi*, supra* note 25. Prezi does have an application that can be downloaded to a computer or smart phone to create and edit presentations offline. *Id.* However, that feature requires a paid subscription. Prezi, *Pricing*, PREZI, www.prezi.com/pricing (last visited Oct. 17, 2018). At the time of writing this Article, the cost of subscriptions range from $7 per month to $59 per month for individual users. *Id.* Prezi does offer discounts for users with a valid school email address. *Id.*

[27] Additional steps include saving the presentation to a thumb drive, emailing it to oneself, or uploading it to the cloud.

[28] This does mean that whatever computer they will be using to give their presentations must have internet access. However, nowadays it is hard to imagine a computer that does not have internet access.

[29] It should be noted here that PowerPoint Online offers similar functionality. *See* Microsoft, *Get Started with PowerPoint Online*, MICROSOFT, https://support.office.com/en-us/article/get-started-with-powerpoint-online-6303da7a-402a-4300-8b1c-160e8940cc34 (last visited Oct. 17, 2018).

A number of other web-based programs began gaining popularity around the same time as Prezi. Haiku Deck limits customizability in favor of "[s]implicity and [c]larity"; with a limited number of templates that cannot be changed and a built-in database of millions of stock photographs, it results in consistently polished presentations.[30] Google Slides, as part of the Google Docs family, is customizable and collaborative, allowing multiple users to contribute to and edit the same presentation.[31] Other programs include Custom Show,[32] Slide Dog,[33] Slide Bean,[34] Clear Slide,[35] and Visme,[36] among others. For a presenter today, the options are seemingly endless.[37]

Nonetheless, current figures suggest that PowerPoint still dominates the market.[38] It helps that PowerPoint comes packaged in the Microsoft Office bundle, which is installed on over one billion

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[30] HAIKU DECK, https://haikudeck.com/ (last visited Oct. 17, 2018). When creating a presentation, the user selects the type of content that will be presented (text, chart, video, audio, or photograph) and then chooses between a set number of layouts for that type of content. *See id.*

[31] Google, *Google Slides*, GOOGLE, https://www.google.com/slides/about/ (last visited Oct. 17, 2018).

[32] CUSTOMSHOW, https://www.customshow.com/ (last visited Oct. 17, 2018) ("Make an impact. Deliver results.").

[33] SLIDEDOG, https://slidedog.com/ (last visited Oct. 17, 2018) ("Freedom to Present").

[34] SLIDEBEAN, https://slidebean.com/ (last visited Oct. 17, 2018) ("Slides, simple and beautiful").

[35] CLEARSLIDE, https://www.clearslide.com/ (last visited Oct. 17, 2018) ("The Sales Engagement Platform Leader").

[36] VISME, https://www.visme.co/ (last visited Oct. 17, 2018) ("Speak Loudly. Speak Visually.").

[37] Most of these programs are available at no charge, although greater functionality is added when the user purchases a paid subscription. For example, a free subscription to Haiku Deck for those eligible for the nonprofit discount (which includes educators) allows the user to save only three presentations; for $4.99 per month, a user eligible for the nonprofit discount can save an unlimited number of presentations. *See* Haiku Deck, *Nonprofit Discount for Qualifying Organizations, Schools, Students, and Teacers*, HAIKU DECK, https://haikudeck.com/pricing/edu (last visited Oct. 17, 2018). Additionally, most of these programs—Haiku Deck being one exception—allow the user to import PowerPoint slides, making it easy to convert an existing PowerPoint presentation into the new presentation format.

[38] Heather Clancy, *Is This App the Antidote to 'Death by PowerPoint'?*, FORTUNE (June 7, 2016), http://fortune.com/2016/06/07/is-this-app-the-antidote-to-death-by-powerpoint/ (describing PowerPoint as having "overwhelming dominance" in the market).

computers.[39] The creators of Prezi aspire to become the leading competitor of PowerPoint—ahead of Apple and Google—and aspire to eventually even overtake PowerPoint.[40] But at just 100 million users,[41] Prezi has a long road ahead to reach that goal. Thus, although PowerPoint may have more competition now and in the future than when it was first launched, it still currently remains the market leader.

B. Debate over PowerPoint
1. *Critics of PowerPoint*

Backlash to the use of PowerPoint began in the early 2000s. It was then that the term "Death by PowerPoint" began circulating.[42] And the best-selling e-book of 2001 was titled *Really Bad PowerPoint*.[43]

Perhaps the best known critic of PowerPoint is Edward Tufte. In 2003, he published *The Cognitive Style of PowerPoint*,[44] an essay that seems partially inspired by the Columbia Accident Investigation Board's report citing PowerPoint as a cause of the Columbia space shuttle disaster.[45] Tufte decries the rampant use of PowerPoint as having "a distinctive, definite, well-enforced, and widely-practiced cognitive style that is contrary to serious thinking."[46] According to

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[39] *See id.*

[40] *Id.*

[41] As of October 2018, Prezi reports that it has 100 million users, less than a tenth of PowerPoint users. Prezi, *Customers*, PREZI, https://prezi.com/business/customers/ (last visited Oct. 17, 2018).

[42] GARR REYNOLDS, PRESENTATION ZEN: SIMPLE IDEAS ON PRESENTATION DESIGN AND DELIVERY 10 (2008).

[43] *Id.* In the e-book, the author, Seth Godin, writes that PowerPoint is a "'dismal failure'" and that "'[a]lmost every PowerPoint presentation sucks rotten eggs.'" *Id.* (quoting SETH GODIN, REALLY BAD POWERPOINT (2001)).

[44] EDWARD R. TUFTE, THE COGNITIVE STYLE OF POWERPOINT (2003) [hereinafter TUFTE (2003)]. Tufte published a second edition of his essay in 2006. *See* EDWARD R. TUFTE, THE COGNITIVE STYLE OF POWERPOINT: PITCHING OUT CORRUPTS WITHIN (2d ed. 2006).

[45] *See* TUFTE (2003), *supra* note 44 at 7-10. Tufte provides a detailed case study of a key PowerPoint slide used by NASA decisionmakers about the shuttle's flight. *Id.* The Columbia Accident Investigation Board concluded that although the slides were flawed substantively in their engineering analysis, "the cognitive style of [PowerPoint] compromised the analysis" and "reflect[ed] *widespread* problems in technical communication by means of [PowerPoint]." *Id.* at 7. Tufte agreed, arguing that "the hierarchical bullet lists failed to bring clarity or focus to the presentation." *Id.* at 10.

[46] *Id.* at 26. Tufte found it "[p]articularly disturbing" that PowerPoint was being taught in schools and opined that "students would be better off if the

Tufte, this cognitive style leads to a number of shortcomings, including the following:

- A low spatial resolution. The limited amount of information that a slide can contain causes information to be oversimplified and overgeneralized.[47]
- Rapid temporal sequencing. Because only so much information can fit on one slide, many slides are needed; thus, PowerPoint encourages a "relentless" sequence of slides.[48]
- Bullet lists that outline only the main points. These lists show "generic, superficial, simplistic thinking" because they leave out the relationships and narrative that connect the points.[49]
- A presentation that is oriented around the presenter, not the content or the audience.[50]
- Elevation of format over content. PowerPoint leads the presenter to "replace serious analysis with chartjunk, over-produced layouts, cheerleader logotypes and branding, and corny clip art"—or, in Tufte's words, "PowerPointPhluff."[51]

Tufte recommends that speakers limit their use of PowerPoint to showing a few detailed images; speakers should provide a handout for the rest of the information and walk their audience through that handout.[52] In the end, he concludes that while PowerPoint may help the 10-20% of "inept, extremely disorganized speakers," it causes detectable intellectual damage to the other 80%.[53] Indeed, speakers who rely on PowerPoint's cognitive style cannot be trusted because they are simply trying to "mask their lousy content."[54]

Similar to Tufte's argument that PowerPoint allows presenters to hide poor content, Franck Frommer argues that PowerPoint elevates form over substance by "promot[ing] use of an impoverished, standardized, and depersonalized language."[55] Perhaps

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schools simply closed on those days and everyone went to The Exploratorium." *Id.* at 11.

[47] *Id.* at 4-5.

[48] *Id.* at 4.

[49] *Id.* at 5-6.

[50] *Id.* at 4, 20.

[51] *Id.* at 4.

[52] *Id.* at 22.

[53] *Id.* at 23.

[54] *Id.*

[55] FROMMER, *supra* note 9, at 223.

surprisingly,[56] Frommer concludes that "[PowerPoint] may not make us stupid" but argues that "there is no doubt that PowerPoint, like many other media, helps to make the world illiterate and contributes to the abandonment of critical thinking, to blind acceptance, to a new form of voluntary servitude."[57]

Moreover, a number of high-profile companies have prohibited use of PowerPoint during meetings. For example, Steve Jobs banned PowerPoint presentations at Apple, stating, "People who know what they're talking about don't need PowerPoint."[58] Similarly, Amazon CEO Jeff Bezos has forbidden PowerPoint at meetings.[59] In an email explaining the reason for the ban, Bezos wrote that "Powerpoint-style presentations somehow give permission to gloss over ideas, flatten out any sense of relative importance, and ignore the interconnectedness of ideas."[60]

2. *PowerPoint's Defenders*

Of course, PowerPoint has its share of defenders. Most of these defenders acknowledge the existence of poor PowerPoint usage but argue that the blame lies with the presenter, not the program itself.

For example, Garr Reynolds acknowledges that "most presentations remain mind-numbingly dull, something to be endured by both presenter and audience alike."[61] However, he goes on to say that PowerPoint "is not a method; it is a tool that can be used effectively with appropriate design methods or ineffectively with inappropriate methods."[62]

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[56] The title of his book begins, *How PowerPoint Makes You Stupid*, which is similar to a quote from a speech by Marine General James N. Mattis. *Id.* at xii ("'PowerPoint makes us stupid.'").

[57] *Id.* at 228.

