

LOGIC AB INITIO: A FUNCTIONAL APPROACH TO IMPROVE LAW STUDENTS' CRITICAL THINKING SKILLS

Barbara A. Kalinowski*

“Logic!” said the Professor half to himself.

“Why don't they teach logic at these schools?”

– C.S. Lewis, *The Lion, the Witch, and the
Wardrobe*

Law professors and legal employers alike lament a modern trend of diminishing critical-thinking skills among law students and new graduates.¹ These concerns are not imaginary: a recent study that followed thousands of

* Associate Professor, Western Michigan University Cooley Law School. Professor Kalinowski thanks Professor Brendan Beery, for his willingness to share ingenious ideas; Professor Patrick Tolan, for his expedited (but excellent) substantive comments; Professor Mark Cooney, for his mentorship and ridiculously positive attitude, and David Lee, her erstwhile research assistant. Special thanks go out to her husband Felix, who picks up her never-ending slack, and to her beloved children, to whom she dedicates every word.

¹ See generally Paul Douglas Callister, *Beyond Training: Law Librarianship's Quest for the Pedagogy of Legal Research Education*, 95 L. LIB. J. 7, 9 (2003) (discussing legal employers' frustration with new graduates' poor legal research skills); Rebecca C. Flanagan, *The Kids Aren't Alright: Rethinking the Law Student Skills Deficit*, 2015 BYU EDUC. & L.J. 135, 138 (2015) (discussing possible reasons for law students' decreasing critical-thinking skills); Courtney G. Lee, *Changing Gears to Meet the "New Normal" in Legal Education*, 53 DUQ. L. REV. 39, 67 (2015) (decreased critical-thinking skills of many law schools' entering classes is likely to continue for years to come); Karen Sloan, *Practice Ready? Law Students and Practitioners Disagree*, NAT'L L.J. (March 6, 2015), <https://www.law.com/nationallawjournal/almID/1202719928678/?slreturn=20171030205801> (last visited Nov. 30, 2017) (discussing a survey by BarBri finding that only 23% of practitioners felt that graduating law students were ready to practice law); James Etienne Viator, *Legal Education's Perfect Storm: Law Students' Poor Writing and Legal Analysis Skills Collide with Dismal Employment Prospects, Creating the Urgent Need to Reconfigure the First-Year Curriculum*, 61 CATH. U. L. REV. 735, 740–41 (2012) (discussing law-school “education-to-profession” disjunction).

undergraduates through college concluded that large proportions of college graduates lacked critical thinking, complex reasoning, and written communication skills once thought to be the foundation of university education.² This means that law schools are increasingly enrolling students who lack the skill set traditionally associated with law-school success.³ To complicate matters, this critical-thinking crisis comes at a time when law schools face stricter and more detailed accreditation standards than ever before.⁴

The concept of “critical thinking” has many overlapping definitions.⁵ It’s been described as an “intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, [] or evaluating information.”⁶ In cognitive terms, critical thinking is “problem solving in situations where ‘solutions’ cannot be verified empirically.”⁷ In the specific context of legal education, critical thinking can be broadly described as “questioning knowledge.”⁸ It requires students to remember, understand, and apply both law and facts, and then analyze, evaluate, and integrate that knowledge to determine “what is important, what is missing, and what is vague.”⁹ In this respect, critical thinking is the “foundation for the ‘key

² RICHARD ARUM & JOSIPA ROKSA, *ACADEMICALLY ADRIFT: LIMITED LEARNING ON COLLEGE CAMPUSES* 35–36 (2011).

³ Flanagan, *supra* note 1, at 144–45.

⁴ Changes needed to implement innovative curriculum changes have been “hampered,” in part, by American Bar Association regulations. Kristen K. Tiscione, *How the Disappearance of Classical Rhetoric and the Decision to Teach Law as a “Science” Severed Theory from Practice in Legal Education*, 51 WAKE FOREST L. REV. 385 (2016); see also ABA SEC. LEG. EDUC. & ADMISSIONS TO THE BAR, *Managing Director’s Guidance Memo: Standard 316, Bar Passage* (Aug. 2016), http://www.americanbar.org/content/dam/aba/administrative/legal_education_and_admissions_to_the_bar/governancedocuments/2016_august_guidance_memo_S316.authcheckdam.pdf (last visited Dec. 12, 2017).

⁵ Michael Scriver & Richard Paul, *Defining Critical Thinking*, THE CRITICAL THINKING COMMUNITY, <http://www.criticalthinking.org/pages/defining-critical-thinking/766> (last visited Dec. 12, 2017).

⁶ *Id.*

⁷ Joanne G. Kurfiss, *Critical Thinking: Theory, Research, Practice, and Possibilities*, ASHE-ERIC HIGHER EDUC. REP. 1, 5 (1988).

⁸ Flanagan, *supra* note 1, at 144.

⁹ *Id.*

intellectual tasks' associated with the sophisticated higher order thinking required in law school."¹⁰

We are all born with the ability to think, but critical thinking generally requires considerable training and hard work.¹¹ The ancient philosophers excelled at critical thinking because most formal learning involved—to a greater or lesser extent—the mastery of logic.¹² Classical philosophers like Aristotle practiced "formal" logic, so named because of its emphasis on the "form," or structure, of the argument.¹³ To formal logicians, whether the substance of an argument was true or false was unimportant. Their focus was on the argument's logical structure and whether the form itself was reliable.¹⁴ Those ancient philosophers spent considerable time thinking about how they were thinking and, were, perhaps, the first true metacognitive¹⁵ thinkers.

But formal logic was and remains a discipline requiring rigorous training—an impractical detour on the path to critical thinking in law school. Therefore, requiring a course in formal logic in law school is much like using a sledgehammer to crack a nut: the benefit is outweighed by the collateral damage. What's needed is a practical method harnessing the metacognitive benefits of logic that fits unobtrusively into existing law-school curricula. By introducing informal or "functional" logic into the curriculum, law schools can not only enhance students' comprehension of individual lessons, but make them better overall thinkers.

The late Judge Ruggero Aldisert was an outspoken proponent of teaching logic to law students. In 1989, he published *Logic for Lawyers: A Guide to Clear Legal Thinking*,¹⁶ a text that cogently explained that the basics of legal reasoning, including the use of precedent, are merely

¹⁰ *Id.* (quoting Judith Welch Wegner, *Reframing Legal Education's "Wicked Problems,"* 61 RUTGERS L. REV. 867, 871 (2009)).

¹¹ Henry Ford is reported to have said, "Thinking is hard work, and that's why so few people do it."

¹² See Kurfiss, *supra* note 7, at 14.

¹³ Stephen M. Rice, *Indiscernible Logic: Using the Logical Fallacies of the Illicit Major Term and the Illicit Minor Term as Litigation Tools*, 47 WILLAMETTE L. REV. 101, 108 (2010).

¹⁴ *Id.*

¹⁵ Cheryl B. Preston et al., *Teaching "Thinking Like a Lawyer": Metacognition and Law Students*, 2014 BYU L. REV. 1053, 1057 (2014) (defining metacognition as "thinking about thinking").

¹⁶ RUGGERO J. ALDISERT, *LOGIC FOR LAWYERS: A GUIDE TO CLEAR LEGAL THINKING*, 28–29 (Nat'l Inst. for Trial Advo. 3d Ed. 1997); Edwin W. Patterson, *Logic in the Law*, 90 U. PA. L. REV. 875 (1942).

variations of deductive and inductive reasoning—the building blocks of logic. *Logic for Lawyers* coincided with a late-20th and early-21st century burst of legal scholarship exploring the relationship between law and classical logic and rhetoric.¹⁷ In 2007, Judge Aldisert published the article *Logic for Law Students: How to Think Like a Lawyer*,¹⁸ a more streamlined version of his earlier work, “explain[ing], in broad strokes, the core principles of logic and how they apply in the law-school classroom.”¹⁹

This article builds on Judge Aldisert's premise that “thinking like a lawyer”—critical thinking—means “employing logic to construct arguments.”²⁰ It goes a step further, however, proposing that training law students to use logic would not only provide professors and students a common language to identify specific deficiencies in analysis, it could actually increase students' cognitive capacity for critical thinking.

While certainly not suggesting that such training would remedy all that ails legal education or even that it could enhance critical thinking for all students, this article asserts that law schools should make the process of legal reasoning more transparent and explicit from the outset, and proposes techniques that can be adopted quickly with minimal institutional costs or upheaval. Part I examines possible reasons that law-school matriculants increasingly lack critical-thinking skills needed for success. Part II maps out three basic components of informal logic training: deductive reasoning, inductive reasoning, and fallacy. It then identifies related law-school competencies that could be enhanced through training in these areas. Part III proposes a relatively painless method of incorporating functional logic training across the law-school curriculum. Given the breadth and depth of the critical thinking deficit (detailed below), this approach presents a pragmatic—though admittedly imperfect—solution to the problem.

¹⁷ See, e.g., Michael R. Smith, *Rhetoric Theory and Legal Writing: An Annotated Bibliography*, 3 J. ALWD 129 (2006) (listing dozens of scholarly works discussing logic and rhetoric in the discipline of legal writing); Richard D. Friedman, *Logic and Elements* (Symposium: Premises and Conclusions: Symbolic Logic for Legal Analysis), 73 NOTRE DAME L. REV. 575 (1998).

¹⁸ Ruggero J. Aldisert et al., *Logic for Law Students: How to Think Like a Lawyer*, 69 U. PITT. L. REV. 1, 2 (2007).

¹⁹ *Id.*

²⁰ *Id.* at 1.

Part I: A Lack Of Critical-Thinking Skills And (Some) Reasons For It

Success in law school (as opposed to success in most undergraduate disciplines) requires skills beyond mastery of facts, dates, formulas, and established theories and positions of academics. It requires independent reasoning.²¹ And that reasoning cannot be theoretical or abstract: it must comport with societal norms of justice, fairness, and overall propriety.²² Furthermore, that reasoning must be drawn from—and remain consistent with—numerous sources of law. Legal reasoning must be sound and valid; in other words, it must be logical. But increasingly, students come to law school ill-equipped for this type of rigor.²³ In recent years, law student credentials have decreased across the board: between 2010 and 2013, the median score of the Law School Admission Test (“LSAT”), which purports to measure critical-thinking skills, declined from 157 to 155.²⁴ In fact, nearly ninety percent

²¹ Paula Lustbader, *Construction Sites, Building Types, and Bridging Gaps: A Cognitive Theory of the Learning Progression of Law Students*, 33 WILLAMETTE L. REV. 315, 338 (1997) (“What is expected of students at the undergraduate level is vastly different from what is expected in law school. Prior to law school, learning mainly involved memorizing and regurgitating predigested, prepackaged, and organized information obtained from textbooks, lectures, and the media. Consequently, they are ill-prepared to read critically, synthesize rules, or analyze material to the extent required in law school.”).

²² Jesse Franklin Brumbaugh, LEGAL REASONING AND BRIEFING: LOGIC APPLIED TO THE PREPARATION, TRIAL AND APPEAL OF CASES, WITH ILLUSTRATIVE BRIEFS AND FORMS 59 (1917) (“Ordinary logical theory requires but truthfulness only in the materials of the syllogism and form, but legal logic adds the social elements of justice and equity”); James R. Maxeiner, *Thinking Like A Lawyer Abroad: Putting Justice into Legal Reasoning*, 11 WASH. U. GLOBAL STUD. L. REV. 55, 60 (2012) (“It is elementary learning that law seeks justice.”).

²³ Ruth Vance & Susan Stuart, *Of Moby Dick and Tartar Sauce: The Academically Underprepared Law Student and the Curse of Overconfidence*, 53 DUQ. L. REV. 133, 134 (2015) (“[M]any matriculating law students arrive at law school woefully underprepared at the same time legal educators are challenged with the task of producing practice-ready graduates.”).

