UNIVERSAL DESIGN: STOP BANNING LAPTOPS!

Ruth Colker[†]

TABLE OF CONTENTS

INTRODUCTION

I do some volunteer work in the special education area to assist children in public school receive the kind of assistance they need to be successful students. Often, much of that advocacy involves arguing that a child is disabled under the definition set forth by the Individuals with Disabilities Education Act.[1] Occasionally, I do work on behalf of college or graduate students who also want assistance or accommodations in order to be successful students. In that context, I sometimes work to help persuade the educational institution that the student is disabled and, therefore, is entitled to accommodation or assistance.

In recent years, the federal government has been helpful in emphasizing the breadth of people who are covered by the Americans with Disabilities Act[2] and Section 504 of the Rehabilitation Act,[3] as well

---

[†] Distinguished University Professor and Heck-Faust Memorial Chair in Constitutional Law, Moritz College of Law, the Ohio State University.

[1] 20 U.S.C. § 1401(3) (2012).

[2] Pub. L. No. 101-336, 104 Stat. 327 (1990) (codified as amended at 42 U.S.C. §§ 12101–12213 (2012)). The Americans with Disabilities Act Amendments Act of 2008 emphasized that "[t]he definition of disability in this Act shall be construed in favor of broad coverage of individuals under this Act, to the maximum extent permitted by the terms of this Act." *Id.* § 12102(4)(A).

[3] Pub. L. No. 93-113, 87 Stat. 394 (1973) (codified as amended at 29 U.S.C. § 701 (2012));

as the significant scope of assistance that they should be offered when they take "[s]tandardized examinations and other high-stakes tests [as] gateways to educational and employment opportunities."[4] Although it is too early to know how the current administration will handle those issues, we have reason not to expect vigorous enforcement or vigorous coverage arguments.

Further, it is sometimes my experience that public schools or universities should often offer the kind of support being requested by a parent or student even without a disability diagnosis. Teachers, for example, can make available notes or PowerPoint slides to all students, rather than limit that assistance to documented students with disabilities. That kind of assistance can simply be good teaching rather than accommodations for students with disabilities. We need to press the importance of principles of Universal Design[5] in order to create a positive learning environment. Rather than force students to come forward and identify themselves as disabled, teachers should be expected to ask what needless barriers to instruction are present in their classroom and how they might use principles of Universal Design to reach more students.

I have previously written about how time limits on exams can be such a barrier.[6] Nonetheless, artificial time limits persist and have a disparate impact on many students with disabilities who do not identify themselves as disabled to request extra time.

In this Article, I will discuss another needless barrier to academic performance that is increasingly common at the university level— banning the use of laptops. I argue that a permissive laptop policy

---

see also 29 U.S.C. §§ 705(20), 794(a).

4 U.S. DEP'T OF JUSTICE, TESTING ACCOMMODATIONS (2014), https://www.ada.gov/regs2014/testing_accommodations.pdf.

5 The seven principles of Universal Design, which were originally developed from architecture, are:

> [1] Equitable use: The design is useful and marketable to people with diverse abilities. [2] Flexibility in use: The design accommodates a wide range of individual preferences and abilities. [3] Simple and intuitive use: Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level. [4] Perceptive information: The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities. [5] Tolerance for error: The design minimizes hazards and the adverse consequences of accidental or unintended actions. [6] Low physical effort: The design can be used efficiently, comfortably, and with a minimum of fatigue. [7] Size and space for approach and use: Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility.

Allison R. Lombardi & Christopher Murray, *Measuring University Faculty Attitudes Toward Disability: Willingness to Accommodate and Adopt Universal Design Principles*, 34 J. VOCATIONAL REHABILITATION 43, 44–45 (2011).

6 *See* Ruth Colker, *Extra Time as an Accommodation*, 69 U. PITT. L. REV. 413 (2008).

should be on the list of Universal Design features. So far, I have not seen that rule make a list of potential Universal Design principles.[7] I will make this argument in the context of the law school classroom.