[58] WALTER ISAACSON, STEVE JOBS 337 (2011). Jobs also reportedly said that "'[i]f you need slides, it shows you don't know what you're talking about'"; he did not pay attention to a slide deck for long, instead preferring to talk, ask questions, and see physical objects. *Id.* at 387 (quoting Tony Fadell quoting Jobs).

[59] Madeline Stone, *A 2004 Email from Jeff Bezos Explains Why PowerPoint Presentations Aren't Allowed at Amazon*, BUSINESS INSIDER (July 28, 2015, 2:21 PM), http://www.businessinsider.com/jeff-bezos-email-against-powerpoint-presentations-2015-7.

[60] *Id.* Instead of PowerPoint, workers are asked to write a four-to-six page memorandum and bring copies of it to the meeting. *Id.* The meeting participants spend the first twenty minutes reading the memo and then ask the presenter questions. *Id.*

[61] REYNOLDS, *supra* note 42.

[62] *Id.* at 12.

Nancy Duarte also takes a similar approach in her defense of the software.[63] She acknowledges that most presentations are not done well and that, as a society, we have resigned ourselves to poor presentations: "We groan when we have to attend a meeting with the slide deck as the star."[64] But as with Reynolds, she attributes these poor presentations to a lack of training in effective visual communication.[65]

Similarly, Stephen Kosslyn says that "there's nothing fundamentally wrong with the PowerPoint program as a medium; rather . . . the problem lies in how it is used."[66] Microsoft Word does not deserve blame for every bad article that has been written; similarly, Microsoft PowerPoint does not deserve blame for every bad presentation that has been given.[67]

According to these defenders, presenters should not abandon PowerPoint altogether but instead should learn how to use it more effectively.[68] Reynolds does not attribute the ineffective use of PowerPoint to a lack of intelligence or creativity.[69] Instead, presenters "have learned bad habits and lack awareness and knowledge about what makes for a great presentation (and what does not)."[70] Kosslyn attributes the problem to users who, "like kids in a candy store, become gluttonous consumers of the options presented by the PowerPoint program—and forget to focus on nutrition."[71]

PowerPoint's critics and defenders may differ as to where the blame for bad presentations lies—either the user or the program itself—and whether the program should still be used. But ultimately, they all agree that PowerPoint is often misused to create dull presentations and that a good presenter should be thoughtful and deliberate in creating more effective presentations.

C. Legal Scholarship about PowerPoint in the classroom

The first mention of PowerPoint in academic legal scholarship appeared in a 1998 article discussing how law professors could

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[63] *See* Nancy Duarte, Slide:ology: The Art and Science of Creating Great Presentations (2008).

[64] *Id.* at xviii.

[65] *Id.*

[66] Stephen M. Kosslyn, Clear and to the Point: 8 Psychological Principles for Compelling PowerPoint Presentations 2 (2007).

[67] *Id.* at 3.

[68] *Id.*

[69] Reynolds, *supra* note 42, at 11.

[70] *Id.*

[71] Kosslyn, *supra* note 66, at 3.

integrate computers into their teaching.[72] Suggestions included projecting an outline, the text of important statutes or opinions, and graphs and spreadsheets.[73] Highlighting these points "keeps crucial information before the entire class and helps focus the discussion on the relevant topics."[74] The article acknowledged that projecting slides could detract from teaching, particularly "when students see their essential classroom activity as copying down the projected material."[75] To combat that impression, the article suggested that professors distribute their slides to their students.[76]

In 2000, around the time that backlash was growing about the use of PowerPoint in general, PowerPoint also had its detractors in legal academia. That year, Douglas L. Leslie, a professor at the University of Virginia, published an article criticizing the use of PowerPoint in the law school classroom because it "destroy[s] interaction."[77] In a PowerPoint-focused classroom, he argued, students will not be focused on the classroom discussion; instead, "[t]heir attention will be glued on the PowerPoint slide like a first-grader focuses on Barney."[78]

Others took a more moderate approach. For example, Daved M. Muttart undertook an "exploratory study" of the use of PowerPoint in law school classrooms.[79] Muttart concluded that although PowerPoint may help some aspects of the classroom, such as organization of lectures and even classroom participation, it "is neither a universal key to good pedagogy nor . . . a slippery slope to artificiality."[80]

Then in 2008, Deborah Merritt published an article encouraging professors to use PowerPoint by providing helpful guidelines for how to avoid the pitfalls that PowerPoint's detractors had identified.[81] Relying on principles of cognitive science for support, Merritt made

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[72] *See* Richard Warner et al., *Teaching Law with Computers*, 24 RUTGERS COMPUTER & TECH. L.J. 107 (1998).

[73] *Id.* at 113-20.

[74] *Id.* at 122.

[75] *Id.* at 121.

[76] *Id.*

[77] Douglas L. Leslie, *How Not to Teach Contracts, and Any Other Course: PowerPoint, Laptops, and the Casefile Method*, 44 ST. LOUIS U. L.J. 1289, 1304 (2000).

[78] *Id.*

[79] Daved M. Muttart, Research Note, *Power Point in Legal Education: Pedagogical Paradox—An Exploratory Study*, 42 OSGOODE HALL L.J. 303, 303 (2004).

[80] *Id.* at 316.

[81] *See generally* Merritt, *supra* note 2.

the following recommendations to professors using PowerPoint: display images connected to the substance of the material, replace bulleted text with graphics and a few essential words, plan each class before turning to PowerPoint, and utilize a simple approach to slide design to minimize distraction.[82]

In summary, legal scholarship addressing the use of PowerPoint in the classroom mirrors the debate over the technology in the general public. While there are some vocal detractors, many scholars still support its use in the law school classroom—when done in a careful, thoughtful way.

III. Current Research About PowerPoint in the Classroom
A. Cognitive Load Theory

Broadly speaking, the field of cognitive science seeks to understand the nature of the human mind.[83] While the human mind is "heralded for its staggering complexity and processing capacity," it is still limited in its ability to learn new information.[84] Cognitive load theory takes a closer look at those limits.

Cognitive load theory divides knowledge into two categories: biologically primary knowledge and biologically secondary knowledge.[85] Biologically primary knowledge is "universal, acquired effortlessly and frequently unconsciously, without explicit instruction."[86] Examples of biologically primary knowledge include

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[82] *I.* at 50-65.

[83] *About the Society*, COGNITIVE SCIENCE SOCIETY, http://www.cognitivesciencesociety.org/description/ (last visited Sept. 20, 2018); *see also* Herbert A. Simon, *Cognitive Science: The Newest Science of the Artificial*, 4 COGNITIVE SCI. 33, 34 (1980) (defining "cognitive science" as "the analysis of the human mind in terms of information process"). *But see* BARBARA VON ECKARDT, WHAT IS COGNITIVE SCIENCE? 1-2 (1995) (noting the broad nature of the field and outlining "disagreements over the basic goals and commitments of cognitive science").

[84] René Marois & Jason Ivanoff, *Capacity Limits of Information Processing in the Brain,* 9 TRENDS COGNITIVE SCI. 296, 296 (2005); *see also* Andrew M. Carter, *The Reader's Limited Capacity: A Working-Memory Theory for Legal Writers*, 11 LEGAL COMM. & RHETORIC 31, 34 (2014); Richard E. Mayer & Roxana Moreno, *Nine Ways to Reduce Cognitive Load in Multimedia Learning*, 38 EDUC. PSYCHOLOGIST 43, 43 (2003) ("Meaningful learning requires that the learner engage in substantial cognitive processing during learning, but the learner's capacity for cognitive processing is severely limited.").

[85] JOHN SWELLER ET AL., COGNITIVE LOAD THEORY 3 (2011)

[86] *Id.* at 5; *see also* David C. Geary, *An Evolutionarily Informed Education Science*, 43 EDUC. PSYCHOLOGIST 179, 180 (2008).

learning a first language, recognizing and distinguishing between human faces, recognizing physical objects, interacting with others, and interacting with our physical environment.[87] All of these skills are ones that humans have learned to speak without being taught—indeed, this type of knowledge cannot be taught.[88]

Biologically secondary knowledge, on the other hand, is "culturally acquired knowledge that has become important in a particular culture" and "is learned consciously and with effort and should be explicitly taught."[89] Secondary knowledge is "the domain of most of the curricula that can be found in educational institutions"; examples of this knowledge include reading and writing.[90] Cognitive load theory focuses on this biologically secondary information.[91]

When completing any mental task, the brain must both store and manipulate information.[92] Its ability to do this can be broadly described as the brain's "working memory."[93] The brain only has so much working memory available, and cognitive load theory encourages instructors to consider those limits when teaching that biologically secondary information.[94]

The process of learning such new information imposes a load on the working memory that can be divided into two categories: intrinsic load and extraneous load.[95] The intrinsic load consists of whatever working memory is inherently required to complete the mental task;

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[87] SWELLER ET AL., *supra* note 85, at 5. Geary organizes biologically primary knowledge around three components: folk psychology, folk biology, and folk physics. Geary, *supra* note 86, at 180. Folk psychology includes knowledge about the self, others, and group dynamics; folk biology includes knowledge about "using ecological resources for survival or reproductive purposes"; and folk physics includes knowledge about navigation, construction and the use of tools. *Id.* at 180-81.

[88] SWELLER ET AL., *supra* note 85, at 5.

[89] *Id.* at 13.

[90] *Id.* at 3, 13.

[91] *Id.* at 13.

[92] Carter, *supra* note 84, at 35.

[93] *Id.*

[94] *See* SWELLER ET AL., *supra* note 85, at 56.

[95] *Id.* at 57. Germane cognitive load is sometimes identified as a third type of cognitive load; it is essentially a subset of intrinsic cognitive load. Terri L. Enns & Monte Smith, *Take a (Cognitive) Load Off: Creating Space to Allow First-Year Legal Writing Students to Focus on Analytical and Writing Processes*, 20 LEGAL WRITING 109, 111 (2015). Germane cognitive load is not imposed by the learning materials, but is "better understood as working memory resources that are devoted to information that is relevant or germane to learning." SWELLER ET AL., *supra* note 85, at 57.