²⁴ Aaron N. Taylor, *Diversity as a Law School Survival Strategy*, 59 St. Louis U.L.J 321, 329 (2015).

of law schools had a lower median LSAT score in 2013 than in 2010.²⁵

As to the cause, there is no shortage of finger pointing. Professor Jay Sterling Silver has opined that primary education—often undertaken in overcrowded public schools, where learning is geared toward mastery of standardized tests—teaches students *not* to think.²⁶ Professors Susan Stuart and Ruth Vance blame federal law, specifically noting that the current generation of law-school matriculants has been almost wholly educated under No Child Left Behind, which, since enactment in 2001, has shifted primary education focus towards mandatory achievement of minimum skill.²⁷ Others point to systematic grade inflation at the undergraduate level as contributing to students' inflated opinion of their competency.²⁸ Still others suggest that institutional use of student evaluations as part of tenure decisions contributes to lower teaching standards.²⁹ Moreover, there appears to be no end in sight to the decline, given educational, social, and technological trends.

²⁵ *Id.* While not the only predictor of law-school success, the LSAT measures “natural skill or reasoning,” skills that law schools and state bars consider essential to lawyering. Robert Steinbuch & Kim Love, *Color-Blind-Spot: The Intersection of Freedom of Information Law and Affirmative Action in Law School Admissions*, 20 TEX. REV. L. & POL. 181, 201 (2016) (citing Nicholas Georgakopoulos, *Bar Passage: GPA and LSAT, Not Bar Reviews* (Indiana University Robert H. McKinney School of Law Research Paper No. 2013-30 Sept. 19, 2013), <http://bit.ly/20Ar8aB> [perma.cc/62MU-JRR7]).

²⁶ Jay Sterling Silver, *Responsible Solutions: Reply to Tamanaha and Campos*, 2 TEX. A&M L. REV. 215, 229–30 (2014).

²⁷ Vance & Stuart, *supra* note 23, at 137. A full discussion of the deficiencies of K-12 and undergraduate educations is beyond the scope of the article.

²⁸ “Despite a dramatic decrease in hours spent studying, college students are receiving higher grades.” Flanagan, *supra* note 1, at 139 (citing Kevin Carey, *Trust Us' Won't Cut It Anymore*, CHRON. HIGHER EDUC., Jan. 18, 2011, <http://chronicle.com/article/Trust-Us-Wont-Cut-It/125978/> (last visited Dec. 12, 2017). (“Yes, there's been grade inflation. A-minus is the new C.”); Lee, *supra* note 1, at 66; *see also* Rebecca C. Flanagan, *Do Med Schools Do It Better? Improving Law School Admissions by Adopting a Medical School Admissions Model*, 53 DUQ. L. REV. 75, 81 (2015) (“Many students can earn above-average grades throughout their undergraduate years by artfully selecting courses and majors.”).

²⁹ Lee, *supra* note 1, at 66.

It's likely impossible to identify the contributing factors exhaustively. But, as explained below, trends in undergraduate education and technology partly explain why students generally seem to have adopted a more shallow, heuristic method of thinking. This is particularly true of the Millennial generation, whose unique cultural characteristics make them all the more prone to such thinking shortcuts.

a. The Changing Nature of Undergraduate Education

Undergraduate education has changed over the last fifty years.³⁰ Some scholars theorize that modern law students lack adequate thinking skills partly because undergraduates no longer receive the benefit of a classical liberal-arts education.³¹ A foundation in the liberal arts was long presumed to prepare students “to become civic and professional leaders, to prepare them for lifelong learning and inquiry.”³² These students were well versed in the humanities, logic, and rhetoric, and developed “communication skills through a variety of oral and written exercises.”³³ This liberal education, focused on flexibility, creativity, critical thinking, analysis, and written communication,³⁴ would, unsurprisingly, prepare a college graduate to successfully participate in and benefit from the rigors of a law-school classroom.³⁵

³⁰ Flanagan, *supra* note 1, at 135–36.

³¹ Viator, *supra* note 1, at 753 (“From the late seventeenth century through the end of the nineteenth century, all levels of American schooling were dedicated to the study of classical literature and history.”).

³² Flanagan, *supra* note 1, at 148; *see also* Marilyn R. Walter, *Erasing the Lines Between the Law School and the Liberal Arts Curricula: A Comment on "A Liberal Education in Law,"* 1 J. ALWD. 153, 154 (2002) (discussing that familiarity with the classical authors and with principles of oratory was viewed, pre-Civil War, as essential to a lawyer's excellence).

³³ Tiscione, *supra* note 4, at 400.

³⁴ Carol T. Christ, *Myth: A Liberal Arts Education Is Becoming Irrelevant*, AM. COUNCIL ON EDUC. (Spring 2012), <http://www.acenet.edu/the-presidency/columns-and-features/Pages/Myth-A-Liberal-Arts-Education-Is-Becoming-Irrelevant.aspx> (last visited Dec. 12, 2017).

³⁵ “[T]he best preparation for the intense phase of the apprenticeship we call 'going to law school' is a broad-based liberal arts education.” Patricia Sayre, “Socrates is Mortal”: *Formal Logic and the Pre-Law Undergraduate*, 73 NOTRE DAME L. REV. 689, 703 (1998).

But while classic liberal-arts education did indeed mold creative and well-rounded learners for many decades, colleges and universities—along with students and their parents—have, over time, become increasingly dubious of its practical value. Knowledge of classical literature, arts, and natural sciences does not provide specific, marketable competencies for a defined entry-level job.³⁶ Some presume that a broad, liberal-arts education is unlikely to lead to the same level of monetary reward as, for example, a Master’s degree in Business Administration³⁷ or Engineering.³⁸ As a result, undergraduate institutions in the United States have, since the 1970s, shifted curricular emphasis from liberal arts to more professionally-oriented or vocational training.³⁹

Colleges and universities now promise to prepare students for specific careers. But a classic liberal-arts program

³⁶ Flanagan, *supra* note 1, at 148.

³⁷ Doug Mataconis, *College Students Lack Critical Thinking Skills, But Who's To Blame?*, OUTSIDE THE BELTWAY (Jan. 18, 2011), <http://www.outsidethebeltway.com/college-students-lack-critical-thinking-skills-but-whos-to-blame/> (last visited Dec. 12, 2017).

³⁸ “Most of the top earners in the liberal arts end up matching only the bottom earners in science, technology, engineering and mathematics — known as the STEM fields — and some will earn less than high school graduates who have vocational skills, like welders and mechanics.” Patricia Cohen, *A Rising Call to Promote STEM Education and Cut Liberal Arts Funding*, N.Y. TIMES (Feb. 21, 2016), <https://www.nytimes.com/2016/02/22/business/a-rising-call-to-promote-stem-education-and-cut-liberal-arts-funding.html> (last visited Dec. 12, 2017).

³⁹ *Id.*; Michael Delucchi, “*Liberal Arts*” *Colleges and the Myth of Uniqueness*, 68(4) J. OF HIGHER EDUC. 414, 414 (1997) (“[T]he curricular trend in higher education since about 1970 has been toward studies related to work Enrollment concerns in recent years have compelled many liberal arts colleges to abandon or sharply scale back their arts and sciences curriculum in order to accommodate student preoccupation with the immediate job market.”); see also Mark Yates, *The Carnegie Effect: Elevating Practical Training over Liberal Education in Curricular Reform*, 17 LEGAL WRITING 233, 243 (2011) (“Since the 1970s, undergraduate institutions in the United States have been shifting their curricular emphasis from liberal arts to more professionally oriented education. This shift is due largely to enrollment concerns caused by changes in the labor market and corresponding changes in the expectations of entering students.”); Judith T. Younger, *Legal Education: An Illusion*, 75 MINN. L. REV. 1037, 1043 (1991) (arguing that, in attempting to democratize higher education, colleges and universities abandoned the liberal arts in favor of specialization and vocationalism).

used classic literature, history, the arts, and natural sciences (as opposed to applied sciences) to shape thinkers who could, presumably, succeed in any number of careers. “The essential paradox, or one might even say the miracle of liberal education, is that by being evidently impractical, it equips a student for life far more richly and completely, and across a far wider expanse of time and space, than does education whose sole aim is to be useful.”⁴⁰

Whether caused by an institutional shift away from liberal arts or some other phenomenon, the decrease in critical-thinking skills in undergraduates is well documented. In 2011, two researchers, Richard Arum and Josipa Roksa, collected empirical evidence of a downward trend in critical-thinking skills in undergraduates. Their book, *Academically Adrift*, proposed that undergraduates are overwhelmingly distracted by work, social lives, and an educational culture that puts learning low on the priority list.⁴¹ Arum and Roksa collected data using the Collegiate Learning Assessment (“CLA”), a test comparing similarly situated students from a wide variety of colleges and universities.⁴² The test measured critical thinking, analytical reasoning, problem solving, and writing skills, all of which are essential during the first year of law school.⁴³ The study tracked the academic progress of 2,322 students, scoring them once in their first semester of college and again at the end of their fourth semester (half-way through college). The study found that forty-five percent of students gained virtually no critical thinking, complex reasoning, or writing skills over the assessment period:

While these students may have developed subject-specific skills . . . , in terms of general analytical competencies assessed, large numbers of U.S. college students can be accurately described as academically adrift. They might graduate, but they are failing to develop the higher-order

⁴⁰ Nicholas Lemann, *Liberal Education and Professionals*, 90 LIBERAL EDUC. 14 (Spring 2004), <http://www.aacu.org/liberaleducation/le-sp04/le-sp04feature1.cfm> (last visited Dec. 12, 2017).

⁴¹ ARUM & ROKSA, *supra* note 2, at 96–98.

⁴² See Flanagan, *supra* note 1, at 140 (describing Collegiate Learning Assessment test subjects as similarly situated students from wide variety of colleges and universities).

⁴³ *Id.* (characterizing critical thinking, analytical reasoning, problem solving, and writing skills as essential skills during the first year of law school).

cognitive skills that it is widely assumed college students should master.⁴⁴

Other studies have painted an equally grim picture of college graduates' critical-thinking skills. The Wabash National Study of Liberal Arts Education,⁴⁵ conducted in 2006-2007, concluded that thirty percent of undergraduates tested showed no growth—or even declined—in critical-thinking skills after completing four years of college.⁴⁶ These results confirmed those of earlier studies, which also suggested a long-term decline in skills acquisition among undergraduates.⁴⁷

Arum & Roksa's study revealed another disturbing problem: universities participating in the assessment were not closing the achievement gap experienced by socioeconomically disadvantaged students.⁴⁸ In the initial, freshman-year CLA assessments, minorities and students from less-educated families scored significantly lower in critical thinking, complex reasoning, and writing than white students from more-educated families.⁴⁹ According to the study, this "achievement gap" between privileged students and their less-advantaged peers only increased after the first year of college. In other words, "[t]he results of the CLA 'suggest higher education . . . reproduces social inequality,'"⁵⁰ insofar as it correlates to lack of critical thinking skills. Accordingly, the critical thinking necessary for law school is likely foreign to students who lack that privilege.⁵¹ Law

⁴⁴ ARUM & ROKSA, *supra* note 2, at 121.

⁴⁵ Center of Inquiry in the Liberal Arts at Wabash College, *Wabash National Study of Liberal Arts Education*, <http://www.liberalarts.wabash.edu/study-research/> (last visited Dec. 12, 2017).

⁴⁶ Center of Inquiry in the Liberal Arts at Wabash College, *Wabash National Study of Liberal Arts Education, Fourth Year Change Summary*, <http://static1.1.sqspcdn.com/static/f/333946/10418206/1296073333850/4-year-change-summary-website.pdf?token=ZVEVCl3%2ButHXke%2FkoYqlLCJCYMo%3D> (last visited Dec. 12, 2017).