I.   Use of Computers in the Classroom

When thinking about the use of computers in the classrooms, there are two separate issues: (1) whether computer users, who are accessing the Internet, have more difficulty taking effective classroom notes than students who are not using computers in the classroom; and (2) whether computer users, who are not able to access the Internet, are able to learn as effectively as students who are not using computers in the classroom.

This Article presumes that computer users, who are accessing the Internet, will be less effective learners than other students because of their distractibility. Internet use during class, like other kinds of "multi-tasking," is likely to impair performance. Further, even if an individual computer user manages to access the Internet during class time and performs well, that Internet use can be distracting to other students in the classroom. Thus, this Article does not challenge the notion that professors who allow students to bring a computer to class should ban Internet use on those computers.

But when the multi-tasking impairment is eliminated, is there still a good reason to ban computers from the classroom? In my personal discussions with professors on this issue, I often find that they conflate the first and second issue. The fact that computer use can be distracting—if students access the Internet—does not mean that

---

7 In an excellent Article that lists twenty Universal Design strategies, a permissive laptop policy is not on the list. *See* Patricia L. Davies et al., *Measuring the Effectiveness of Universal Design for Learning Intervention in Postsecondary Education*, 26 J. Postsecondary Educ. & Disability 195, 200–04 (2013). This is their list of twenty Universal Design strategies:

[1] Instructor presents course material in multiple formats. [2] Instructor actively engages students in learning. [3] Instructor relates key concepts to larger objectives of the course. [4] Expectations for student performance are consistent with the learning objectives. [5] Instructor begins lecture with outline of what will be covered. [6] Instructor summarizes key points during or at end of lecture. [7] Instructor faces the board or screen while speaking. [8] Online material offered in multiple file formats. [9] Instructor highlights key points after showing instructional videos. [10] Instructor technologies are used to enhance learning. [11] Course content delivered employing instructional technologies. [12] Materials are accessible, organized, and easy to use. [13] Opportunities for students to express comprehension of materials in ways other than tests/exams. [14] Students feel engaged and motivated to learn. [15] Instructor explains real-world importance. [16] Course has challenging and meaningful assignments. [17] Instructor expresses personal enthusiasm. [18] Instructor is highly approachable and available to students. [19] Instructor creates a class climate in which student diversity is respected. [20] Instructor offers contact with students outside of class time in flexible formats.

Id.

computer use is inappropriate when Internet use is banned. It is possible that some students learn more effectively when they have access to a computer in the classroom to take notes and review their own notes.

The most informative studies on the issue of computer use, without an Internet connection, were conducted by Pam Mueller and Daniel Oppenheimer.[8] They conducted three studies to compare laptop users to note takers. As will be discussed below, however, the nature of their studies provides limited application to the law school context.

In the first Mueller and Oppenheimer study, sixty-seven students were asked to listen to five TED Talks.[9] They were either given notebooks or laptops, which were disconnected from the Internet. The talks were about fifteen minutes in length. Participants were asked both factual and conceptual questions. On factual-recall questions, the two groups performed similarly. On conceptual-application questions, laptop participants performed significantly worse than longhand participants. Further refinement of the data suggested that the detrimental effects of laptop use were due to verbatim transcription.[10]

In the second study, 151 students were asked to listen to a lecture and take notes.[11] Some of the computer users were advised not to take verbatim notes, while others were not. This intervention, however, was found to be ineffective because the group receiving this instruction was equally likely to take verbatim notes. As with the first study, they found that laptop users did worse on conceptual-application questions than students who took notes longhand.[12]

In both of these studies, students were not given an opportunity to study their notes before taking the test. In the third study, some students were given an opportunity to study their notes before taking the test.[13] For all students, there was a week delay between hearing the lecture and taking the test. All of the students did poorly on the test if they were not given an opportunity to review their notes. When given an opportunity to review their notes, the longhand note takers did significantly better on both the factual and conceptual questions. Thus, with a time delay and an opportunity to study one's notes, the improvement in performance was most pronounced. The authors therefore concluded that "laptop use in classrooms should be viewed with a healthy dose of caution; despite their growing popularity, laptops may be doing more harm in classrooms than good."[14]

---

8 *See* Pam A. Mueller & Daniel M. Oppenheimer, *The Pen is Mightier than the Keyboard: Advantages of Longhand over Laptop Note Taking*, 25 PSYCHOL. SCI. 1159 (2014).