"[i]t is imposed by the basic structure of the information that the learner needs to acquire . . . ."[96] The extraneous load, however, consists of the working memory resources that are imposed—often unnecessarily—by the manner in which the new information is presented.[97]

In short, cognitive load theory encourages instructors to present new information to learners in a way that minimizes the extraneous cognitive load, thereby maximizing the amount of working memory that can be devoted to learning the new skill.[98] Instructors can do this by familiarizing themselves with a number of "effects" that can increase—or decrease—extraneous cognitive load.

One effect that increases cognitive load is the redundancy effect, which occurs when the same information is presented in two different formats.[99] This "may overload working memory and have negative rather than positive learning effects."[100] For example, when information is presented visually on a screen and verbally by reading aloud—which often happens when PowerPoint is used—the learner must "relate the on-screen text with the presenter's oral explanations."[101] But searching for the connections between these two different sources heavily burdens the learner's working memory.[102] The working memory required to search for and make those connections reduces the resources available for comprehending and learning the information.[103]

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[96] *Id.*

[97] *Id.*

[98] *See id.* at 56; *see also* Fred Paas & Paul Ayres, *Cognitive Load Theory: A Broader View on the Role of Memory in Learning and Education*, 26 EDUC. PSYCHOL. REV. 191, 192 (2014) ("[C]ognitive load researchers attempt to engineer the instructional control of cognitive load by designing methods that substitute productive for unproductive working memory load."); FREDERICK REIF, APPLYING COGNITIVE SCIENCE TO EDUCATION 361 (2008) ("If the cognitive load needed for learning becomes excessive, little or no learning can occur. Hence the cognitive load at any stage of a learning process must be kept within reasonable bounds.").

[99] SWELLER ET AL., *supra* note 85, at 142.

[100] *Id.* at 145.

[101] *Id.* at 153; *see also* Mayer & Moreno, *supra* note 84, at 49 (finding that when "words are presented both as narration and simultaneously as on-screen text[,] . . . the learner may devote cognitive capacity to processing the on-screen text and reconciling it with the narration—thus, priming incidental processing that reduces the capacity to engage in essential processing").

[102] SWELLER ET AL., *supra* note 85, at 153.

[103] *Id.*

This means that the "common sense perspective" that simultaneously presenting the same information in two different forms will emphasize the information and help the student learn[104] is actually incorrect.[105] Contrary to what many think, using PowerPoint to project visuals of the same information that is being said orally does not help emphasize the material.[106] Instead, as the redundancy effect shows, it increases cognitive load, which results in less effective learning. In sum, "instructional presentations involving redundant information more often inhibit rather than enhance learning. . . . Irrelevant, unnecessary information can easily capture working memory resources and reduce learning. It should be eliminated."[107]

While the redundancy effect increases cognitive load and thus burdens working memory, the modality effect frees up working memory.[108] The modality effect occurs when two pieces of information that are unintelligible in isolation are presented using two different channels—visual and auditory.[109] The visual channel processes images while the auditory channel processes verbal information.[110]

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[104] Learning style theory is addressed briefly *infra*, see notes 263-270 and accompanying text.

[105] SWELLER ET AL., *supra* note 85, at 154. As early as 1999, researchers had already noted that an instructional format that "used auditory explanations simultaneously with the same visually presented text and animated diagrams" was "widespread in many lecturing situations." Slava Kalyuga et al., *Managing Split-Attention and Redundancy in Multimedia Instruction*, 13 APPLIED COGNITIVE PSYCHOL. 351, 354 (1999). Given the findings that such a format "may have serious negative consequences for learning," educators were encouraged to reconsider the structure of their multimedia presentations. *Id.* at 368.

[106] *See id.* at 369 (noting that "[m]any multimedia instructional presentations are still based on common sense rather than theory or extensive empirical research").

[107] SWELLER ET AL., *supra* note 85, at 154; *see also* Mayer & Moreno, *supra* note 84, at 49 (defining the redundancy elimination as "cutting [the] unneeded duplication of essential material"); Kalyuga et al., *supra* note 105, at 369 ("Reducing cognitive load can be accomplished by eliminating redundant information thus freeing resources for learning.").

[108] *See* SWELLER ET AL., *supra* note 85, at 131.

[109] *Id.*

[110] Wayne Leahy & John Sweller, *Cognitive Load Theory and the Effects of Transient Information on the Modality Effect*, 44 INSTRUCTIONAL SCI. 107, 109 (2016). These channels "process their different forms of information with some degree of independence." *Id.*

To understand this effect, consider a diagram that must be accompanied by text to understand the diagram.[111] When both the diagram and text are presented visually, the written text must first be processed visually before being processed as speech by the auditory channel.[112] Instead of presenting both the diagram and text visually, learning will be enhanced by displaying the diagram visually while giving the explanation in auditory form—in other words, by "off-loading" the explanation to the auditory channel.[113] By using both the auditory and visual channels, the capacity of working memory is increased.[114]

The modality effect is closely related to the redundancy effect.[115] The key difference between the two is that with the redundancy effect, which impedes learning, the teacher presents the *same* information via both auditory and visual channels.[116] However, the modality effect occurs when the teacher presents *different* information in both auditory and visual channels.[117] The key to the modality effect is that the audio and visual sources must rely on each other for intelligibility; either one alone would be meaningless.[118] When that information is presented via both channels, learning is enhanced.[119]

B. Empirical Research About How PowerPoint Affects Learning

Empirical research offers some support for cognitive load theory. What follows is a brief survey of empirical research that has analyzed how an instructor's use of visual presentation software in the classroom affects student learning.[120] Overall, the findings of this

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[111] SWELLER ET AL., *supra* note 85, at 131.

[112] *See* Leahy & Sweller, *supra* note 110, at 109.

[113] *See id.*; *see also* SWELLER ET AL., *supra* note 85, at 131; Mayer & Moreno, *supra* note 84, at 46-47.

[114] SWELLER ET AL., *supra* note 85, at 131; *see also* Paul Ginns, *Meta-Analysis of the Modality Effect*, 15 LEARNING & INSTRUCTION 313, 320, 326 (2005) (confirming hypothesis that "[p]resenting instructional materials using a combination of an auditory mode for textual information, . . . and a visual mode for graphical information . . . will be more effective than presenting all information in a visual format . . .").

[115] *See* SWELLER ET AL., *supra* note 85, at 140.

[116] *See id.* at 154.

[117] *Id.* at 139.

[118] *Id.*; *see also* Leahy & Sweller, *supra* note 110, at 109.

[119] SWELLER ET AL., *supra* note 85, at 139.

[120] This section is limited to empirical research on the use of visual presentation software in live classrooms as part of post-secondary education

research are mixed; the studies do not always show that PowerPoint is harmful, nor do they always show that PowerPoint is helpful. The first section below discusses the studies where results showed that PowerPoint had a neutral impact on learning. The second section discusses the studies where results showed either mixed results or a negative impact on learning.

1. Neutral Impact

(i) Joshua E. Susskind (2005): PowerPoint does not affect academic performance.

In 2005, Joshua E. Susskind published a study involving college students in two sections of an introductory psychology class.[121] The same professor taught each section, and each class included the same content.[122] However, one class began with traditional lecture using a white board and the other began with lecture using PowerPoint.[123] Partway through the course, the students in both sections took an exam.[124] The sections then swapped lecture formats; the students then took another exam at the end of the semester.[125] Susskind found that PowerPoint did not affect the students' performance on the exams either positively or negatively.[126] Thus, contrary to his initial hypothesis, "accompanying lectures with PowerPoint d[id] not significantly affect student achievement."[127]

(ii) Levasseur & Sawyer (2006): There is no significant difference in learning outcomes when using computer-generated slide-based instruction.

In 2006, David G. Levasseur and J. Kana Sawyer published an essay reviewing studies on the effects of computer-generated slides in the classroom.[128] They concluded that using slides "d[id] not generally

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(mostly college) courses; similar research specific to law school courses is not available.

[121] Joshua E. Susskind, *PowerPoint's Power in the Classroom: Enhancing Students' Self-Efficacy and Attitudes*, 45 COMPUTERS & EDUC. 203, 206 (2005).

[122] *Id.* at 207.

[123] *Id.*

[124] *Id.*

[125] *Id.*

[126] *Id.* at 210.

[127] *Id.* at 211.

[128] David G. Levasseur & J. Kanan Sawyer, *Pedagogy Meets PowerPoint: A Research Review of the Effects of Computer-Generated Slides in the Classroom*, 6 REV. OF COMM. 101 (2006).

produce *more* learning."[129] Rather, "the majority of studies comparing computer-generated slide-based instruction against other instructional methods have failed to find significant differences in learning outcomes."[130] The essay did note that using computer-generated slides may increase learning when students are given copies of the slides, but speculated that "these effects may simply stem from students having copies of a thorough and organized set of class notes."[131]

2. Mixed Results and Negative Impact

(i) Bartsch & Cobern (2003): PowerPoint with related graphics does not help or hurt learning; however, PowerPoint with unrelated graphics hurts learning.

In 2003, Robert A. Bartsch and Kristi M. Cobern published a study comparing the use of PowerPoint and overhead transparencies as related to student learning.[132] The authors examined a college-level social psychology class of thirty-nine students over the course of a fifteen-week semester.[133] Each week, the professor would alternate between three presentation styles: transparencies; basic PowerPoint, which included only text; and expanded PowerPoint, which included text, pictures, and sound.[134] After each class, students used a scale of 1-9 to rate how much they learned and how much they enjoyed the class.[135] After each week, the students took a ten-question multiple choice quiz testing comprehension of that week's material.[136] Finally, the students took a survey at the end of the semester.[137]

Regarding the effectiveness of PowerPoint, Bartsch and Cobern found that the students' quiz scores were significantly lower for the expanded PowerPoint presentations.[138] Given this finding, the

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[129] *Id.* at 116.