⁴⁷ "[S]tudies have not found positive evidence of broad-based skills acquisition by college students since the 1990s." Flanagan, *supra* note 1, at 142.

⁴⁸ *Id.* at 143.

⁴⁹ *Id.*

⁵⁰ *Id.* (quoting ARUM & ROKSA, *supra* note 2, at 40).

⁵¹ *Id.*

schools that purport to promote diversity and equal opportunity in learning simply cannot ignore such data.

The effect of this achievement gap is brought into sharper focus by the recent, colossal downturn in law-school applications. Higher-tier schools made up for the deficit in applications by accepting students they previously would never have considered.⁵² Those students were effectively pilfered from middle-tier schools, which made up for their own losses by accepting students who they, in turn, would previously have rejected.⁵³ But this left many lower-tier schools, particularly those created to provide opportunities for minorities or other at-risk students, with an existential crisis: disappear, or continue the valuable mission with less-qualified and, presumably, less-prepared students. At the end of the day, nearly every law school has been left with a student cohort less likely than previous ones to pass the bar exam.⁵⁴

The ostensible decrease in critical thinking in college graduates across socioeconomic spectrums impacts more than just individual students. A first-year law student who has never had the opportunity to disagree with a professor or to independently form opinions about cultures based on their art, literature, or music will almost certainly struggle to synthesize seemingly inconsistent judicial opinions into a cogent legal principle. But a critical mass of students struggling on the same level will fundamentally change the dynamic of a law-school classroom and prevent the purposeful exchange of ideas.

b. The Effect of Technology on Students' Ability to Think

The effect of the digital age and the ubiquity of technology in nearly every detail of daily life cannot be understated when considering the reasons for waning critical thinking. “The Internet has made so much information available to us, more than we could possibly retain in our brains, that we are more often ‘handing off the job of remembering’ things to

⁵² Elizabeth Olsen, *Study Cites Lower Standards in Law School Admissions*, N.Y. TIMES, Oct. 27, 2015, at B1; Jennifer M. Cooper, *Smarter Law Learning: Using Cognitive Science to Maximize Law Learning*, 44 CAP. U.L. REV. 551, 552 (2016).

⁵³ See generally Taylor, *supra* note 24.

⁵⁴ Jeremy Berke, *Law-School Grads are Bombing the Bar and It's a Sign of Trouble for Legal Education*, BUSINESS INSIDER, <http://www.businessinsider.com/bar-passage-exam-rates-have-dropped-in-several-key-states-2015-11> (last visited Dec. 12, 2017).

technology."⁵⁵ But technology causes problems more worrisome than just intellectual laziness: technology is changing the way students learn.

Learning can be described as any "relatively permanent change in a neuron."⁵⁶ Neurons are simply the brain's cells which, when activated, release chemicals called neurotransmitters. Neurotransmitters connect neurons to other neurons, creating electrochemical pathways in the brain that form our thoughts, memories, emotions, and sensations.⁵⁷ When confronted with challenges, the human brain adapts by modifying existing neural connections.⁵⁸ This is known as brain plasticity or neuroplasticity. The brain can "efficiently reorganize allocation of its resources to meet demands and compensate for deficits."⁵⁹ "Evolution has given us a brain that can literally change its mind—over and over again."⁶⁰ This means humans "can form bad neurological habits as well as good ones."⁶¹

In *The Shallows: What the Internet is Doing to Our Brains*, author Nicholas Carr describes the subtle—yet ultimately profound—effects the Internet and other technological advances are having on human brains. Just as we can strengthen our mental capabilities through use of technology, Carr explains that human brains are subject to "intellectual decay."⁶² His collected research suggests that information and communication technologies are changing humans at a neurological level.⁶³

For example, Carr posits that the Internet has supplanted reading as the primary source of information gathering (as did television, to some extent, before it). In terms of neurological development, the emergence of reading—particularly the

⁵⁵ Shailini Jandial George, *Teaching the Smartphone Generation: How Cognitive Science Can Improve Learning in Law School*, 66 ME. L. REV. 163, 169 (2013).

⁵⁶ *Id.* at 172.

⁵⁷ *Id.* at 172–73.

⁵⁸ Sara Bernard, *Neuroplasticity: Learning Physically Changes the Brain*, EDUTOPIA (Dec. 1, 2010), <http://www.edutopia.org/neuroscience-brain-based-learning-neuroplasticity> (Dec. 12, 2017).

⁵⁹ *Id.*

⁶⁰ NICHOLAS CARR, *THE SHALLOWS: WHAT THE INTERNET IS DOING TO OUR BRAINS* 31, 34 (2011).

⁶¹ *Id.*

⁶² *Id.* at 120.

⁶³ Jennie Bricker, *Where No One Has Gone Before: Practicing Law in the Digital Age*, 72 J. MO. B. 18 (2016).

“deep reading” necessary to consume literature and other book-length works—rewired and optimized the human brain for “deep thinking.”⁶⁴ The ability to read not only expanded one's knowledge; it allowed previously unattainable levels of comparison to thoughts and experiences of others.⁶⁵ To fully appreciate the written word, one would have to discipline one's mind to “follow a line of argument or narrative through a succession of printed pages.”⁶⁶

The Internet, in contrast, features small chunks of information punctuated with distracting hyperlinks, multimedia, and ads. These features activate the prefrontal cortex, overtaxing the brain, making online reading a “cognitively strenuous act.”⁶⁷ In response to this stress, Carr suggests, our brains’ plasticity kicks in, rewiring and optimizing neural connections (and pruning unnecessary ones) for this new, rapid method of information gathering.⁶⁸ His research shows that as little as five hours of Internet use can significantly rewire the neural circuitry of the prefrontal cortex.⁶⁹

The triumph of the Internet as a single medium for communication and information gathering may, therefore, also be its greatest danger. Just as computers have evolved to function simultaneously as typewriters, encyclopedias, phones, televisions, and social gathering spaces, their users have, unsurprisingly, become skillful multi-taskers.⁷⁰ And the same plasticity that, over millennia, had optimized our brains for deep thinking is now strengthening the neural circuitry customized for “rapid and incisive spurts of directed attention” that enable multitasking.⁷¹ Unfortunately, quick shifts of attention and multitasking are quite useless in a typical 1L classroom. The reasoned analysis necessary in law school is not achievable without focused attention for a sustained time period.⁷² Thus, critical thinking takes another hit thanks to technology.

⁶⁴ CARR, *supra* note 60, at 65.

⁶⁵ *See id.* at 72.

⁶⁶ *Id.* at 75.

⁶⁷ *Id.* at 122.

⁶⁸ *Id.* at 141–42.

⁶⁹ *Id.* at 121.

⁷⁰ A slightly exaggerated, but not-all-too-unrealistic multi-tasking scenario is described at the outset of George, *supra* note 55, at 164.

⁷¹ CARR, *supra* note 60, at 140.

⁷² Vance & Stuart, *supra* note 22, at 141.

One last insult to critical thinking occurs as a result of “The Google Effect.”⁷³ This phenomenon describes the automatic forgetting of information that can be found online.⁷⁴ Neuropsychologists know that, to maintain efficiency, our brains constantly—and subconsciously—prune memories.⁷⁵ Since there is less need to preserve information that can be readily retrieved, facts and ideas are more often pruned when the brain perceives that the information will be archived.⁷⁶ For law students faced with hundred-page reading assignments and looming deadlines, this phenomenon would appear rational and advantageous. Sometimes, “the effort needed to acquire knowledge outweighs the advantage of having it.”⁷⁷ The Google Effect could, therefore, be further eroding law students’ capacity for successful legal analysis. For example, a student accustomed to efficient and fruitful Internet searches will have little success using those techniques to brief a case before class. In the context of legal research, the wide-cast net of a Google search will yield poor results in comparison to a systematic, linear exploration of legal sources made possible by understanding jurisdictional structure.⁷⁸ Rule-based subjects, such as Civil Procedure and Evidence, which require memorization of rules as building-blocks of greater concepts,⁷⁹ could be challenging for a student whose brain is unaccustomed to storing large amounts of data. As technology rapidly pushes aside millennia of neurological refinements allowing for deep thinking and logical reasoning, legal education will likely have to adapt.

⁷³ Daniel M. Wegner & Adrian F. Ward, *The Internet Has Become the External Hard Drive for our Memories*, SCI. AM. (Dec. 1, 2013), <http://www.scientificamerican.com/article/the-internet-has-become-the-external-hard-drive-for-our-memories/> (last visited Dec. 12, 2017).

⁷⁴ Patrick Meyer, *The Google Effect, Multitasking, and Lost Linearity: What We Should Do*, 42 OHIO N.U. L. REV. 705, 716 (2016).

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ William Poundstone, *The Internet Isn’t Making Us Dumber — It’s Making Us More “Meta-Ignorant,”* N.Y. MAG. (July 27, 2016), <http://nymag.com/scienceofus/2016/07/the-internet-isnt-making-us-dumber-its-making-us-more-meta-ignorant.html> (last visited Dec. 12, 2017).

⁷⁸ Meyer, *supra* note 74, at 712–13.

⁷⁹ Gabriel H. Teninbaum, *Spaced Repetition: A Method for Learning More Law in Less Time*, 17 J. HIGH TECH. L. 273, 302 (2017).

c. Millennial Zeitgeist and Beyond

Shifts in undergraduate education and technology may indeed be the two main ingredients for the collective deficits in critical-thinking skills of matriculating law students. But the culture and attitudes of the 21st Century could be the seasoning that makes those deficits so unpalatable in the context of law-school learning. It's all too easy to blast the Millennial generation⁸⁰ for its (real or imagined) lack of intellectualism,⁸¹ perfunctory knowledge of history,⁸² or narcissism.⁸³ But Millennials are also more socially conscious and idealistic than previous generations.⁸⁴ Their early exposure to computers and the Internet make them “the most technologically savvy and resourceful generation yet to hit the law school scene.”⁸⁵ They are “education-oriented, career-

⁸⁰ NEIL HOWE & WILLIAM STRAUSS, *MILLENNIALS RISING: THE NEXT GREAT GENERATION* 4 (2000) (defining a Millennial as anyone born during or after 1982).

⁸¹ Data suggests that Millennials do not read print newspapers, watch television news, or purposely visit news websites, instead receiving information on selected stories through social media. The Media Insight Project, *How Millennials Get News: Inside the Habits of America's First Digital Generation*, <http://www.mediainsight.org/Pages/how-millennials-get-news-inside-the-habits-of-americas-first-digital-generation.aspx> (last visited Dec. 12, 2017).

⁸² Poundstone, *supra* note 77 (“Most — more than 50 percent — of millennials can’t name anyone who shot a U.S. president or discovered a planet; they don’t know the ancient city celebrated for its hanging gardens, the one destroyed by Mount Vesuvius, or the emperor said to have fiddled while Rome burned; and most millennials can’t name the single word uttered by the raven in Edgar Allan Poe’s poem.”).

⁸³ “The incidence of narcissistic personality disorder is nearly three times as high for people in their 20s as for the generation that's now 65 or older, according to the National Institutes of Health; 58% more college students scored higher on a narcissism scale in 2009 than in 1982.” Joel Stein, *Millennials: The Me Me Me Generation*, *TIME MAGAZINE* (May 20, 2013) <http://time.com/247/millennials-the-me-me-me-generation/>; *see also* Vance & Stuart, *supra* note 22, at 134–35.

⁸⁴ Kari Mercer Dalton, *Bridging the Digital Divide and Guiding the Millennial Generation's Research and Analysis*, 18 *BARRY L. REV.* 167, 173–74 (2012).