9 *Id.* at 1160.

10 *Id.* at 1162.

11 *Id.*

12 *Id.* at 1163.

13 *Id.* at 1164.

14 *Id.* at 1166.

Those studies represent a careful presentation of three artificial experiments where students are assigned their note-taking style—longhand or computer—and in which students have little incentive to learn the material from the lecture. They are paid to participate irrespective of how well they do on the exercise. The material is not assigned in any course at a university. And the material is conveyed entirely through a brief TED Talk or lecture.

Based on these and other studies, as well as professors' own experiences in the classroom, there has been a movement at many universities to ban computers or other electronic devices from the classroom. As long ago as 2007, Michael J. Bugeja, the director of the Greenlee School of Journalism and Communication at Iowa State University, reported that many professors have concluded that the only way to "turn[] students on to learning [is to] turn off the technology."[15] Similarly, on January 2, 2017, Darren Rosenblum, a professor at the Elisabeth Haub School of Law at Pace University, wrote an op-ed in the New York Times in which he argued that he had "no choice but to limit laptop use in the classroom" except when students had "medical exemptions."[16]

Because of this apparent "movement" towards banning laptops except for students with "medical exemptions," I decided to look at a natural experiment that has been occurring in my classroom. The Bugeja reference to only providing "medical exemptions" seemed to discount the possibility that students may have many different styles of learning. A student with dyslexia may prefer to type notes because it relieves the student of the need to even think about proper spelling. A student with attention-deficit/hyperactivity disorder (ADHD) may prefer to handwrite notes in order to avoid the possible distractions from the Internet. Neither of those decisions are what Bugeja may consider "medical." Both students have the physical capacity to write or type.

Further, these studies used undergraduate students in artificial testing environments—nothing like the kind of conceptual, summative assessments that are typical of law school classrooms. These studies did not involve situations where students would come to class having read the material to potentially integrate their prepared notes with in-class notes. Moreover, these studies only involved situations where students heard lectures. The classrooms seemed to have no discussion. In what ways, I wondered, did these studies relate to a law school classroom?

---

[15] Michael J. Bugeja, *Distractions in the Wireless Classroom*, CHRON. HIGHER EDUC. (Jan. 26, 2007), http://www.chronicle.com/article/Distractions-in-the-Wireless/46664.

[16] Darren Rosenblum, Opinion, *Leave Your Laptops at the Door to My Classroom*, N.Y. TIMES (Jan. 2, 2017), https://www.nytimes.com/2017/01/02/opinion/leave-your-laptops-at-the-door-to-my-classroom.html.

II.   MY CLASSROOM

A.   *Modest Empirical Study*

In the Spring of 2016, I was teaching a first-year constitutional law class with fifty-seven first-year students who took the same courses each semester. The grade on my course was based on a twenty-eight hour take-home exam with a significant word limit, which the student would submit anonymously via the Internet in a typed format.

I was aware of the literature suggesting that students learn better if they do not use a laptop to take notes during class. I was also aware that some of my students might have a disability-related reason to seek to use a laptop, but I did not want students to have to make a special request to use a laptop. Further, I assumed that numerous learning styles would likely be present in my classroom, so I did not want to impose one note-taking style on my students. Finally, I was aware that laptop use might distract other students sitting near the laptop user and thought that such distraction could disproportionately hurt students who were struggling with attention issues in the classroom.

Therefore, I decided to tell my students they could use a laptop only if they requested permission from me to do so, and promised not to use the laptop for any non-class-related purpose such as browsing the Internet. I told them that I would grant permission to everyone who sent me such a request. Finally, I shared the research finding that students tend to take too many verbatim notes when they use a computer and that hand-writers tend to outperform computer users with respect to learning outcomes.

In order to minimize their need to take notes, I also made available my PowerPoint slides in advance of class. I encouraged students simply to handwrite or type on the slides to minimize their note-taking. Despite these instructions, my hypothesis was that my laptop users would perform worse than my non-laptop users based on the existing literature.