[130] *Id.*

[131] *Id.* at 111-12. *But see infra* Section V.D.

[132] Robert A. Bartsch & Kristi M. Cobern, *Effectiveness of PowerPoint Presentations in Lectures*, 41 COMPUTERS & EDUC. 77 (2003).

[133] *Id.* at 79.

[134] *Id.*

[135] *Id.* at 80.

[136] *Id.*

[137] *Id.*

[138] *Id.* at 82. They also found that students were inconsistent with their presentation style preferences. *Id.* Specifically, in the end-of-the-semester survey, students indicated a preference for PowerPoint over transparencies;

authors completed a second study examining PowerPoint specifically and comparing student learning when the professor used three types of PowerPoint slides: 1) text only, 2) text and related graphics, and 3) text and unrelated graphics.[139] The results showed no difference between the first two types, but found that the students had lesser comprehension with the third type.[140] Bartsch and Cobern concluded that "unrelated graphics in a presentation have a negative effect on the enjoyment and learning of the material."[141] However, they did note that related graphics may be beneficial, particularly "when the material is more complicated or the students do not know much about the information."[142]

(ii) Karl R. Kunkel (2004): PowerPoint may help with descriptive courses, but not with theory courses

In 2004, Karl R. Kunkel published a study examining the use of PowerPoint and its effect on learning in two different types of courses: one theory-based course and one "substantive, descriptive course requiring more memorization than abstract theoretical conceptualization and application."[143] In both courses, he taught some sections using a "straight lecture" or "chalk-and-talk" approach and some sections using PowerPoint.[144] The results of Kunkel's study indicated "no significant difference" in student performance between traditional and PowerPoint lectures in the theory-based course.[145] However, the students in the descriptive course that used PowerPoint showed a statistically significant improvement in performance over the students in the traditional descriptive course.[146] Kunkel concluded that "lecture-oriented substantive courses may benefit more from presentation software than theory courses."[147]

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however, the end-of-class ratings taken each week did not show any difference between the two. *Id.*

[139] *Id.* at 83.

[140] *Id.*

[141] *Id.* at 84.

[142] *Id.*

[143] Karl R. Kunkel, *A Research Note Assessing the Benefit of Presentation Software in Two Different Lecture Courses*, 32 TEACHING SOC. 188, 189 (2004).

[144] *Id.* at 190.

[145] *Id.* at 192.

[146] *Id.* at 192-93.

[147] *Id.* at 195.

(iii) Nouri and Shahid (2005): PowerPoint may improve short-term memory, but does not affect long-term memory.

Also in 2005, Hossein Nouri and Abdus Shahid published a study with a similar approach to Susskind: it examined learning in two sections of an accounting class taught by the same professor, who used PowerPoint for one section and traditional lecture for the other.[148] Comparing the results of the students' performance on six quizzes, Nouri and Shahid concluded that PowerPoint "may improve short-term memory depending on the topic under discussion and the students' preferred representation style," but that it has "[n]o significant effect . . . on *long-term* memory."[149]

(iv) Nicole Amare (2006): Students in a technical writing class did worse when PowerPoint was used.

Nicole Amare's 2006 study noted a student preference for PowerPoint lectures.[150] Amare's study analyzed four sections of a college-level technical writing class[151] where about half of the class time was spent on lecture.[152] Two of the sections involved lectures with PowerPoint; the other two used traditional lecture materials including chalkboard and handouts.[153] Students were given a pre-test and a post-test, and, after a semester of instruction, students in both

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[148] Hossein Nouri & Abdus Shahid, *The Effect of PowerPoint Presentations on Student Learning and Attitudes*, 2 GLOBAL PERSP. ON ACCT. EDUC. 53, 59 (2005). Unlike Susskind, the students in Nouri and Shahid's study did not switch lecture formats during the semester. *See id.*; *supra* text accompanying note 125.

[149] Nouri & Shahid, *supra* note 148, at 70-71.

[150] Nicole Amare, *To Slideware or Not to Slideware: Students' Experiences with* PowerPoint *vs. Lecture*, 36 J. TECHNICAL WRITING & COMM. 297, 302 (2006).

[151] *Id.* at 300. More specifically, class topics included "document design and formatting, style and tone, mechanics, audience analysis, graphics, [and] organization." *Id.* at 301. Given that Amare's study also addresses technical writing, it may be particularly instructive for the legal writing classroom.

[152] *Id.* at 300. The other half of the class consisted of "communication exercises or small group work." *Id.* The total number of students in the sections was eighty-four. *Id.*

[153] *Id.* Amare emphasized that "[n]o overhead or video equipment was used" in the traditional lecture sections. *Id.* at 301.

PowerPoint sections showed less improvement from the pre-test than the students in the sections using a chalkboard and handouts.[154]

(v) Savoy et al. (2009): PowerPoint should not be used when students need to learn concepts through dialogue or verbal explanation.

A study published in 2009 further examined the type of material being presented and the effect of PowerPoint on learning.[155] Students in an engineering course[156] attended two classes, one where the professor used traditional lecture and one where the professor used PowerPoint.[157] In a third class, the students took a quiz addressing information presented in the two lectures.[158] The quiz questions corresponded to the type of material that was presented: information presented auditorily by the professor, information presented graphically, alphanumeric information, and information presented auditorily with visual support.[159] This allowed the study's authors to analyze the efficacy of PowerPoint based on the type of information students were expected to retain.[160]

If students needed to "retain complex graphics, animation, and figures," then PowerPoint could be advantageous.[161] If students need to retain alphanumeric information, either PowerPoint or traditional lectures could be used.[162]

However, "[i]f students are expected to retain information and/or concepts that are best conveyed through dialogue or verbal explanation, traditional presentations appear to be best."[163] The authors went even further to say that "this type of information should

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[154] *Id.* at 301, 304-05. The two PowerPoint sections improved on average by 3.4% and 4.9%; the two traditional lecture sections improved by 8.8% and 6.7%. *Id.* at 305. The author noted that the results were somewhat surprising because previous studies found that there was "no significant difference in scores" when PowerPoint was used "or that PowerPoint viewers scored better" when compared to students viewing overhead transparencies. *Id.* at 299, 304.

[155] April Savoy et al., *Information Retention From PowerPoint and Traditional Lectures*, 52 COMPUTERS & EDUC. 858 (2009).

[156] The course was dual-listed; it could be taken for either undergraduate or graduate credit. *Id.* at 860.

[157] *Id.* at 861-63.

[158] *Id.* at 862-63.

[159] *Id.* at 861.

[160] *Id.* at 866.

[161] *Id.*

[162] *Id.*

[163] *Id.*

not be shared verbally in the presence of PowerPoint."[164] This is because "the presence of PowerPoint negatively affected the recall of auditory information"—specifically, students retained 15% more information when the lecturer gave traditional class presentations than when the lecturer used PowerPoint.[165] In short, students "tend to pay attention to what is presented on the slides as opposed to what is verbalized."[166]

(vi) Cladellas Pros et al. (2013): PowerPoint lowers student learning by 18%.

In a more recent but more limited study, Ramon Cladellas Pros et al. confirmed Amare's results.[167] The Pros study involved a single forty-minute lecture during a psychology class.[168] As with Amare's study, two sections were lectured by a professor using PowerPoint slides; two sections were lectured by a professor using a chalkboard.[169] After the lecture, students were tested on the material covered.[170] The students in the PowerPoint sections answered fewer questions correctly than the students in the traditional lecture section, leading the authors to conclude that "the effect of this technology used according to the procedure described is to lower learning by 18%."[171]

However, the study did stress that the "procedure described" was one where "the bulk of the class is supported by projections, leaving the teacher in a secondary role. The results were very clear in terms of the negative effects of this way of teaching."[172]

3. *Summary of Empirical Research*

In short, there is little research confirming whether PowerPoint always helps students learn. There are some ways that PowerPoint can be used in the classroom that will help students learn. But at the same time, there are many ways it can be used that will negatively impact students' learning. Thus the empirical research fails to affirm any notion that PowerPoint is an all-purpose learning tool that must be utilized in the classroom for students to learn most effectively.

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[164] *Id.*

[165] *Id.* at 864, 866.

[166] *Id.* at 866.

[167] Ramon Cladellas Pros et al., *Effects of the PowerPoint Methodology on Content Learning*, 9 INTANGIBLE CAP. 184, 193 (2013).

[168] *Id.* at 190.

[169] *Id.*

[170] *Id.* at 189.

[171] *Id.* at 193.

[172] *Id.* at 195.

IV. Best Practices for the Use (or Omission) of PowerPoint

Even though there is little research confirming the efficacy of PowerPoint in the classroom, many professors continue to use it, often in ways that hinder student learning. In particular, professors may commit some or all of the following errors:

- Planning class using PowerPoint.
- Putting too much text on slides.
- Using bullet points on most slides.
- Turning the classroom lights off.
- Ignoring the whiteboard.
- Giving slides as a handout.

This section discusses why these common errors may contribute to PowerPoint's ineffectiveness in the classroom. It then highlights some of the characteristics of presentations that are widely recognized as effective and engaging.[173]

A. Common Errors Resolved

Planning class using PowerPoint. Professors often turn to PowerPoint when planning class—opening the program and putting each class together slide by slide. However, PowerPoint and other slideware programs "are simply containers for ideas and assets, not the means to generate them."[174] Using PowerPoint to plan class "can produce the text-heavy, bullet-point-laden slides that are least effective for learning."[175] Therefore, professors should plan each class outside PowerPoint—perhaps even ditching the computer altogether.[176] Once the professors identify the core concepts of class,

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[173] Seeing examples of good work and understanding what makes it good is a well-known, effective learning technique. *See generally* Terrill Pollman, *The Sincerest Form of Flattery: Examples and Model-Based Learning in the Classroom*, 64 J. LEGAL EDUC. 298 (2014).

[174] DUARTE, *supra* note 63, at 26.

[175] *See* Merritt, *supra* note 2, at 63.