⁸⁵ Eric A. DeGroff, *Training Tomorrow's Lawyers: What Empirical Research Can Tell Us About the Effect of Law School Pedagogy on Law Student Learning Styles*, 36 *S. ILL. U.L.J.* 251 (2012).

minded, motivated, connected, and self-confident.”⁸⁶ These same characteristics have led some scholars to brand Millennials as overconfident and entitled.⁸⁷

In the context of legal education, overconfidence should be distinguished from confidence. Students who matriculate to law school have generally achieved much: They have completed a Bachelor’s degree—at least—with enough success to be accepted into a graduate-level program.⁸⁸ They have succeeded on the LSAT to the extent that their scores have earned them a place in an entering law-school class. Non-traditional students entering law school as a second or third career may have already achieved business success. As a result of this widely varied success, many students come to law school overestimating their intellectual abilities.⁸⁹ Often, students “express high academic expectations and professional ambitions but fail to realistically appreciate the necessary steps to achieve their goals.”⁹⁰

This pattern is consistent with a fascinating psychological phenomenon known as the Dunning-Kruger Effect. The Dunning-Kruger Effect⁹¹ was proposed in 1999 by David Dunning and Justin Kruger, cognitive psychologists at Cornell University. Their study concluded that unskilled people generally hold overly favorable views of their intellectual abilities. This overestimation of ability increases as actual ability decreases. In other words, incompetence “robs [the incompetent] of the metacognitive ability to realize” they are incompetent:⁹²

[S]kills that engender competence in a particular domain are often the very same skills necessary to evaluate competence in that domain—one’s own or anyone else’s. Because of this, incompetent individuals lack what cognitive psychologists

⁸⁶ *Id.*

⁸⁷ Vance & Stuart, *supra* note 22, at 134–35.

⁸⁸ Vance & Stuart, *supra* note 22, at 141.

⁸⁹ Anthony Niedwiecki, *Teaching for Lifelong Learning: Improving the Metacognitive Skills of Law Students Through More Effective Formative Assessment Techniques*, 40 CAP. U. L. REV. 149, 160 (2012); Cooper, *supra* note 53, at 556.

⁹⁰ Cooper, *supra* note 52, at 556.

⁹¹ See generally Justin Kruger & David Dunning, *Unskilled and Unaware of It: How Difficulties in Recognizing One’s Own Incompetence Lead to Inflated Self-Assessments*, 77 J. PERSONALITY & SOC. PSYCHOLOGY 1121 (1999).

⁹² *Id.* at 1121.

variously term *metacognition*, *metamemory*, *metacomprehension*, or *self-monitoring* skills. These terms refer to the ability to know how well one is performing, when one is likely to be accurate in judgment, and when one is likely to be in error.⁹³

Dunning and Kruger's study is particularly interesting considering that the researchers used logical reasoning skills—in the form of LSAT questions—as one of the metrics for measuring the effect.⁹⁴ Overall, subjects (forty-five Cornell undergraduates) overestimated their logical reasoning skills relative to their peers.⁹⁵ But bottom quartile subjects overestimated their performance by a staggering degree: although they scored at the 12th percentile on average, they nevertheless estimated that their general logical reasoning ability fell at the 68th percentile.⁹⁶ In other words, the poorest performers considered themselves significantly above average.

The point, of course, is not that law-school matriculants are incompetent. But the existence of the Dunning-Kruger effect may shed light on why those students most lacking in critical-thinking skills are either unaware of their deficits or are unable to rectify them.⁹⁷ More importantly, it suggests that students would benefit from learning specific metacognitive skills at an early stage in law school so that they can evaluate their own analytical competence before and after graduation.

Whatever the reasons for the (real or perceived) lack of critical thinking skills, a more appropriate discussion is what law schools can do to address any real deficits. There is no definite etiology for dwindling reasoning skills, nor is there any real need to articulate one. But if legal educators sense that "things are not as they were," and that observation is

⁹³ *Id.* (citations omitted).

⁹⁴ *Id.* at 1124.

⁹⁵ Participants placed themselves in the 66th percentile relative to others, significantly higher than the actual mean of 50. *Id.* at 1123.

⁹⁶ *Id.* at 1125.

⁹⁷ Legal Writing guru Bryan Garner linked the Dunning-Kruger effect to the legal profession. He suggested that attorneys overestimate their writing skills and, therefore, fail to take steps to improve it, even when doing so would be beneficial. Bryan A. Garner, *Why Lawyers Can't Write: Science Has Something to Do with It, and Law Schools Are Partly to Blame*, 99-MAR. A.B.A. J. 24 (2013).

coupled with increasing attrition rates or decreasing bar exam success,⁹⁸ then we must take corrective measures.

Part II: The Basics of Logic and Related Law-School Competencies

Law schools purport to teach students to "think like lawyers."⁹⁹ But despite the need for clear and logical reasoning in the legal profession, law schools do not teach principles of logic.¹⁰⁰ Or do they?

The fact is that modern law curricula do use principles of logic—without denominating them as such. Law-school competencies—identifying issues, articulating rules and exceptions, comparing precedent to new facts, understanding public policy, addressing counterarguments—all require some form of logical reasoning. When law students apply a general legal rule to a specific legal issue on an exam, they engage in deductive reasoning. When students synthesize precedent into a general legal principle in legal writing class, they engage in inductive reasoning. When students argue in a brief or oral argument that a particular precedent should be followed, they engage in reasoning by analogy.¹⁰¹

But often, students see these law-school learning methods as nothing more than their professors' personal methodological preferences.¹⁰² They fail to appreciate that these techniques have been tested over thousands of years by history's greatest thinkers. Hence the need for basic logic training: exposing neophyte law students to the basic principles of logic could provide them and their professors a common language to identify and correct deficits in reasoning and critical thinking. In addition, such training could—

⁹⁸ See 2016 MBE Statistics, NAT'L CONF. BAR EXAMINERS, <http://www.ncbex.org/publications/statistics/mbe-statistics/> (last visited Sept. 29, 2017) (showing a decline in MBE National Mean Scaled Scores from 2007 to 2016).

⁹⁹ "Thinking like a lawyer" has been described as "employing logic to construct arguments." Aldisert et al., *supra* note 18, at 1.

¹⁰⁰ Jack L. Landau, *Logic for Lawyers*, 13 PAC. L.J. 59, 60 (1981); Aldisert et al., *supra* note 18, at 2; Stephen M. Rice, *False Persuasion, Superficial Heuristics, and the Power of Logical Form to Test the Integrity of Legal Argument*, 34 PACE L. REV. 76, 76 (2014).

¹⁰¹ ALDISERT, *supra* note 16, at 28–29; see Patterson, *supra* note 16, at 903–04 (describing types of analogies).

¹⁰² Professors often hear, "I know the material; I just didn't present it the way you wanted it."

through the magic of brain plasticity—remediate deficiencies in cognitive analytical ability and foster better learning.

The principles of logic that could benefit a law-school curriculum in this way represent only a fraction of the discipline of formal logic. It would be impractical and counterproductive to teach a comprehensive additional discipline in the already-crowded list of required subjects. Sufficient metacognitive benefits can be achieved through exposure to three fundamental principles of logic: deductive reasoning, inductive reasoning, and fallacy.¹⁰³ While philosophers may cringe at such attenuation of the Art of Aristotle, Aquinas, and Wittgenstein,¹⁰⁴ the goal is not to teach logic for its own sake. It is to provide students with a practical—perhaps heuristic—method for evaluating the quality of their reasoning. In short, one "familiar with the basics of logical thinking is more likely to argue effectively than one who is not."¹⁰⁵

a. Deductive Reasoning and Rule Application

Perhaps the easiest logic principle to teach law students is deduction, a lawyer's most fundamental skill.¹⁰⁶ This process of reflective thinking¹⁰⁷ moves from general truth to specific conclusion.¹⁰⁸ In its simplest form, deduction involves two

¹⁰³ The Honorable Jack L. Landau, Justice of the Supreme Court of Oregon, proposed essentially the same in 1981, when he was an Instructor of Law at Northwestern School of Law of Lewis and Clark College:

Much of what is currently taught in logic classes is entirely too cumbersome for analysis. However, there are certain techniques, namely deduction, induction and analogy, and the avoidance of informal fallacies, that can easily be taught to first-year students, that do have a direct bearing on the legal reasoning process, and that can definitely improve the quality of reasoning and critical thinking skills exhibited by students and lawyers alike.

Landau, *supra* note 100, at 60.

¹⁰⁴ Judge Aldisert expressed similar unease at possibly offending logicians and mathematicians. Aldisert et al., *supra* note 18, at 2. But it is, perhaps, the greatest approbation to demonstrate Logic's utility even in such a highly diluted form.

¹⁰⁵ *Id.*

¹⁰⁶ "Deductive reasoning is a mental operation that a student, lawyer or judge must employ every working day." ALDISERT, *supra* note 16, at 45.

¹⁰⁷ *Id.* at 23.

¹⁰⁸ See, e.g., *id.* at 48–49.

propositions which, if true, taken together lead undeniably to a third proposition. The classic tool of deductive reasoning is the syllogism,¹⁰⁹ demonstrated by this ubiquitous example:

All humans are mortal.
Socrates is a human.
Therefore, Socrates is mortal.

The reliability of a syllogism comes from the objective certainty that the conclusion follows from the truth of the first two propositions, or "premises."¹¹⁰ The first, the "major premise," represents a universal truth. The second, the "minor premise," represents a specific and more narrowly applicable fact. The third, the conclusion, is a new idea that follows inferentially from the truth of the first two premises. It is this progression of thought, based on the relationship between known truths, that instills confidence in the resulting conclusion.¹¹¹

Logicians test the validity of a syllogism by analyzing the patterns of the terms within each premise.¹¹² Each of the three premises is made up of two terms: a subject term (e.g., "All humans") and a predicate term ("are mortal"). The specific idea contained in each of these terms appears twice in the syllogism. The "major term" appears in the major premise and the conclusion. The "minor term" appears in the minor premise and the conclusion. The "middle term" appears in the major and minor premises but not the conclusion.¹¹³ So, in the Socrates example, "mortal" is the major term, "human" is the middle term, and "Socrates" is the minor term.¹¹⁴

All humans are mortal.
Middle Term, Major Term

¹⁰⁹ There are three basic types of syllogisms:

Conditional Syllogism: If A is true then B is true (If A then B).
Categorical Syllogism: If A is in C (and B is in A) then B is in C.
Disjunctive Syllogism: If A is true, then B must be false
(A or B).

See id. at 145.

¹¹⁰ This is true, of course, only if the syllogism is valid.

¹¹¹ Aldisert et al., *supra* note 18, at 4.

¹¹² *See generally* ALDISERT, *supra* note 16.

¹¹³ Aldisert et al., *supra* note 18, at 6.

¹¹⁴ For beginners, it may be easier to remember that the major term represents the broad or universal class, the middle term represents a portion of that class, and the minor term represents the narrowest or most specific component.

Socrates is a human.

Minor Term, Middle Term

Therefore, *Socrates* **is mortal**.

Minor Term, Major Term

Each term can further be described as "distributed" or "undistributed." A subject term is distributed if it represents all members of the class and is undistributed if it represents only part of a class.¹¹⁵ A predicate term is distributed if it is a negative statement and undistributed if it is a positive statement.¹¹⁶ Only certain patterns of distributed and undistributed terms can be valid syllogistic forms.¹¹⁷

In the legal context, the syllogism involves taking a legal premise (an enacted or judicially created "rule") and applying it to a factual premise (the facts of a case) to reach an objectively sound result (the conclusion). Judge Aldisert used a generic template, which he called the "prosecutor's model," to illustrate this fundamental "categorical syllogism" of legal reasoning:

Major premise: [Doing something] [violates the law]

Minor premise: [The defendant] [did something]

Conclusion: [The defendant] [violated the law].¹¹⁸

The benefits of presenting legal ideas in this structured way are manifest. The structure promotes clarity and consistency and prevents many analytical errors.¹¹⁹ It allows one to test the accuracy of individual arguments by observing each step of the analytical process. For lawyers, who must routinely debunk opponents' arguments, this reasoning skill is

¹¹⁵ ALDISERT, *supra* note 16, at 57–58.