Of the fifty-seven students, twenty-five requested to use a laptop and thirty-two did not. The average grade of the two groups was nearly identical as reflected in the following table.

Table 1: Grade Con Law

Computer Use	Mean	N	Std. Deviation
no	86.97	32	5.184
yes	87.28	25	5.813
Total	87.11	57	5.420

I recognized that the self-selection bias in the sample may have

skewed my outcomes. Thus, I checked to see if their decision to use a computer was a significant factor predicting their performance if I controlled for their LSAT score, undergraduate grade point average (GPA), and fall semester grades. As the table below reflects, computer use was not a significant factor in predicting their spring semester grade in my course.

Table 2: Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	9.378	35.958		.261	.795
LSAT Score	.370	.189	.290	1.961	.055
UGPA	5.147	2.983	.255	1.725	.090
Fall GPA	1.454	1.058	.226	1.374	.175
Computer Use	.965	1.313	.089	.735	.466

B.   *Analysis of Data*

Based on prior research, one would have expected my computer users to perform worse on the final examination than students who only took notes by hand. In fact, there was no difference between the grades for computer and longhand note-takers even when I controlled for their LSAT score, undergraduate GPA, and fall GPA. There may have been other, more sophisticated ways that I could have assessed the data, but computer use does not even trend towards being a significant factor.

Why are my results different than that of prior research? First, my students had a strong incentive to use their laptops effectively because they were enrolled in an actual course for which they would take a graded exam. Students in a laboratory may have a different incentive structure. Even when counseled not to take verbatim notes and to try to process the information, they may not have actively cared about doing well on the assessment. They were participating in the study to make money, rather than to learn.

Second, my students had assigned reading before they attended class. When I asked my students why they chose to bring a laptop to class, many of them told me that they wanted to be able to access their typed notes without printing them out. I also make PowerPoint slides available in advance of class. Some of them told me that they liked to download the PowerPoint slides and view them during class—again, without printing them. Thus, my students have access to supplemental material when they use a laptop. The students in the previously discussed studies did not have such an option.

Third, my students are in graduate school and have had at least

four years of undergraduate education to refine their computer skills. I have had some students tell me that they know they could not resist Facebook or email if they brought a computer to class. Thus, they have learned that they learn best without the distraction of a laptop. As adult learners, with a record of academic success, they may have learned what style of learning is best for them and replicated that learning style in my classroom.

Finally, my students were not listening to a thirty-minute TED Talk and then being asked to apply limited, discrete information. My students were trying to absorb information over a fourteen-week period for a final, summative, twenty-eight hour take-home examination. For the purpose of taking the final examination, some of my students wanted to have typed notes that they could cut and paste to create an outline. Some students told me that there was inefficiency to handwriting notes because they then needed to type them into an outline. The kinds of benefits that may transpire from taking handwritten notes on short lectures may not correspond to note-taking in a class that consists of considerable discussion and dialogue in preparation for a twenty-eight hour take-home exam. On the other hand, other students told me that they found it beneficial to transfer the handwritten notes to typed notes. The additional step of typing notes was a learning experience for them. They therefore made an informed decision not to bring a computer into the classroom because they preferred to handwrite notes. But, interestingly, all students reported to me that they eventually created typed notes—unlike the students in the experiments.

III.   APPLICATION TO THE DISABILITY FIELD

In the list of twenty suggestions for creating an inclusive classroom, optional use of laptops is not listed.[17] Instead, it seems that professors sometimes allow "reasonable accommodation" exceptions to a no-laptop policy. Given my data on laptop use within a law school classroom, it appears that professors should re-think their no-laptop policy. From a disability perspective, I would add two points.

First, the reasonable accommodation exception policy serves to stigmatize students with invisible disabilities who will need to request an exception. Their classmates will see them using a laptop when the professor has a general no-laptop policy.[18] There is no need to cause that

---

[17] *See supra* note 5.

[18] Anecdotally, students have reported to me that they did not request permission to use a laptop from a professor with a no-laptop policy because they did not want to reveal their disability status to their classmates.

stigma if the ban is unnecessary.