[176] Reynolds and Duarte both advocate not using a computer at all when planning class. *See* REYNOLDS, *supra* note 42, at 45 ("There's just something about paper and pen and sketching out rough ideas in the 'analog world' in the early stages that seems to lead to more clarity and better, more creative results when we finally get down to representing our ideas digitally."); DUARTE, *supra* note 63, at 26 ("It's been an easy trap to fall into, launching presentation applications to prepare content. In reality, the best creative process requires stepping away from technology and relying on the same tools of expression that you grew up with—pens, pencils, and crayons.").

they can then consider if and how PowerPoint might best communicate those concepts.[177]

Putting too much text on slides. Another common misuse of PowerPoint is including too much text, something that PowerPoint's templates encourage.[178] "At a certain point, the number of words on a slide prevents it from being a visual aid."[179] Although certain "rules" have been circulated about the number of words that should go on a slide,[180] ultimately there is no single rule that provides a universally applicable number.[181] Instead of a bright line rule, presenters should "go for a very low word count."[182] In short, they should use as few words as possible while still being able to deliver the message.[183]

Using bullet points on most slides. Another common misuse of PowerPoint related to using too much text is using too many bullet points. "Here's the rub: no one can do a good presentation with slide after slide of bullet points. No one."[184] The PowerPoint templates encourage the bulleted list as the default of presentations.[185] But more often than not, the information in those bulleted lists can best be communicated in another visual way.[186] For example, instead of using a bulleted list, a presenter can "[p]ace the information by spreading it across multiple slides to increase its impact."[187] Bullet points "should be a rare exception," used only after considering other options.[188]

Turning the classroom lights off. When it comes to actually presenting the slides, many professors turn the lights out when they use PowerPoint so that students can better see the slides. However, "[t]here is no good reason for turning off all the lights today in most

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[177] *See* Merritt, *supra* note 2, at 63.

[178] *Id.* at 51; DUARTE, *supra* note 63, at 144.

[179] DUARTE, *supra* note 63, at 6.

[180] For example, some suggest using the 1-7-7 rule: one main idea per slide, using a maximum of seven lines of text, with a maximum of seven words per line. *See* REYNOLDS, *supra* note 42, at 130.

[181] *See* DUARTE, *supra* note 63, at 144.

[182] *Id.*; Merritt, *supra* note 2, at 58 (advising professors to "rigorously reduce the number of words on each slide").

[183] *See* DUARTE, *supra* note 63, at 144.

[184] REYNOLDS, *supra* note 42, at 130.

[185] *See id.* at 131.

[186] *See id.* Reynolds' book provides helpful illustrations of slides that have been converted from using ineffective bullet-point lists to using effective visuals. *See id.* at 131, 133.

[187] DUARTE, *supra* note 63, at 79.

[188] REYNOLDS, *supra* note 42, at 130.

situations."[189] Professors should keep the lights on during class so that their students can see them.[190] Visual cues are important to listening and understanding a speaker; if students can't see their professor, it is harder for them to engage and they will be more likely to tune out.[191] Keeping the lights on helps to "maximize[e] the human link between professors and students."[192]

Ignoring the whiteboard. Traditional PowerPoint wisdom recommends using the software to display text because it is faster and neater than writing on a whiteboard.[193] However, research shows that watching physical activity—such as a professor writing on a board—leads to the brain processing the information as "visual and physical sensory data."[194] This means that writing on the board "creates motor memories in addition to visual ones, which experts say may enhance retention and recall."[195]

Giving slides as a handout. Many professors provide their slides to their students, either in hard copy form or online, and either before class so that students can follow along or afterwards as a review. However, presentation experts generally say this is a mistake:

> Never, ever hand out copies of your slides, and certainly not before your presentation. That is the kiss of death. By definition, since slides are "speaker support" material, they are there in support of the speaker . . . YOU. As such, they should be completely incapable of standing by themselves, and are thus useless to give to your audience, where they will simply be guaranteed to be a distraction. The flip side of this is that if the slides can stand by themselves, why the heck are you up there in front of them?[196]

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[189] *Id.* at 208. In the early days of PowerPoint, projectors were not very bright and turning the lights off was necessary for the audience to see the screen; projectors today are much brighter. *Id.*

[190] *See* Merritt, *supra* note 2, at 58-59.

[191] REYNOLDS, *supra* note 42, at 208.

[192] Merritt, *supra* note 2, at 59.

[193] *See, e.g.,* Robin A. Boyle, *Employing Active-Learning Techniques and Metacognition in Law School: Shifting Energy from Professor to Student*, 81 U. DET. MERCY L. REV. 1, 20 (2003) ("PowerPoint has a professional presentation, much beyond what a professor can appear to do with a blackboard and chalk or whiteboard and marker.").

[194] *See* James B. Levy, *Teaching the Digital Caveman: Rethinking the Use of Classroom Technology in Law School*, 19 CHAP. L. REV. 241, 290 n.302 (2016).

[195] *Id.* at 290.

[196] REYNOLDS, *supra* note 42, at 66 (quoting David S. Rose).

B. Learning from TED Talks

The TED nonprofit, an organization "devoted to spreading ideas"[197] is known for hosting conferences each year that "showcase[e] important ideas from any discipline, and explor[e] how they all connect."[198] TED invites presenters to give short talks about their discipline—talks that generally last around ten minutes but no longer than eighteen minutes.[199]

These talks are recorded and published on TED's website, and TED maintains a running list of the most popular talks.[200] As of October 1, 2018, the most popular TED Talk had over 53 million views.[201] Combined, the top ten most popular TED Talks have been viewed almost 340 million times. These talks address a wide range of topics including creativity in the education system, how body language can boost confidence, the science of orgasm, and one man's experience engaging with an email scam artist.[202]

Part of what makes these talks so "insanely great" is the speakers' presentation skills.[203] Notably, the most popular TED Talk does not

[197] TED Conferences, LLC, *Our Organization*, TED: IDEAS WORTH SPREADING, https://www.ted.com/about/our-organization (last visited Mar. 5, 2018) [hereinafter TED, *Our Organization*].

[198] TED Conferences, LLC, *Conferences*, TED: IDEAS WORTH SPREADING, https://www.ted.com/about/conferences (last visited Mar. 5, 2018) ("TED stands for Technology, Entertainment, Design—three broad subject areas that are collectively shaping our world.").

[199] TED, *Our Organization*, *supra* note 197.

[200] TED Conferences, LLC, *The Most Popular Talks of All Time*, TED: IDEAS WORTH   SPREADING, https://www.ted.com/playlists/171/the_most_popular_talks_of_all (last visited Mar. 5, 2018) [hereinafter TED, *Most Popular Talks*].

[201] *See* KEN ROBINSON, *Do Schools Kill Creativity?* (TED Conferences, LLC Feb.   2006), https://www.ted.com/talks/ken_robinson_says_schools_kill_creativity.

[202] *See* TED, *Most Popular Talks*, *supra* note 200.

[203] REYNOLDS, *supra* note 42, at 206; *see also* DUARTE, *supra* note 63, at 226 (describing the speakers as "phenomenal"). Indeed, the engaging presentation style of TED Talks is so well-known that it has become the subject of parodies on how to give an engaging presentation about off-putting topics—or about no topic at all. *See, e.g., Ducks Go Quack, Chickens Say Cluck* (The Onion Oct. 31, 2012), https://www.youtube.com/watch?v=tom6_ceTu9s (presenting about the noises animals make); *Key & Peele—Menstruation Orientation—Uncensored* (Comedy Central Jul. 10, 2015), https://www.youtube.com/watch?v=ihRHIGpyspA (presenting about menstruation); *'Thought Leader' Gives Talk That Will Inspire Your*

involve the use of any presentation software; in fact, the speaker does not use any visual aids at all.[204] The speaker in the third most popular talk also does not use any presentation software, relying instead on a large notepad on an easel.[205]

The remaining eight speakers used some form of presentation software to project a mix of slides that included pictures, words, or both. What is striking about these presentations is the number of words used. With limited exception, the average number of words on the slides that used words was only five to eight words.[206] Instead of using words on the screen, the speakers allowed their slides to do what slides are meant to do—provide visual aids while allowing the speaker to give the details of the substance in verbal speech.

Many of the presenters were also creative with other visual aids beyond PowerPoint. For example, instead of projecting a photograph or a diagram, Jill Bolte Taylor used an actual human brain as a visual aid when discussing the two hemispheres of the brain.[207] At the

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Thoughts (CBC Comedy June 8, 2016), https://www.youtube.com/watch?v=_ZBKX-6Gz6A (presenting about how to give a presentation about nothing); WILL STEPHEN, *How to Sound Smart in Your TEDx Talk* (TEDx Talks Jan. 15, 2015), https://www.youtube.com/watch?v=8S0FDjFBj8o (TEDx Talk about how to give a TEDx talk). *See generally* Kate Torgovnick May, *What Speakers Can Learn from 11 of the Funniest TED Talk Spoofs*, TEDBLOG (Oct. 13, 2015, 8:00 PM EDT), https://blog.ted.com/11-of-the-funniest-ted-talk-spoofs-and-what-speakers-can-learn-from-them/.

[204] *See* ROBINSON, *supra* note 201.

[205] *See* SIMON SINEK, *How Great Leaders Inspire Action* (TED Conferences, LLC Sept. 2009), https://www.ted.com/talks/simon_sinek_how_great_leaders_inspire_action.