¹¹⁶ *Id.* at 60.

¹¹⁷ The informal or practical logic envisioned in this article does not necessarily require students to understand these patterns or, for that matter, to create exclusively valid syllogisms. Rather, it is the process of forcing ideas into a syllogism—whether revealing an objective "truth" or not—that is likely to improve students' critical-thinking skills. A secondary effect of this approach may be that some students become interested in more formal logic and pursue it further.

¹¹⁸ Aldisert et al., *supra* note 18, at 6.

¹¹⁹ ALDISERT, *supra* note 16, at 237.

critical.¹²⁰ Another helpful structure is the conditional (or hypothetical) syllogism, which takes an “if-then” format. The “if” term is known as the “antecedent” and the “then” term is known as the “consequent.” To be valid, a conditional syllogism must take one of two forms.¹²¹ One such form, known as *modus ponens*,¹²² is structured,

If *p*, then *q*;
p, therefore *q*.

The syllogism is valid when the antecedent is “affirmed” as existing or being true. For example,

If a non-competition clause is not in writing, then it is unenforceable.

The defendant's agreement not to compete was oral.

Therefore, it is unenforceable.

When the minor premise of a conditional syllogism negates the consequent of the major premise, the form is called *modus tollens*.¹²³

If *p*, then *q*;
 Not *q*, then therefore not *p*.

These conditional syllogism forms appeared in a recent Florida First District Court of Appeals case, *Madison v. Florida*.¹²⁴ In *Madison*, the majority reversed the defendant's conviction on the grounds that the trial court had abused its discretion in failing to properly consider and grant the defendant's motion for a continuance.¹²⁵ The deferential standard of review for abuse of discretion required “affirmance of the trial court order unless no reasonable judge

¹²⁰ “[Formal logic] structure allows legal thinkers to comparatively analyze legal argument, by comparing and contrasting it to necessarily valid or invalid logical structures, and reach conclusive logical decisions about the validity or invalidity of the form of the argument.” Stephen M. Rice, *Conspicuous Logic: Using the Logical Fallacy of Affirming the Consequent as a Litigation Tool*, 14 BARRY L. REV. 1, 13 (2010).

¹²¹ *Id.* at 8.

¹²² Andrew Jay McClurg, *Logical Fallacies and the Supreme Court: A Critical Examination of Justice Rehnquist's Decisions in Criminal Procedure Cases*, 59 U. COLO. L. REV. 741, 774 (1988).

¹²³ Rice, *supra* note 120, at 9.

¹²⁴ 132 So. 3d 237 (Fla. Dist. Ct. App. 2013).

¹²⁵ *Id.* at 245.

could have reached the decision challenged on appeal.”¹²⁶ But, in his dissent, Judge T. Kent Wetherell pointed out that, when broken down into a *modus tollens* syllogism, the majority's decision demonstrated flawed logic: If reasonable judges could disagree as to the propriety of the trial court's ruling, then the trial court did not abuse its discretion.

The trial court abused its discretion.

Therefore, reasonable judges could not disagree as to the propriety of the trial court's ruling.¹²⁷

If the majority's conclusion that the trial court had abused its discretion were true, then the antecedent (reasonable judges could not disagree as to the propriety of the trial court's ruling) would also have to be true. But Judge Wetherell—presumably a reasonable judge—*did* disagree. The syllogism, according to Judge Wetherell, revealed the majority's illogic.¹²⁸ He then demonstrated that, because the antecedent was true, the consequent (the trial court did not abuse its discretion) must be true as well under *modus ponens*.¹²⁹ Alas, deductive logic did not carry the day in *Madison*. But the case cogently demonstrates the utility of breaking an argument into its fundamental parts: doing so reveals illogic and, simultaneously, suggests the better outcome.

This greatly attenuated description of deductive reasoning would be enough to start students on the path to recognizing syllogisms in judicial opinions and, more importantly, to "shoehorning"¹³⁰ their own arguments into the illuminating pattern of syllogistic thought. By thinking meaningfully about their thought processes in this way, students gain metacognitive skills that could improve overall learning.

¹²⁶ *Id.* at 247 (quoting *Clark v. State*, 95 So. 3d 986, 987 (Fla. Dist. Ct. App. 2012)).

¹²⁷ *Id.* at 247 n. 16.

¹²⁸ Naturally, it is possible that, in this particular judgment on this particular issue, Judge Wetherell was not reasonable. Nonetheless, his use of conditional syllogism to compare the facts (judges disagreed about the ruling) to the legal standard (no abuse of discretion if reasonable judges could disagree) was effective, in theory.

¹²⁹ *Id.*

¹³⁰ Aldisert et al., *supra* note 18, at 6.

b. Inductive Reasoning and Precedent

In areas where the law is unsettled, deductive logic is an insufficient reasoning tool.¹³¹ If there is no universal "rule," there can be no material for the major premise in syllogistic thinking.¹³² In such cases, rules must be extracted from many specific outcomes.¹³³ This is the process of inductive reasoning.¹³⁴

"Induction is the inference from the observed to the unobserved, occasionally, and rather loosely, termed inferring the general from the specific."¹³⁵ Unlike deductive reasoning, where the conclusion follows absolutely from the premises, inductive reasoning does not produce conclusions guaranteed to be correct.¹³⁶ However, if one examines enough similar, specific outcomes, one can ascertain with some confidence the resulting new principle.¹³⁷

Consider scientific research. A scientist conducts enough trials of an experiment to be able to observe a pattern in the results. Numerous similar results can then suggest a general hypothesis: if A, B, and C all have result X, then D (which is similar to A, B, and C) will probably also have result X. As long as the scientist conducts enough trials, he or she can have confidence in the accuracy of the hypothesis.¹³⁸ It is unlikely, however, that a scientist would suggest that simply repeating results consistently creates scientific proof or absolute certainty in the result.¹³⁹ The process of induction as applied to legal reasoning is no different.

Inductive reasoning generally takes one of two forms: inductive generalization (or enumeration) or reasoning by

¹³¹ *Id.* at 12.

¹³² See ALDISERT, *supra* note 16, at 48.

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ Kent Sinclair Jr., Comment, *Legal Reasoning: In Search of an Adequate Theory of Argument*, 59 CALIF. L. REV. 821, 827 (1971), <http://scholarship.law.berkeley.edu/californialawreview/vol59/is3/13> (last visited Dec. 12, 2017).

¹³⁶ Aldisert et al., *supra* note 18, at 13.

¹³⁷ Anita Schnee, *Legal Reasoning "Obviously,"* 3 LEGAL WRITING 105, 112 (1997), <http://www.legalwritingjournal.org/wp-content/uploads/2015/06/volume3.pdf> (last visited Dec. 12, 2017).

¹³⁸ ALDISERT, *supra* note 16, at 92–93.

¹³⁹ Carlo Rovelli, *Science is not Certainty*, NEW REPUBLIC (July 11, 2014), <https://newrepublic.com/article/118655/theoretical-physicist-explains-why-science-not-about-certainty> ("Science is extremely reliable; it's not certain.") (last visited Dec. 12, 2017).

analogy.¹⁴⁰ The process of inductive generalization lies at the heart of common law: in the absence of codified law, the accumulation of many specific holdings in individual cases has led, over time, to common acceptance—and formal articulation—of generalized legal precepts or principles.¹⁴¹ The common law, therefore, "is but the accumulated expressions of the various judicial tribunals in their efforts to ascertain what is right and just"¹⁴² Again, this inductive process does not provide certainty. It yields probabilities and generalities—but often extremely reliable ones.

One instructive example of inductive generalization is found in Justice Cardozo's opinion in the early products liability case of *MacPherson v. Buick Motor Co.*¹⁴³ The case involved an injury from a collapsed wooden wheel of an automobile.¹⁴⁴ At the time, lack of privity of contract between the automobile's owner and the manufacturer would have prevented the injured owner from collecting damages from the manufacturer.¹⁴⁵ Rather than decide the case on established contract principles (as the dissent suggested),¹⁴⁶ Justice Cardozo used inductive reasoning to fashion a rule that avoided the unjust result existing law seemed to require. Cardozo compared the results of sixteen factually diverse products liability cases.¹⁴⁷ He identified relevant similar or divergent features between the cases, such as whether the defendant was a manufacturer and whether there was a near certainty of injury, should the product be defective.¹⁴⁸ By analyzing a large enough number of specific circumstances of liability and comparing relevant resemblances between them, Cardozo was able to derive a new (and yet, *not* new) principle: A manufacturer who constructs an automobile using defective component parts may be liable to a remote purchaser of the

¹⁴⁰ Mary Massaron Ross, *A Basis for Legal Reasoning: Logic on Appeal*, 3 J. ASS'N LEGAL WRITING DIRECTORS 179, 182 (2006).

¹⁴¹ ALDISERT, *supra* note 16, at 50, 92.

¹⁴² *Kansas v. Colorado*, 206 U.S. 46, 97 (1907).

¹⁴³ 111 N.E. 1050 (N.Y. 1916); *see* Schnee, *supra* note 137, at 113.

¹⁴⁴ *MacPherson*, 111 N.E. at 1051.

¹⁴⁵ *Id.* at 1055 (commenting that "defendant was not absolved from a duty of inspection" because it bought the wheels from a third party manufacturer); Schnee, *supra* note 137, at 113.

¹⁴⁶ *Id.* at 1055 (Bartlett, J., dissenting) (opining that the majority's opinion extended vendor liability further than any case the court previously approved).

¹⁴⁷ *Id.* at 1051–53 (majority opinion); Schnee, *supra* note 137, at 113.

¹⁴⁸ ALDISERT, *supra* note 16, at 100–01.

automobile for injuries resulting from those parts.¹⁴⁹ Cardozo's rule has withstood the test of time.¹⁵⁰ Its longevity can be attributed to the large number of cases Cardozo compared and the significance of the common features he analyzed. In other words, Cardozo used enough relevant particulars to generalize a reliable statement of the law.

Analogical reasoning is also a form of induction. It's arguably one of the most crucial skills in the study and practice of law.¹⁵¹ Analogy is simply the comparison of similarities between things with the attendant expectation that, if they resemble each other in several ways, then they will likely share some other property.¹⁵² In the law, analogical reasoning involves comparing precedent—with established facts and outcome—to a new set of facts to determine the likely outcome of the new case. The more relevant similarities between the cases, the more likely their outcomes will be similar as well. Unlike inductive generalization, analogy's reliability is not dependent on presenting a large number of particulars.¹⁵³ Rather, it is the quality of the comparison of the cases that makes the analogy reliable:

The success of the analogy depends on how significant the reader perceives the factual similarities between the two cases and whether any differences strike the reader as even more significant. An analogy can fail as much because an advocate ignores significant differences between two cases as because of a dearth of similarities.¹⁵⁴

One could rightly state that our system of jurisprudence is built on a foundation of analogy. *Stare decisis*, the doctrine that underlies our case law system, requires that courts

¹⁴⁹ *MacPherson*, 111 N.E. at 1055.

¹⁵⁰ Schnee, *supra* note 137, at 113.

¹⁵¹ See ALDISERT, *supra* note 16, at 91 (“Inductive generalization is used in all aspects of the legal profession – in studying law, in practicing law and in judging cases. Thus, it looms large in the common-law tradition in the development of legal precepts in the case by case experience.”).

¹⁵² *Id.* at 93.

¹⁵³ Ross, *supra* note 140, at 185 (“Typically, deductive reasoning proceeds from a general proposition to a conclusion that is either a particular proposition or another general proposition.”).