Second, the reasonable accommodation exception policy treats disability like it is an on/off switch. Some disabilities, like attention deficit disorder, anxiety disorder, or a reading disorder exist on a spectrum. A student may not self-identify as so "disabled" as to require a reasonable accommodation. But the student may have learned to self-accommodate through computer use over the years. It is unfortunate to force a student to self-identify as "disabled" merely to take advantage of a learning style that the student has developed over the years.

The disability literature clearly indicates that some students with disabilities will benefit from laptop use in a classroom. A study of college students with learning disabilities found that poor performance in recording notes resulted in poor test performance.[19] While the research on laptop use suggested that students who use laptops take *too many* notes, the research of students with disabilities suggests a different outcome. Joseph Boyle and his colleagues have found that students with learning disabilities take notes with about half the words of students without disabilities; and their poor note-taking impairs their performance on exams.[20] They do not simply recommend letting students use computers to take notes; they also recommend giving students instruction on how to take *effective* notes. In fact, they found that students with disabilities can be taught strategic note-taking to improve their classroom learning.[21] We do not have to accept at face value that students who take notes with the assistance of a computer will be ineffective note-takers.

CONCLUSION AND CAVEATS

While writing this Article, I have talked with many of my students informally about their experience in classes where laptops are forbidden or permitted. I have been especially interested in comments from students who have self-identified to me that they have a disability. When laptops are allowed without restriction, these students report that students often do surf the Internet during class in a way that is very distracting to those sitting around them. But these students also report that the Internet surfing ends when the professor has a clear policy banning such conduct in the classroom. For example, during the year of

---

[19] Sharon K. Suritsky & Charles A. Hughes, *Notetaking Strategy Instruction, in* TEACHING ADOLESCENTS WITH LEARNING DISABILITIES 267, 281–82 (Donald D. Deshler et al. eds., Love Publ'g Co. 2d ed. 1996).

[20] Joseph R. Boyle et al., *Note-Taking Interventions to Assist Students with Disabilities in Content Area Classes*, 59 PREVENTING SCH. FAILURE 186, 187–88 (2015).

[21] Joseph R. Boyle & Tina Z. Rivera, *Note-Taking Techniques for Students with Disabilities: A Systematic Review of the Research*, 35 LEARNING DISABILITY Q. 131, 138 (2012).

this study, my first-year students had the same classmates during the fall and spring semesters. I taught them in the spring. They reported to me that their classmates who surfed the Internet during the fall were not Internet surfing in the spring in my class because of my clear Internet policy.

Further, some of my students with ADHD reported that they deliberately did not even bring a laptop to school because they knew of their tendency to get distracted. It was important to them that the class was taught in a way that did not *require* laptop use. Some professors allow students to use a laptop or cell phone to answer questions with an electronic "clicker." These students reported that they would prefer faculty not even to expose them to the distraction of a cell phone or laptop during class. If faculty seek to use clicker technology, they would prefer hand clickers that can only be used as clickers and cannot be used to access email or other messages. So, the flip side of banning laptops is for faculty to consider how they may be unnecessarily *requiring* the distracting use of technology in the classroom.

In addition, it is simplistic to assume that students with disabilities will always desire to use laptops. Some of them may actually find that their learning style is best suited to taking notes longhand. Thus, I do not mean to suggest that a laptop-permissive policy will benefit all, or even most, students with disabilities. It may only be a subset of students with disabilities who choose to use laptops. For that subset, however, it is beneficial not to have to identify as disabled to seek the use of alternative technology. It is better to have the practice embedded as part of Universal Design.

Finally, the research for both typical students and students with disabilities strongly suggests that students do not necessarily take effective notes, irrespective of whether they use a laptop. A simplistic statement that laptop users should not take verbatim notes appears to be an insufficient way to help students take more effective notes. Some students may take effective notes using handwriting. Other students may take effective notes with computers. The technology itself does not dictate the outcome. The student's note-taking effectiveness affects the outcome.

In law, we are always teaching our students that answers are murky, there are two sides to most issues, and one needs to assess facts with care. A professor's reflexive "no-laptop" policy fails to hold us to these high standards. I hope this Article encourages professors to use principles of Universal Design to determine what laptop policies to use in their classrooms. I hope the blanket no-laptop ban comes to an end.