[206] Tony Robbins' talk is one exception. *See* TONY ROBBINS, *Why We Do What We Do* (TED Conferences, LLC Feb. 2006), https://www.ted.com/talks/tony_robbins_asks_why_we_do_what_we_do. Although the slides he used were more text-heavy, averaging about twenty-eight words per slide, Robbins did not read from the slides. *See id.* The other exception is James Veitch, who walked the audience through what happened when he responded to spam email. JAMES VEITCH, *This Is What Happens When You Reply to Spam Email* (TED Conferences, LLC Dec. 2015), https://www.ted.com/talks/james_veitch_this_is_what_happens_when_you_reply_to_spam_email. Veitch displayed the text of the emails he exchanged with the spammer as their communication became more and more outlandish and entertaining. *Id.*

[207] JILL BOLTE TAYLOR, *My Stroke of Insight* (TED Conferences, LLC Feb. 2008),

beginning of her talk, Cameron Russell, a model, put on a loose sweater and skirt over the more form-fitting black dress she had come onstage wearing to illustrate how one's impression of a person can change based on what that person's clothes.[208] These speakers did not limit themselves to projected images, and their talks stood out for that reason.

The concept of the TED Talk is admittedly different from that of the law school classroom. TED Talks are meant to spread ideas; the audience listens for a relatively short time as masters of various topics provide high-level overviews of their ideas that can easily be grasped and shared. Law school classes, however, go much more in depth. The goal of a law school classroom is not to introduce students to an idea, but to help them master the law and its applications. Doing so will require deeper-level critical thinking and will often involve much more interaction than the TED Talk format allows.

Nonetheless, law professors can still learn from these presenters. While TED Talks are limited in depth, the presenters have found a way to use PowerPoint and other visual aids strategically to connect with and engage their audiences. Thus, to the extent that law professors seek to do the same with their students, they would benefit from taking a similar approach to those TED Talk presenters:

- Don't stand behind a podium; walk around.[209]
- Think beyond presentation software for visual aids.[210]
- Consider not using presentation software at all.[211]

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https://www.ted.com/talks/jill_bolte_taylor_s_powerful_stroke_of_insight.

[208] Cameron Russell, *Looks Aren't Everything. Believe me, I'm a model* (TED Conferences, LLC Oct. 2012), https://www.ted.com/talks/cameron_russell_looks_aren_t_everything_believe_me_i_m_a_model.

[209] None of the presenters of the most popular TED Talks stood behind a podium. In fact, TED generally does not allow speakers to use a podium. *See* TED Conferences, LLC, *Rehearsals*, TED: IDEAS WORTH SPREADING, https://www.ted.com/participate/organize-a-local-tedx-event/tedx-organizer-guide/speakers-program/prepare-your-speaker/rehearsals (last visited Oct. 1, 2018) ("Speakers may not use a podium or lectern unless special circumstances warrant it. These objects disconnect the speaker from the audience, create an overly formal atmosphere, and encourage presenters to read from their notes.").

[210] *See supra* notes 207-208 and accompanying text.

[211] *See supra* notes 204-205 and accompanying text.

- If presentation software is used, it should focus on pictures and animation. In particular, it should use striking photographs and visuals that enhance meaning.[212]
- If text is used with the presentation, it should be minimized, with no more than a few words per slide and no bullet points.[213]

V. Common Reasons PowerPoint is Still Misused and Ways It Can Be Used More Effectively

Given the empirical research on the topic and the many resources that address how to effectively use PowerPoint,[214] why do many law school professors continue to misuse PowerPoint? The final section of this article addresses some common answers to that question and provides practical solutions that will help professors better effectuate learning in the classroom without making the common errors identified above.

A. PowerPoint Helps Students Learn By Displaying Information Visually.

Professors may continue using PowerPoint because they believe that it enhances student learning by repetition—in other words, students learn better if they can see the information on the screen in addition to hearing the professor speak about it. Indeed, professors often hear that the brain processes new information better if it receives that information in both visual and auditory formats.[215] This is true but with one very important condition that professors often overlook: the type of information that is being displayed. The redundancy effect described above shows that a professor should not

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[212] For example, Amy Cuddy's Ted Talk, which is the second most popular of all time, addressed body language. *See* AMY CUDDY, *Your Body Language May Shape Who You Are* (TED Conferences, LLC June 2012) https://www.ted.com/talks/amy_cuddy_your_body_language_shapes_who_you_are. She used photographs and videos of famous politicians (including Angela Merkel, Sarah Palin, and Barack Obama) to illustrate "an awkward interaction . . . or a contemptuous glance or maybe a very awkward wink or maybe even something like a handshake . . . or the lack of a handshake." *Id.*

[213] *See supra* text accompanying note 206.

[214] REYNOLDS, *supra* note 42, and DUARTE, *supra* note 63, are both excellent resources for additional reading on this topic.

[215] *See, e.g.*, Rosa Kim, *Lightening the Cognitive Load: Maximizing Learning in the Legal Writing Classroom*, 21 PERSPS: TEACHING LEGAL RES. & WRITING 101, 102-03 (2013).

display the exact same information in both formats—such as by putting words on a screen and also reading those words aloud—because doing so actually creates additional, unnecessary cognitive load.[216]

Instead, what really helps students learn is the modality effect, which is invoked when related—but not identical—information is displayed visually while explanatory text is spoken aloud.[217] Thus, while projecting spoken words visually will hinder students' learning, projecting a photograph, diagram, or other visual that is related to what is being said will help students' learning.[218]

B. Students Prefer Classes with PowerPoint.

Another reason professors may continue using PowerPoint poorly is because they think that students like it and want their professors to use it. A significant body of empirical research does support this belief. A 2012 study evaluating students' and professors' perceptions of PowerPoint showed that 84% of the 384 undergraduate students surveyed thought that PowerPoint improved their overall classroom experience, and 69% preferred classes with PowerPoint.[219] A 2004 study of law students also reported that "a large majority" believed that PowerPoint "helps them learn and remember what they are taught."[220]

Much of the empirical research discussed above that analyzed the effectiveness of PowerPoint also studied students' attitudes towards PowerPoint. For example, Bartsch and Cobern found that, when surveyed at the end of the semester, students reported a preference for the classes that used PowerPoint over traditional lecture using transparencies.[221] They also consistently reported that they believed they learned more from PowerPoint than from lectures with transparencies.[222] Similarly, Susskind also found that students "believed that they were more capable students with PowerPoint,"[223]

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[216] *Supra* notes 99-107 and accompanying text.

[217] *Supra* notes 108-119 and accompanying text.

[218] *Supra* notes 115-119 and accompanying text; Merritt, *supra* note 2, at 47; *see also infra* text accompanying notes 288-289.

[219] Andrea Hill et al., *"I'm Ambivalent About It": The Dilemmas of PowerPoint*, 40 TEACHING SOC. 242, 248 (2012).

[220] Muttart, *supra* note 79, at 315.

[221] Bartsch & Cobern, *supra* note 132, at 82.

[222] *Id.*

[223] Susskind, *supra* note 121, at 211.

and Amare found that students in her study also preferred classes using PowerPoint.[224]

Yet even if students do prefer classes with PowerPoint, that does not mean professors must cater to that preference—particularly given the lack of strong evidence that it will enhance their learning.[225] Indeed, the Bartsch and Cobern, Susskind, and Amare studies, which found some student preference towards PowerPoint, all reported that PowerPoint did not actually enhance student learning.[226] Susskind described this difference between "the students' subjective and objective performance" as "[t]he most interesting results" of his study.[227] Amare commented that "while PowerPoint may be popular with most students, ... it is not clear how much or what they learn from it."[228] And Pros stressed "the lack of connection between students' performance and their preference for the use of PowerPoint projections," noting that "what is gained in student satisfaction is clearly lost in the quality of the resulting learning."[229]

Thus, just because students may prefer classes with PowerPoint does not mean that they will learn better with it.[230] "Availability, familiarity, or sheer preference should not dictate the use of educational technologies. Course material (i.e., type of information) and objectives should influence the use of educational technology to develop a learning environment that fosters increased student performance and attitude."[231]

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[224] Amare, *supra* note 150, at 302. Specifically, 79% of students said they preferred PowerPoint. *Id.* Interestingly, only 62% of them said they believed PowerPoint improved their learning. *Id.*

[225] *See* Muttart, *supra* note 79, at 315 (concluding, despite students' preference for PowerPoint, "there remains no convincing empirical support for actual, as opposed to perceived, learning enhancement").

[226] *Supra* Part III.B.

[227] Susskind, *supra* note 121, at 211.

[228] Amare, *supra* note 150, at 305-06.

[229] Pros et al., *supra* note 167, at 195. The Pros study was limited to a particular use of technology where "the bulk of the class is supported by projections, leaving the teacher in a secondary role. The results were very clear in terms of the negative effects of this way of teaching." *Id.* However, the authors noted that their results "refer only to the negative effects of one way (although a fairly widespread way) of using [PowerPoint]" and did not "condemn the use of technology in general and PowerPoint in particular." *Id.*

[230] *See* Muttart, *supra* note 79, at 315.

[231] Savoy et al., *supra* note 155, at 866; *see also* Levy, *supra* note 194, at 286 ("[W]e should pick methods and tools based on their compatibility with our classroom objectives, not what is most familiar or popular with students.").

Additionally, studies do not always show a preference for PowerPoint. In Bartsch and Cobern's 2003 study, students gave ratings both immediately after each class and at the end of the semester.[232] While the end-of-semester ratings showed a preference for PowerPoint, the end-of-class ratings showed no such preference.[233]

Moreover, the average age of law school applicants is twenty-six or twenty-seven years old,[234] meaning most law students have seen PowerPoint used in the classroom as long as they have been in school. "By the time they got to university, they often saw nothing else, with video projectors built into classroom ceilings and every lecturer using PowerPoint."[235] Indeed, Lisa A. Burke and Karen E. James published a study in 2008—a decade ago—that found that only 27% of the students believed that using PowerPoint was "interesting and fresh."[236]

The other 73% who did not find PowerPoint novel "tended to view traditional lecture as more effective in facilitating social interaction and class discussion" while also being "slightly more likely to attribute to [PowerPoint] negative classroom behaviors and attitudes."[237] Thus, while students may like PowerPoint, this preference is not unqualified; there are a number of aspects of the program that they dislike, and they certainly no longer find it to be exciting, novel technology.

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[232] Bartsch & Cobern, *supra* note 132, at 80.

[233] *Id.* at 82.