¹⁵⁴ Kristen K. Robbins, *Paradigm Lost: Recapturing Classical Rhetoric to Validate Legal Reasoning*, 27 VT. L. REV. 483, 532 (2003).

compare pending cases to existing precedent such that similar facts lead to similar legal consequences. Accordingly, students with a healthy working knowledge of induction (both inductive generalization and analogy) will not only better understand our legal system's foundational principles but will be equipped to mold and manipulate legal ideas in useful ways.

c. Fallacy and the Quality of Arguments

If an argument can be defined as an attempt to establish the truth, a fallacy can be described as an argument that appears to do so—but doesn't.¹⁵⁵ The ability to recognize fallacy allows law students to meaningfully evaluate judicial opinions and question outcomes in cases. As a result, it improves the quality of students' argumentation and assessment of opponents' counter-arguments.

Unfortunately, much like the public at large, students entering law school have been so inundated with arguments undermined by logical fallacies¹⁵⁶ that they are psychologically predisposed to accept logical fallacy as a substitute for sound reasoning.¹⁵⁷ People routinely “make logical mistakes, ignore logic altogether, or actually prefer

¹⁵⁵ Bruce Weinstein, *How Trump and Friends Could Learn a Few Things From Mr. Spock*, FORTUNE MAGAZINE ONLINE (March 8, 2016), <http://fortune.com/2016/03/08/fallacious-arguments-logic-trump/> (discussing fallacies in recent presidential campaign speeches).

¹⁵⁶ Consider some pop-culture examples of blatant fallacy: Advertisements in the “Four out of five dentists approve” variety (demonstrating appeal to authority fallacy); talking head debates over whether ISIS militants are or are not “genuine Muslims” (no true Scotsman fallacy); political candidates stating their opponents are in the pocket of special interests, hate the middle class, are socialist, are racist, etc. (ad hominem argument); arguments against the theory of evolution using a picture of a chimpanzee and asking, “Is this really your ancestor?” (straw-man fallacy).

Indeed, use of fallacy is so prevalent that television and commercial writers have found it a ripe target for satire: A Simpsons episode where Homer concludes that a rock is capable of repelling tigers because, while the rock was present, no tigers were about (*post hoc* fallacy), Simpson-*I want to buy your rock*, <https://www.youtube.com/watch?v=g3U6IUMTDHY> (last visited Sept. 28, 2017); a Direct TV commercial suggesting, “Don't wake up in a roadside ditch: Get rid of cable” (slippery slope fallacy).

¹⁵⁷ Rice, *supra* note 100, at 79–80.

certain illogical argument patterns.”¹⁵⁸ Essentially, audiences are conditioned to pick up on cues embedded in an argument that hint at the desired conclusions. These thinking shortcuts, known as “superficial heuristics,” often take the place of actual analysis.¹⁵⁹

Of course, superficial heuristics and faulty reasoning should be avoided at all costs in law school. Exposing these thinking shortcuts and their attendant risk of error is the gateway to avoiding them. Therefore, learning a bit about common logical fallacies would help law students and law professors alike: When a student makes a faulty argument in class, the professor can describe the problem using the common language of functional logic.

A formal fallacy describes an error in the structure of an argument.¹⁶⁰ In a formal fallacy, a conclusion could be false even if all of the premises are true.¹⁶¹ For example, using the classic “Socrates” syllogism:

All humans are mortal
Socrates is mortal
Therefore, Socrates is human.

This syllogism is fallacious because it is entirely possible that Socrates is the name of the neighbor’s cat. The formal error is the swapping of the minor term (in the minor premise) with the major term (in the conclusion). As with all formal logic, recognizing a formal fallacy requires familiarity with the patterns of distributed or undistributed terms. Again, this level of knowledge is beyond what’s needed for our limited goal of improving critical thinking. Nonetheless, it’s important to recognize that formal fallacy and formal deductive logic are two sides of the same coin.

Informal fallacies, also known as material fallacies,¹⁶² are harder to spot. Informal fallacies could be described as mistakes in “the content (and possibly the intent) of the

¹⁵⁸ *Id.* at 82.

¹⁵⁹ *Id.* at 82–83.

¹⁶⁰ Ross, *supra* note 140, at 189 (“Formal fallacies are based on a mistake in the form or logic of the argument.”).

¹⁶¹ ALDISERT, *supra* note 16, at 141.

¹⁶² ALDISERT, *supra* note 16, at 143.

reasoning."¹⁶³ Logicians have identified hundreds of distinct types of informal fallacies;¹⁶⁴ therefore, a comprehensive list of them is unworkable here. But some are so common—and so effective—that learning to recognize them should be considered a critical law-school skill. The following common fallacies demonstrate the potential deceptiveness of otherwise appealing arguments:

Ad Hominem: This fallacy is committed by abusing the proponent of an argument or by dismissing the proponent's position on the grounds of the proponent's appearance, circumstances, or background.¹⁶⁵ An advocate can cross the line from identifying weakness in an opponent's argument into an improper attack on the opponent's character. In *Bauer v. Yellen*,¹⁶⁶ the Second Circuit admonished counsel (and reduced its award of attorney fees) for the following *ad hominem* attack on its opponent, a *pro se* litigant: "Ms. Bauer has pursued this case blindly, recklessly, vindictively, maliciously and without a shred of evidence to support her wild and deluded claim of copyright infringement. . . . Ms. Bauer's opposition papers mirror the nasty, mean-spirited approach she has taken in prosecuting this matter."¹⁶⁷

Bandwagon Fallacy: Also known as the *ad populum* fallacy, this type of fallacious argument suggests that, because a great number of people believe something, it must be objectively true. This fallacy occurs when a party argues that a court should adopt a rule because of "near universal agreement among . . . courts that have confronted [the] issue,"¹⁶⁸ rather than because of the merits of the rule.

Begging the Question: This fallacy assumes as true what is to be proved.¹⁶⁹ It can be as simple as a single step of faulty reasoning (e.g., "The hospital was negligent because it failed to use ordinary care") or it can be buried in several steps of circular reasoning (e.g., An indigent prisoner claims a right to

¹⁶³ Cory S. Clements, *Perception and Persuasion in Legal Argumentation: Using Informal Fallacies and Cognitive Biases to Win the War of Words*, 2013 BYU L. REV. 319, 332 (2013).

¹⁶⁴ LOGICALLY FALLACIOUS: THE ULTIMATE COLLECTION OF OVER 300 LOGICAL FALLACIES, <https://www.logicallyfallacious.com/tools/lp/Bo/LogicalFallacies> (last visited Sept. 28, 2017).

¹⁶⁵ Michael Sean Quinn, "Scholarly Ethics": A Response, 46 J. LEGAL EDUC. 110, 112 (1996).

¹⁶⁶ 375 Fed. App'x 154, 157 (2d Cir. 2010) (unpublished).

¹⁶⁷ 375 F. App'x at 156 n.2.

¹⁶⁸ *Scheck v. Burger King Corp.*, 798 F. Supp. 692, 698 n10 (S.D. Fla. 1992).

¹⁶⁹ ALDISERT, *supra* note 16, at 208.

a free trial transcript because he wishes to argue ineffective assistance of counsel on appeal. There is no requirement to furnish an indigent prisoner with a free transcript unless he is unable to show that he has a non-frivolous claim. Because the prisoner cannot show that he has a non-frivolous claim, he has no right to a free trial transcript).

Fallacy of Accident: This fallacy, also known as *dicto simpliciter*, occurs when one applies a general rule to exceptional circumstances or facts.¹⁷⁰ For example, an Internet pornographer arguing that his website's content is "Free Speech" may be committing the fallacy of accident by not acknowledging that limitations on obscenity and commercial speech exceptions likely apply—and must be analyzed—in his case.

Hasty Generalization: Essentially "jumping to conclusions." A Hasty Generalization fallacy occurs when a conclusion is induced from too few particulars.¹⁷¹ The reliability of any inductive generalization depends on having considered enough specific instances with identical outcomes to eliminate doubt as to the likelihood of non-conforming outcomes. But drawing a conclusion from only a few particular instances lacks that reliability. For example, in *O'Conner v. Commonwealth Edison Co.*,¹⁷² an expert witness committed the fallacy when he testified that a plaintiff's cataracts were caused by exposure to radiation at a nuclear plant where he worked.¹⁷³ His opinion was based on previously observing five patients with similar cataracts, all of which had been radiation-induced.¹⁷⁴

Post Hoc: Any argument that suggests causation simply because one event preceded another is guilty of the *post hoc ergo propter hoc* fallacy.¹⁷⁵ It's also known as the false cause fallacy, and it is tricky. The danger of presuming a causal connection between events when none exists is obvious. But in a legal context, it's often rational to conclude that when a legally significant event is followed by a result, that result probably flowed from the event.¹⁷⁶ For example, a criminal defendant could claim her medication prevented her guilty

¹⁷⁰ *Id.* at 193.

¹⁷¹ *Id.* at 195.

¹⁷² 807 F. Supp. 1376 (C.D. Ill. 1992).

¹⁷³ *Id.* at 1391.

¹⁷⁴ *Id.*

¹⁷⁵ ALDISERT, *supra* note 16, at 199.

¹⁷⁶ Eugene Volokh, *The Mechanisms of the Slippery Slope*, 116 HARV. L. REV. 1026, 1102 (2003)

plea from being knowingly and voluntarily made.¹⁷⁷ It sounds reasonable, but absent evidence that the medication affected the defendant's cognitive function, it's spurious. Despite the fallacy, *post hoc* arguments are an effective tool for litigators since they are so enticing to jurors.¹⁷⁸ *Straw Man*: This is a fallacious argument in which one "creates the illusion of having refuted a solid proposition by substituting a similar, weaker proposition for it and refuting the substitute instead."¹⁷⁹ By exaggerating or misrepresenting an opposing argument, one can more easily present one's own position as reasonable. Consider the statement by former presidential candidate Bernie Sanders, who, during a Democratic Presidential Candidates Forum, suggested that opponents of gun control "think they should have a missile launcher in their backyard as a Constitutional right"¹⁸⁰

These—and the scores of other known fallacies—all have the common attribute of obscuring the truth. But fallacies are often highly persuasive and can be used to manipulate—intentionally or otherwise.¹⁸¹ And to properly represent clients and fulfill one's professional responsibilities, lawyers must, if not pursue the truth, at least be aware of when it is being obscured. Knowing how to recognize fallacies is, in itself, a tool for honing critical thinking, and should be considered a fundamental lawyering skill.

Part III: Integrating Functional Logic Training Across the Law-School Curriculum

Regardless of how theoretically beneficial logic training may be, students cannot be expected to distill the principles of logic on their own.¹⁸² Integrating basic, informal logic training into the law-school curriculum could be relatively painless and cost-effective and, most importantly, could begin to bridge the ever-widening gap between how students think and how academics expect them to think.

¹⁷⁷ See *State v. Brown*, 305 P.3d 48 (Kan. App. 2013).

¹⁷⁸ See generally Neal R. Feigenson, *The Rhetoric of Torts: How Advocates Help Jurors Think About Causation, Reasonableness, and Responsibility*, 47 HASTINGS L.J. 61, 165 n 154 (1995).

¹⁷⁹ Gabriel H. Teninbaum, *Reductio Ad Hitlerum: Trumping the Judicial Nazi Card*, 2009 MICH. ST. L. REV. 541, 554 (2009)

¹⁸⁰ Weinstein, *supra* note 155.

¹⁸¹ *Id.*

¹⁸² Doing so would be "like asking them to design a rocket without teaching them the rules of physics." Aldisert et al., *supra* note 18, at 2.

a. Logic During Orientation

The obvious moment to begin exposing students to a paradigmatic system of thinking is during orientation. Orientation varies in length, depth, and purpose from school to school. Schools use orientation for everything from registering parking passes and assigning study carrels to presenting more substantive programs that introduce the cohort to systems of law and the Socratic Method. Schools with more in-depth programs could introduce basic principles of logic in a two-to-three hour session, incorporating outside reading and a formative (perhaps online) assessment.

Orientation programs introducing logic should be straightforward and unthreatening. The goal is to build a solid foundation upon which to build the thinking processes students will encounter in the first weeks of law school and beyond. The classic categorical syllogism is a perfect starting point.¹⁸³ After introducing the basic form of a syllogism, the professor should provide numerous real-world examples of valid syllogisms:

Lack of sleep makes one drowsy during the day.

Joe Law Student stayed up all night.

*Joe Law Student will be drowsy during the day.*¹⁸⁴

When we finish this orientation session, it will be time for lunch.

We have not yet finished this orientation session.

Therefore, it is not time for lunch.¹⁸⁵

Once the basic form is clear, students should see examples of legal syllogisms: the basic application of rules to facts, along with their consequent conclusions. A formative assessment at this point could test students' ability to distinguish rules from facts.

Students with innately sound reasoning skills (or, perhaps, previous training in logical reasoning) would recognize the deductive pattern at once and organize their thinking about legal issues accordingly. But for students who

¹⁸³ *Id.* at 6. Judge Aldisert describes the prosecutor's syllogism as a useful template for most legal problems:

Major premise: [Doing something] [violates the law]

Minor premise: [The defendant] [did something]

Conclusion: [The defendant] [violated the law].

Id.

¹⁸⁴ A basic categorical syllogism.

¹⁸⁵ A *modus tollens* conditional syllogism.

lack critical-thinking skills, this breakdown of the basic syllogistic form would provide a step-by-step process upon which to structure analysis. Armed with an effective process of reflective thinking, these students could avoid analytical missteps, which often go unnoticed until mid-term or final exams—in other words, too late.

In addition to basic deduction, Orientation should present the basic principles of inductive reasoning. Simple but engaging exercises in a “what do all these cases tell you about the law” model—presented as “induction”—would not only prepare students for the progressive integration of law that will happen once classes begin, but would give a name to the process they will be expected to use and, eventually, master. Professors involved in Orientation can enhance this benefit by preparing exercises specifically engineered to call out invalid induction. For example, a set of cases that seem to induce an obvious answer, save one anomalous result, tempts students to commit the fallacy of hasty generalization.¹⁸⁶ The fruits of the endeavor would be enduring: students who take the time to consider why their answers are good or bad are thinking like lawyers.

Introducing deductive and inductive reasoning during Orientation would, therefore, likely bear fruit once classes begin. By repeating these processes in different contexts as classes progress, students will naturally strengthen their brains' neural networks responsible for critical thinking.¹⁸⁷

b. Logic in Doctrinal Classes

Merely knowing the principles that distinguish good and bad reasoning is not enough. To enhance critical thinking, law students should replicate the process of putting analytical components together in multiple contexts. In other words, students should be encouraged to use syllogistic logic across the curriculum.

But herein lies the greatest difficulty: changing the way law students think means a change in the way law professors think and teach. Law professors, however, are not generally known for their great desire to implement teaching

¹⁸⁶ ALDISERT, *supra* note 16, at 195.

¹⁸⁷ "The more times a network is stimulated, the stronger and more efficient it becomes." Bernard J. Luskin, *"If I Had a Better Brain!" Brain Health, Plasticity, Media, and Learning Can be a Perfect Storm*, PSYCHOLOGY TODAY (Aug. 20, 2013), <https://www.psychologytoday.com/blog/the-media-psychology-effect/201308/if-i-had-better-brain> (last visited Dec. 12, 2017).

innovations.¹⁸⁸ Fortunately, simple adjustments to existing instructional models might yield unexpected mutual benefits and ease frustration for both professors and students.

In nearly every American law-school class, students read appellate decisions in casebooks and answer professors' questions about the holdings and principles of law contained in the cases. This "Case Law" or "Socratic"¹⁸⁹ method of instruction remains the standard teaching method in law schools, despite concerns about its effectiveness and recommendations against its widespread use.¹⁹⁰ But despite its prevalence, law schools generally fail at explaining the process and goals of the Socratic Method.¹⁹¹ Many professors assume that students implicitly recognize these goals.¹⁹² There is generally no explanation of the underlying thought process that gets the students to the "right" answer.¹⁹³ Many students eventually work out that professors are not simply "hiding the ball," but are, rather, drawing out reasoned

¹⁸⁸ See Michael Hunter Schwartz, *Teaching Law by Design: How Learning Theory and Instructional Design Can Inform and Reform Law Teaching*, 38 SAN DIEGO L. REV. 347, 360 (2001) (law schools' emphasis on scholarship and publication, the criteria by which law schools measure professors' performance for tenure purposes, discourages teaching innovation); Samantha A. Moppett, *Control-Alt-Incomplete? Using Technology to Assess "Digital Natives"*, 12 CHI.-KENT J. INTELL. PROP. 77, 86 (2013) (law professors fear change because of concern about academic freedom, resistance to changing status quo, and hesitation over increasing workload).

¹⁸⁹ The Case Law method, introduced by Christopher Columbus Langdell at Harvard Law School in 1870, has been commonly labeled the "Socratic Method." This is, somewhat, a misnomer. Ruta K. Stropus, *Mend It, Bend It, and Extend It: The Fate of Traditional Law School Methodology in the 21st Century*, 27 LOY. U. CHI. L.J. 449, 453 (1996) ("Unlike Socrates, who focused purely on the questioning process, Langdell sought to combine both the substance of the law and the process of the law into the legal classroom.") Despite this technical difference, I refer to the typical law-school instructional method as "Socratic."

¹⁹⁰ See, e.g., WILLIAM M. SULLIVAN et al., EDUCATING LAWYERS: PREPARATION FOR THE PROFESSION OF LAW 56–60, 75–78 (The Carnegie Foundation for the Advancement of Teaching, Preparation for the Professions Program, 2007); A.B.A. SECTION OF LEGAL EDUC. & ADMISSIONS TO THE BAR, LEGAL EDUCATION AND PROFESSIONAL DEVELOPMENT--AN EDUCATIONAL CONTINUUM, REPORT OF THE TASK FORCE ON LAW SCHOOLS AND THE PROFESSION: NARROWING THE GAP 233–36 (1992) [MacCrate Report].

¹⁹¹ Tiscione, *supra* note 4, at 399–400

¹⁹² Niedwiecki, *supra* note 89, at 168.

¹⁹³ *Id.* at 169.

analysis. Others however, may stumble through law school never quite understanding the reason for the trauma and humiliation that the Socratic Method engenders.¹⁹⁴

The frustration is mutual. First-year professors complain that students' exam answers are missing analysis.¹⁹⁵ Students jump from identifying a rule to stating a conclusion with no significant application of the rule to facts in between. What is missing in those answers, logically speaking, is the syllogistic minor premise.¹⁹⁶ On an exam, many students struggle to even articulate the accurate legal issue.

Consider a scenario where a defendant is charged with aggravated battery for using a deadly weapon. The facts state that the defendant sloshed household bleach in the victim's face.¹⁹⁷ The rule is that any object can be a deadly weapon if it is used in such a way as to make it likely to cause great bodily harm.¹⁹⁸ It may seem obvious to an experienced lawyer that the precise legal issue is "whether bleach, sloshed in a victim's face, is likely to cause great bodily harm." But a student with poor analytical skills might begin by stating the issue as "whether the defendant used a deadly weapon" or even more obtuse, "whether defendant committed aggravated battery." With this as a starting point, it's no wonder that students resort to incomplete, heuristic thinking in place of reasoned analysis.

Now, imagine if every professor began requiring students to express arguments in the form of a syllogism. Certainly, the process would be a struggle, if not downright ugly, in the first weeks or even months of law school. But with repetition, students would quickly become proficient at identifying the proper components of the syllogistic process—thereby clarifying their reasoning. A simple approach to achieve these benefits in nearly any law-school classroom is to require

¹⁹⁴ See generally Jennifer L. Rosato, *The Socratic Method and Women Law Students: Humanize, Don't Feminize*, 7 S. CAL. REV. L. & WOMEN'S STUD. 37 (1997) (discussing students' humiliation as an integral part of the Socratic Method).

¹⁹⁵ Timothy R. Zinnecker, *Syllogisms, Enthymemes and Fallacies: Mastering Secured Transactions Through Deductive Reasoning*, 56 WAYNE L. REV. 1581, 1589 (2010) (quoting James M. Boland, *Legal Writing Programs and Professionalism: Legal Writing Professors Can Join the Academic Club*, 18 ST. THOMAS L. REV. 711, 726 (2006)).

¹⁹⁶ *Id.*

¹⁹⁷ *State v. Smith*, 969 So. 2d 452, 453 (Fla. Dist. Ct. App. 2007).

¹⁹⁸ *Id.* at 454.

students to articulate rules as "if-then" statements.¹⁹⁹ By reframing rules in this way, students are forced to critically examine the constituent elements of the rule: its requirements and its consequences.²⁰⁰ Consider the following basic rules in Torts, Constitutional Law, and Civil Procedure:

If the plaintiff proves elements X, Y, and Z, then tort liability is established.

If the state deprives a citizen of notice and opportunity to be heard, then the right to Due Process is violated.

If a party currently resides in the state and intends to remain there indefinitely, then he or she qualifies as a "citizen" for diversity jurisdiction purposes.

Note that these simple rules are structured so as to force the rule's requirement (the "if") and consequence (the "then") into plain view. This skill alone is beneficial for students because it not only trains the brain to recognize the pattern of rules, it transfers to skills necessary for legal writing and drafting: coherence and clarity. More importantly, however, these if-then rules form the major premise of a conditional syllogism. In such a major premise, the "if" clause is the middle term and the "then" clause is the major term.

Once students are comfortable articulating rules as the major premise of a syllogism, the next step is to present the facts of a case—whether a hypothetical presented by the professor or an assigned case reading—as the minor premise. Here are the minor premises that correlate to the major premises above:

Defendant did facts A B C.

The state imposed a fine without affording the party an opportunity for a hearing.

Plaintiff owns a houseboat that is moored in the state.

The subject of each minor premise is the minor term. The predicate of each minor premise is the middle term—or at least it would be, if the syllogism were complete. In a complete

¹⁹⁹ I am indebted to my colleague, Professor Brendan Beery, for this pragmatic and tested approach for using conditional syllogisms to promote what he terms "right thinking." Professor Beery conducts voluntary logic workshops that not only teach the syllogistic process using functional terminology, but which enhance students' ability to express their reasoning on exams.

²⁰⁰ See generally Kevin H. Smith, *Practical Jurisprudence: Deconstructing and Synthesizing the Art and Science of Thinking Like a Lawyer*, 29 U. MEM. L. REV. 1, 49 (1998).

sylogism, of course, the middle terms would match exactly. Here, the middle terms do not match—yet. This is the advantage of this syllogistic exercise: students can immediately spot the precise legal issue in a case by joining the two middle term positions (in bold):

Major premise:	If elements X Y Z (middle term)	then tort liability (major term)
Minor premise:	Defendant (minor term)	did facts A B C (middle term?)

Major premise:	If the state deprives a citizen of notice and opportunity to be heard (middle term)	then Due process is violated (major term)
Minor premise:	The State (minor term)	Imposed a fine without affording the party an opportunity for a hearing. (middle term?)

Major premise:	If party currently resides in state and intends to remain there indefinitely (middle term)	then party qualifies as "citizen" for diversity (major term)
Minor premise:	Plaintiff (minor term)	owns a houseboat that is moored in state (middle term?)