[234] Kim Dustman & Ann Gallagher, *Analysis of ABA Law School Applicants by Age Group: 2011-2015* LSAC (Jan. 2017), http://www.lsac.org/docs/default-source/data-(lsac-resources)-docs/analysis-of-lsat-taker-application-behavior-2009-2016-final.pdf.

[235] Robert Gaskins, *PowerPoint at Age 30 Has Many Fans Among Millennials*, INDEZINE (May 5, 2017 9:30 AM) https://blog.indezine.com/2017/05/powerpoint-age-30-many-fans-among-millennials.html. Gaskins is the creator of PowerPoint. *See supra*, note 12.

[236] Lisa A. Burke & Karen E. James, *PowerPoint-Based Lectures in Business Education: An Empirical Investigation of Student-Perceived Novelty and Effectiveness*, 72 BUS. COMM. Q. 277, 288 (2008); *see also* Dionne Anthon et al., *A Technological Trifecta: Using Videos, Playlists, and Facebook in Law School Classes*, 40 RUTGERS COMPUTER & TECH. L.J. 1, 2-3 (2014) ("The familiarity brought about through the routine pedagogical use of PowerPoints . . . causes students to become less excited and, thus, often less interested in the material we are covering.").

[237] Burke & James, *supra* note 236, at 288.

C. PowerPoint Leads to Better Student Evaluations

As a corollary to the last item, some professors may use PowerPoint in the classroom because they believe it will lead to better student evaluations. This could be true even though PowerPoint may not match their teaching ideologies.[238] Although a number of empirical studies have analyzed the effect of PowerPoint on student learning, fewer have analyzed how the use of PowerPoint affects teaching evaluations. The studies that have been done reflect mixed results.

For example, in one study that encompassed three different institutions,[239] there was a statistically significant increase at one in students' evaluations of professors using PowerPoint over professor using traditional lecture when asked about instructor preparedness.[240] However, students at the third institution gave the professor using traditional lecture a higher overall evaluation than the professors using PowerPoint.[241]

Indeed, students may tend to view classes and professors using PowerPoint as more organized.[242] Yet, in one study where students ranked the professor using PowerPoint as more organized than one using traditional lecture, there was no difference as far as students' perceptions of the instructor's "informativeness, effectiveness, time

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[238] Hill et al., *supra* note 219, at 253 ("For some instructors, when student expectations and teaching ideology are at odds, demand trumps philosophy. Several of those most conflicted by this dilemma noted that the institutional pressure to receive positive student evaluations of teaching lay at the heart of their compromise.").

[239] Lisa Daniels et al., *The Impact of PowerPoint on Student Performance, Course Evaluations, and Student Preferences in Economics Courses: An Experiment at Three Institutions*, presentation at the Allied Social Science Association (Jan. 5-7, 2007), http://economic.oswego.edu/papers/ASSA007.pdf. The study analyzed one course at California State University—Sacramento, one course at State University of New York—Oswego, and one course at Washington College. *Id.* at 8, 15. Two sections of each course were taught by one professor, with the professor using PowerPoint in one section and traditional lecture in the other. *See id.* at 8.

[240] There was a non-significant increase in students' overall evaluation of the instructor and the course at these two institutions. *Id.* at 9, 19.

[241] There was also a non-significant increase in students' evaluation of the professor's preparedness at this third institution. *Id.*

[242] *See* Susskind, *supra* note 121, at 211 ("[T]he PowerPoint lectures were perceived as more organized and easier to understand."); Nouri & Shahid, *supra* note 148, at 70.

efficiencies, and overall performance."[243] And in a small study of law students, one author found "no consistent change" in student evaluations for professors who used PowerPoint versus those who did not,[244] even though those students had also reported a belief that PowerPoint classes were better organized.[245]

On an admittedly anecdotal note, this author has significantly reduced her own use of PowerPoint in the classroom over the last few semesters. In the spring semester of 2017, I used presentation software during only three classes: in one session, slides were projected for the entire class;[246] in the other two classes, slides were used for less than about one-fourth of the class. In total, less than 20% of class time during that semester was spent using presentation software.[247] That semester, my evaluations actually improved. Specifically, students gave higher ratings on the two questions asking specifically about the instructor[248] than both the previous fall semester and the spring semester the previous year.

Therefore, reducing or eliminating PowerPoint from the classroom may not necessarily result in lower evaluations. But if lower evaluations are a concern, a professor can take steps to minimize any negative impact of reducing the reliance on PowerPoint. Specifically, it may help if the professor explains his or her teaching methodology regarding the use of presentation software during class and the research informing that methodology. For example, on the first day of class when I tell students that they cannot use laptops,[249] the first

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[243] Nouri & Shahid, *supra* note 148, at 70.

[244] Muttart, *supra* note 79, at 309.

[245] *Id.* at 314.

[246] This was the first class of the semester; even though it spanned the entire two-hour class, the entire presentation was only ten slides long.

[247] The rest of the class time consisted of interactive learning and occasional lectures using the whiteboard.

[248] One question asks, "Was the professor an effective teacher—prepared, engaged, well-organized, adding value to the course over and above the materials standing alone?" The other asks, "Was the professor sufficiently attentive to students—generally respectful, responsive to questions, accessible outside class?"

[249] A discussion of the debate over use of laptops in the classroom is well beyond the scope of this article. However, I generally do not allow laptops in class, letting students use them only when necessary for a particular exercise. *See generally* Steven Eisenstat, *A Game Changer: Assessing the Impact of the Princeton/UCLA Laptop Study on the Debate to Ban Law Student Use of Laptops During Class*, 92 U. Det. Mercy L. Rev. 83, 84 (2015) ("[S]tudent laptop use should be permitted in class only if the professor is using them for a specific educational purpose. Otherwise, the use of laptops should be

question is usually whether I distribute my slides. In answering that question in the negative, I explain that my goal is to make slides that are a) short and thus easy for them to write down in their own notes during class and b) not helpful outside the context of class.[250] I do note that there may be times when I use a slide that has charts, graphs, or a significant amount of text, and I offer to make those particular slides available to students if I feel it would be beneficial. I also allow them to request that I make certain slides available—which they rarely do.

Another suggestion to combat the impression that a class without PowerPoint is disorganized or that the professor is less prepared is to write an agenda on the board before class and keep it there throughout the class. This will give students a sense of what will be covered in class and in what order so that they know the professor has prepared and organized the content.

D. PowerPoint Helps Students by Giving Them Accurate Notes and Class Outlines

Professors may also continue using PowerPoint out of a desire to help students. If students have access to the professor's slides, then they will have an accurate set of notes from which to create their own course outlines or prepare for the exam.

The problem with this approach is that it denies students one of the main benefits of note taking. Taking notes in class helps students initiate the thinking and learning processes.[251] To understand what the professor is saying in class, the student must translate the professor's words into his or her own words, known as *encoding*.[252] The key to encoding is engaging in the active process of translating what the professor says into notes that are meaningful for the student given his or her "existing cognitive structure."[253] Once the student has encoded the information, the student can memorialize it by putting into notes.[254] Providing students with the PowerPoint is just giving

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banned."); Levy, *supra* note 194, at 281-82 ("Unless the professor is having students use their laptops as part of an in-class exercise or is otherwise actively managing their use, they should be closed or turned off. This is the only policy that strikes the right balance between the value laptops have as an interactive learning tool and our evolutionary programming, which makes it nearly impossible . . . to resist the distractions they cause.").

[250] *See supra* note 196.

[251] *See* Eisenstat, *supra* note 249, at 89.

[252] *Id.*

[253] *Id.* at 89-90 (quoting Francis J. Di Vesta & Susan Gray, *Listening and Note Taking*, 63 J. EDUC. PSYCHOL. 8 (1972)).

[254] *Id.* at 89.

students the professor's own words in an additional medium. Without translating those words into "meaningfully tailored notes," the student is not as engaged in the learning process.[255]

Of course, there may be times when a complicated topic calls for additional guidance from the professor in either notes or outline format. In that case, the better approach is to craft a separate handout rather than provide PowerPoint slides.[256] "Attempting to have slides serve both as projected visuals and as stand-alone handouts makes for bad visuals and bad documentation."[257] Rather than trying to combine the two,[258] give students a separate handout. PowerPoint is good to display visuals on a screen, but it should not be used to create written documents—"that's what word processors are for."[259]

E. Millennial Students Are Visual Learners, and Professors Should Teach to That Learning Style by Using PowerPoint.

Another reason that professors may prefer to use PowerPoint is out of the belief that their students, who are of the millennial generation for the most part, grew up with screen-based technology and are thus better suited to visual learning. However, one problem with this belief is that "digital natives are no more visually-oriented than anyone else."[260] Rather, "the entire species evolved to be highly visual, not just the recent few who grew up looking at screens."[261]

Moreover, even presuming that current law students are more visually oriented, it would not follow that PowerPoint should be used in the classroom to accommodate any such perceived orientation. The theory that learners have a particular mode of instruction or study

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[255] *Id.* at 90 ("[S]tudents who take verbatim handwritten notes have a more superficial understanding of the materials than those who engage in thoughtful and discerning note taking. Not surprisingly, those students perform less successfully on evaluative exercises than those students who implement the encoding process into their note taking practices."); *see also* Muttart, *supra* note 79, at 315 (suggesting that "forcing students to compile their own summaries from scratch may be more productive pedagogically" and advising professors not to post detailed course notes).

[256] *See supra* note 196.

[257] REYNOLDS, *supra* note 42, at 69.

[258] *Id.* at 68 ("Slides are slides. Documents are documents. They aren't the same thing.").

[259] *Id.* at 69.

[260] Levy, *supra* note 194, at 275.

[261] *Id.*

that is most effective for them is known as *learning style theory*,[262] which has been the subject of recent scholarship regarding pedagogy in law school.[263] Specifically, one such popular model of learning-style theory posits that learners have particular modality preferences when it comes to learning: specifically, visual, auditory, kinesthetic, or tactile learning.[264] This model encourages teachers to assess their students' learning styles and tailor their teaching methods to accommodate those styles.[265]

While many professors may be aware of learning style theory, fewer may be aware of its controversial nature. Learning style theory is far from confirmed science, even though experts have extensively analyzed the subject.[266] In fact, rather than confirming learning style theory, "[m]uch of this analysis has concluded that there is a lack of scientifically valid inquiry to support the underlying bases for the individual learning style theories and the related propositions that teaching intervention is necessary to teach to students' styles."[267] One researcher has gone so far as to declare that "science has . . . prov[en] that learning styles do not exist."[268]

Therefore, because there is little support for the assumption that our students are visual learners who respond best to visual presentations,[269] this should not continue to be a justification for extensive use of PowerPoint.

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[262] *See* Aida M. Alaka, *Learning Styles: What Difference Do the Differences Make?*, 5 CHARLESTON L. REV. 133, 136-37 (2011).

[263] *See id.* at 138.

[264] *See id.* at 146.

[265] *Id.* at 147.

[266] *See id.* at 153.

[267] *Id.*; *see also* Levy, *supra* note 194, at 274 ("Though several studies have looked for evidence to support learning style theory, none has been found."); Elizabeth Adamo Usman, *Making Legal Education Stick: Using Cognitive Science to Foster Long-Term Learning in the Legal Writing Classroom*, 29 GEO. J. LEGAL ETHICS 355, 363 (2016) ("[M]any of the various learning styles theories are contradictory, and, moreover, none have been scientifically proven to increase learning.").

[268] Daniel Willingham, *Listen Closely, Learning Styles Are a Lost Cause*, THE TIMES EDUC. SUPPLEMENT, no. 5122 (Nov. 21, 2014); *see also* Daniel Willingham et al., *The Scientific Status of Learning Styles Theories*, 42 TEACHING OF PSYCHOL. 266, (2015) ("[T]he weight of evidence fails to support learning styles. . . . Learning styles theories ought to be debunked.").

[269] Even Amare in her 2006 study seemed skeptical of this theory, opining that PowerPoint's popularity with students "may be for the eye candy aspect of PowerPoint rather than because some students are 'visual learners.'" Amare, *supra* note 150, at 306.

F.   PowerPoint Slides Help Ensure that Professors Cover Everything and Stay on Topic.

Professors may also be drawn to using PowerPoint because it provides a built-in structure for their classes to ensure that they cover the material they had planned to cover in class and to ensure that they stay on point. Having a PowerPoint presentation does require some advance thought and planning, and it certainly can keep a professor focused.

Indeed, moving away from reliance on projected slides to provide the structure and content of a presentation can seem difficult or intimidating. This is because when most presenters put their presentations together, they include visual triggers on their slides.[270] Then, "[a]s a safety net, [they] rel[y] on all those triggers to remember to keep [their] story straight and not screw up [their] own play."[271]

The problem is that these "superfluous words and clutter" help only the speaker—they "mean nothing to [the] audience."[272] Duarte offers a few practical suggestions for how the speaker can depend less on slides, which she calls "The Three R's of Letting Go."[273] The first "R" is to "reduce" the words on the slides.[274] The speaker does this by highlighting only one key word per bullet point and practicing the presentation focusing only on that key word; then, the speaker removes all words except that key word.[275] The second "R" is to "record" yourself presenting the slides and then listen to that recording to become more familiar with the content.[276] The last "R" is to "repeat the content over and over" until you can remember the key points and delete the clutter.[277]

Additionally, the speaker does not need to abandon written notes altogether. Most presentation experts suggest that a speaker have his or her own set of notes, separate from the slides that are projected.[278] Having a separate set of notes just for the speaker allows the speaker

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[270] DUARTE, *supra* note 63, at 220.

[271] *Id.*

[272] *Id.*

[273] *Id.* at 221.

[274] *Id.*

[275] *Id.*

[276] *Id.*

[277] *Id.*

[278] *See* REYNOLDS, *supra* note 42, at 67 (listing the speaker's notes as one of the three components to a presentation).

to de-clutter the presentation; instead of putting all the details in the slides, they go in the notes that only the speaker can see.[279]

> Removing clutter is a process, one that takes courage, practice, time, and lots of trial and error before you will feel the benefits of being free. You might initially exude more nervous energy when you present, but it will transform your presentations to be more about your connection with the audience and less about the slides. It will also make the world a more attractive place to live.[280]

G. It Requires Time and Effort to Change.

One final reason that professors may continue using PowerPoint is the time and effort required to change their classroom approach. Professors have been using PowerPoint for years and have developed presentations for each class session, thus simplifying class preparation. They don't have to prepare an entire class from scratch, but can instead review the presentation and simply make changes that may have become necessary in the time since the presentation was last used.[281] In short, they are correct: it will require more time looking back over the presentations that have already been made and developing new ways of presenting that material.[282] Yet "while it may be more effort . . . , the quality of your visuals and takeaway documents will be dramatically improved."[283]

However, by no means should all presentations be thrown into the recycle bin. One option is to transform those presentations into notes, creating a new, shorter, simpler PowerPoint to go along with them.

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[279] *Id.*

[280] DUARTE, *supra* note 63, at 221.

[281] This is understandable, given the demands on a professor that go well beyond simply teaching. *See generally* Susan P. Liemer, *The Quest for Scholarship: The Legal Writing Professor's Paradox*, 80 OR. L. REV. 1007 (2001) (describing the demands on legal writing professors' time that makes it difficult to pursue scholarship); John Ziker, *The Long, Lonely Job of Homo Academicus*, THE BLUE REVIEW (Mar. 31, 2014), https://thebluereview.org/faculty-time-allocation/ (describing a 2014 study involving thirty professors at one U.S. university that found professors worked an average of sixty-one hours per week).

[282] DUARTE, *supra* note 63, at 221 ("Removing clutter is a process, one that takes courage, practice, time, and lots of trial and error.").

[283] REYNOLDS, *supra* note 42, at 69.

Alternatively, in lieu of creating a new presentation, only the titles could be kept from the old presentation to display on the slides.[284]

And this process does not have to be undertaken all at once. Each class can be taken as it comes; when reviewing the PowerPoint that has already been developed, see if there is anything that can be changed, asking the following questions:

- Is there a set of bullet points or a list that could instead be written on the board during class? It may take a little longer than simply pressing a button on a clicker and having the text automatically appear on the screen, but writing on a whiteboard better emphasizes the text than having it displayed on a PowerPoint.[285] Additionally, writing on the board better reflects the natural dynamics of a conversation than a pre-programmed PowerPoint presentation; the professor is free to add or erase based on the ongoing classroom conversation.[286]

- Is there any text that could be replaced with a photograph or other graphic?[287] Instead of projecting the elements of an idea, project images that illustrate those elements. Merritt gives the example of projecting a photograph of a child kicking another child when teaching the *Vosburg v. Putney* case, which involved one child who ended up having a leg amputated after a classmate kicked him, in a torts class.[288] The photograph can act as an anchor point for the students: "By projecting a picture of a classroom kick as a backdrop to a discussion of *Vosburg*, a professor can give all students a mental image that will help them organize their understanding of the case."[289] Above all, make sure to use an image that is relevant, as unrelated graphics will unnecessarily add to cognitive load.[290]

- Is there any kind of summary that could be turned into an interactive in-class exercise? For example, towards the

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[284] *See* Duarte, *supra* note 63, at 144 ("Avoid two-line titles when giving a presentation because of the distance the eye has to travel across the slide. In fact, consider doing a presentation with titles only.").

[285] *Supra* notes 194-195 and accompanying text.

[286] *Id.*

[287] Reynolds, *supra* note 42, at 135. "[I]f you are using text on a slide for describing something, you probably could use an image instead more effectively." *Id.*

[288] Merritt, *supra* note 2, at 52.

[289] *Id.* at 53.

[290] *Supra* notes 108-119 and accompanying text.

end of the fall semester when students are supposed to have read their final memo assignment materials before class, I like to start class with a "pop quiz"[291] asking questions about the assignment. This provides a way to go over the important parts of the assignment without using PowerPoint.

- Is there an exercise that could be turned into a handout? For example, I used to conduct grammar exercises in class using PowerPoint; I would project a sentence and ask the students to find the grammatical errors in it. Instead, all of those exercises are now in handouts. After reviewing the answers together,[292] the students can take the handout home. This means the students no longer have to transcribe the sentences from a slide, but they still have to pay attention in class to find out the correct answer.[293]

Experiment with these practices as much as time permits. If there is time to change only one portion of the class or only one slide, that is better than making no change at all. Eventually, the result will be better slides. And the more often this process is undertaken, the easier and less time consuming it becomes.

VI. Conclusion

We, as law professors, need to stop thinking of PowerPoint as new technology. We must critically consider not just how we use PowerPoint, but whether we should use it at all. Cognitive science suggests that brains may not benefit from it in the ways we instinctively expect, and the bulk of empirical studies shows that PowerPoint does not increase student comprehension. Moreover, a number of studies show that comprehension actually decreases with PowerPoint.

This is not a call to stop using PowerPoint altogether. It is a call to stop and consider *why* you use it and *how* you use it. If you are using it because you think it will enhance your students' learning, it may be time to re-evaluate that belief. If you are using it because it is what you are used to using, take this as a challenge to step outside your

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[291] It does not count towards their grade, although sometimes the student with the most correct answers wins a small prize.

[292] As we go through each answer, I often mark up a copy of the same handout under a document camera.

[293] Of course, the professor could always post a copy of the correct answers online or distribute an answer key after going through the exercise.

comfort zone and take on a little more work to do something that will help your students.

It is our mission as educators to help our students learn, and we should not assume that PowerPoint is the best method of accomplishing that goal. Sometimes the best thing we can do to help our students learn is to put the clicker down and turn off the screen. For the other times when PowerPoint may be appropriate and helpful, we should use it purposefully and intentionally—taking care to ensure that its use actually benefits our students' learning, not hinders it.