The issues revealed in this way are:

Do facts A B C → satisfy elements X Y Z?
 Did the state's imposing a fine without affording the party an opportunity for a hearing → deprive the citizen of notice and opportunity to be heard? (YES)

Does merely owning a houseboat currently moored in the state —> mean that a party currently resides in the state and intends to remain there indefinitely? (NO)

In this way, the analysis can be tested for accuracy. And in the first weeks and months of law school, the reliability of students' analyses is of paramount importance.

These functional logic exercises, repeated in various contexts across the curriculum, would undoubtedly have at least some metacognitive benefits. And professors might find that the process improves not only students' preparation, but also the quality of dialogue between them and their students.

c. Logic in Legal Writing and Analysis Courses

There is no question that legal writing professors are on the front lines of recognizing—and attempting to mitigate—shortcomings in law students' reasoning. Legal writing assignments force students to reveal their thought processes on paper.²⁰¹ In grading their memos and briefs, we see that students' "confusing prose reflects their confused thinking."²⁰² Moreover, legal writing courses bridge a curricular gap between doctrine and skills. Students learn theory in their doctrinal courses and learn to apply it in a meaningful way toward the resolution of a client's legal issue in legal writing classes. These courses help students integrate material across curriculum "because they do not separate the learning of theory from its application."²⁰³ Naturally, this setting is ideal for reinforcing functional logic skills.

Most law students are exposed to fundamental logical reasoning in their first-year research and writing course. They just don't know it. Basic IRAC structure (Issue, Rule, Analysis, Conclusion)—the hallmark of legal writing organization—represents a deductive syllogistic process.²⁰⁴ But written legal analysis involves induction as well.²⁰⁵ Virtually no analysis is

²⁰¹ Carol McCrehan Parker, *Writing Throughout the Curriculum: Why Law Schools Need It and How to Achieve It*, 76 NEB. L. REV. 561, 571 (1997).

²⁰² Viator, *supra* note 1, at 742.

²⁰³ David S. Romantz, *The Truth About Cats and Dogs: Legal Writing Courses and the Law School Curriculum*, 52 U. KAN. L. REV. 105, 139 (2003).

²⁰⁴ Schnee, *supra* note 137, at 106.

²⁰⁵ Laura P. Graham, *Why-Rac? Revisiting the Traditional Paradigm for Writing About Legal Analysis*, 63 U. KAN. L. REV. 681, 688 (2015) (citing KRISTIN KONRAD ROBBINS-TISCIONE,

complete without incorporating analogical reasoning by comparing the facts of one's case to precedent. And when a factual scenario presents novel or troublesome facts that seem not to fit established law, students are taught to engage in rule synthesis.²⁰⁶ In other words, the legal writing classroom is rich with opportunities to practice deduction and induction in ways that incorporate both theory and practical application. What's critical, however, is for legal writing professors to use logic terminology (i.e., deduction, induction, analogy, fallacy) when teaching these skills. It's not that *IRAC*, *synthesis*, *case illustration*, or *application* are bad terms: legal writing professors have had great success using these and other labels for parts of analysis and should continue to do so.²⁰⁷ Rather, it's the additional benefit of reinforcing the concepts of logical thought in various contexts that will strengthen those skills across the board.²⁰⁸ Accordingly, during the writing-instruction phase of a typical first-year legal-writing course, professors should take every opportunity to point out deductive and inductive analysis wherever it can be found. The professor should demonstrate that the Rule Synthesis section (the "R" of IRAC) has, overall, the same function as the major premise of a syllogism: as a unit, it represents a universal truth against which the facts of the case must be tested. Ideally, students should be exposed to several such deductive (or "rule-based"²⁰⁹) analyses during their first legal-writing class session. Doing so connects legal writing not only to the deduction they learned about in Orientation, but also to the deductive processes used in their doctrinal courses. It also

RHETORIC FOR LEGAL WRITERS: THE THEORY AND PRACTICE OF ANALYSIS AND PERSUASION 111–13 (2009)).

²⁰⁶ See generally Jane Kent Gionfriddo, *Thinking Like A Lawyer: The Heuristics of Case Synthesis*, 40 TEX. TECH L. REV. 1 (2007).

²⁰⁷ But see Terrill Pollman, *Building A Tower of Babel or Building A Discipline? Talking About Legal Writing*, 85 MARQ. L. REV. 887, 924–25 (2002) (discussing the need for consistent legal-writing terminology, or "jargon," to effectively communicate about writing and about the substance of the academic discipline of legal writing).

²⁰⁸ Some writing texts already approach legal analysis using logic terminology. See generally DEBORAH A. SCHMEDEMANN & CHRISTINA L. KUNZ, *SYNTHESIS: LEGAL READING, REASONING, AND WRITING* (3d ed. 2007); TERESA J. REID RAMBO & LEANNE J. PFLAUM, *LEGAL WRITING BY DESIGN* (2d ed. 2013).

²⁰⁹ See LAUREL CURRIE OATES & ANNE ENQUIST, *JUST MEMOS* (3d ed. 2011).

serves as a jumping-off point for the next step: the inductive process of applying precedent to new facts.

New law students learning predictive writing²¹⁰ are often confounded by the concept of analogizing facts of a case to established precedent.²¹¹ It's not that students don't understand analogy: they've likely mastered the "head is to hat as foot is to shoe" analogy prevalent on the LSAT.²¹² Rather, it's the fact that using multiple (and often seemingly contradictory) analogies to reach a conclusion is a foreign concept to most non-lawyers. Moreover, even the conclusions reached by such a process can be less than satisfying, since they lack certainty.²¹³

In drafting their first memos, rookie law students often make the mistake of analogizing a single precedent case to the facts of the memo problem. Despite having described several precedent cases, they default to choosing "the closest" single case to apply to the untested facts without endeavoring to reconcile other precedent or, much less, the law as a whole. The result is a superficial conclusion and inadequate prediction. To combat this tendency, legal-writing professors should reinforce that the two inductive forms, (1) inductive generalization and (2) analogy, should feature in the application (the "A" of IRAC) section of a memo.

In inductive generalization, a legal writer extracts multiple, often intersecting, points of similarity among a representative group of precedent cases to reach a working standard.²¹⁴ Say a legal writing professor includes four precedent cases in a closed-universe memo assignment. The professor undoubtedly chose those cases because they represent basic concepts relevant to the expected analysis. Case 1 has characteristics *A* and *B*; Case 2 has characteristics *A* and *C*; Case 3 has characteristics similar to *A*, *B*, and *C*, but mostly hinges on *D*; and Case 4 falls short on *A*, *B*, *C*, and *D* (and, accordingly, fails to meet the legal standard at issue). Again, a student may be tempted to base his or her application simply on which of these cases most closely resembles the

²¹⁰ Predictive writing is nearly always taught before persuasive writing. Kathy Stanchi, *Teaching Students to Present Law Persuasively Using Techniques From Psychology*, 19 PERSPECTIVES: TEACHING LEGAL RES. & WRITING 142, 142 (2011).

²¹¹ See, e.g., Dan Hunter, *Teaching and Using Analogy in Law*, 2 J. ASS'N. LEGAL WRITING DIRECTORS 151, 151 (2004).

²¹² *Id.*

²¹³ Cass R. Sunstein, *On Analogical Reasoning*, 106 HARV. L. REV. 741, 745 (1993).

²¹⁴ Ross, *supra* note 140, at 180.

untested set of facts. But a professor can avoid this dangerous shortcut by taking time in class to break down each case conceptually, identifying and describing characteristics *A*, *B*, *C*, and *D*, and, where possible, articulating a formula describing characteristics necessary for the standard to be met.

Disorderly conduct provides a good example. In Florida, disorderly conduct is rather abstractly defined by Florida Statute section 877.03 as conduct that “corrupt[s] the public morals,” “outrage[s] the sense of public decency,” or “affect[s] the peace and quiet of persons who may witness [it].”²¹⁵ This mushy definition makes pure deduction difficult. Precedent, however, provides more helpful concepts. In one case, a defendant’s loud verbal conduct attracted a crowd of curious onlookers, but it was his physical act of interfering with the police officer’s lawful duties that made his conduct disorderly.²¹⁶ In another case, the defendant’s verbal conduct attracted a crowd, and he was physically aggressive toward an officer; this was also sufficient to constitute disorderly conduct.²¹⁷ In a third case, the defendant’s verbal conduct attracted a crowd that became hostile toward the officer, and this too was considered disorderly conduct.²¹⁸ But in a case where a defendant’s loud verbal conduct merely attracted a crowd of annoyed onlookers, the conduct was not considered disorderly.²¹⁹

From these cases, at least three conceptual points of comparison arise: (A) conduct that draws a crowd; (B) conduct that interferes with an officer’s lawful duties; and (C) conduct that puts the officer in danger. In the cases where the disorderly conduct standard was met, there was some combination of (A) attracting a crowd and either (B) interfering with the officer’s duties or (C) putting the officer in danger. In the one case where the standard was not met, only (A) was present. Therefore, even from this limited selection of precedent, an implicit working standard can be extracted: Where (A)+(B) or (A)+(C) are present, conduct will be considered disorderly. If the formula is reliable, it should explain the results in all cases.

What’s happened here is induction: a general principle has been extracted from a number of particulars based on

²¹⁵ FLA. STAT. § 877.03 (2016).

²¹⁶ *C.L.B. v. State*, 689 So. 2d 1171, 1172 (Fla. Dist. Ct. App. 1997).

²¹⁷ *Wiltzer v. State*, 756 So. 2d 1063, 1065 (Fla. Dist. Ct. App. 2000).

²¹⁸ *W.M. v. State*, 491 So. 2d 335, 336 (Fla. Dist. Ct. App. 1986).

²¹⁹ *Fields v. State*, 24 So. 3d 646, 648 (Fla. Dist. Ct. App. 2009).

relevant similarities.²²⁰ That general principle would then be applied to the untested facts of a new case. Admittedly, four cases may be a small sample from which to extract a general standard. But if the chosen cases are highly representative of all the cases on point, then the standard is likely to be highly reliable.²²¹ Nonetheless, because the conclusion reached by this process is uncertain, further substantiation is needed. That's where analogy comes in.

Using analogical reasoning, the legal writer justifies his or her conclusion in terms of the chosen precedent.²²² Our typical "rookie" law student tried analogy, but failed to connect it to the law as a whole; therefore, it was superficial and analytically flimsy. But analogy coupled with the application of the inductive working standard demonstrates that a predicted outcome is consistent not only with an individual case, but also with the entire body of law on that issue. Thus, instead of describing random or disconnected similarities and distinctions between precedent cases and a set of untested facts, students can think of analogical reasoning as "proof" that the inductive formula was reliable.

Back to the disorderly conduct example. Suppose a memo fact pattern described a suspect—a witness to a shooting—who was loudly insisting that an officer take his statement, despite the fact that the officer was busy arresting the shooter. The suspect's antics of yelling at the officer attracted a crowd of onlookers. The suspect, perhaps fueled by having an audience, put his face within two inches of the officer's face, causing the officer to push him away with a free hand. The issue, of course, is whether the suspect can be charged with disorderly conduct.

In applying the law to these facts (the "A" of IRAC), a writer may initially want to point out that the statute does not provide concrete enough concepts upon which to base a purely deductive analysis.²²³ Therefore, the analysis would be

²²⁰ See Aldisert et al., *supra* note 18, at 12.

²²¹ "If the analysis is based on a complete set, then the conclusion will be strong. But if a complete set is not used for the analysis, the conclusion may be weak. The advocate must test the strength of the conclusion by examining the sample's size and its representativeness." Ross, *supra* note 140, at 181.

²²² Dan Hunter, *Reason Is Too Large: Analogy and Precedent in Law*, 50 EMORY L.J. 1197, 1246 (2001).

²²³ In reality, Fla. Stat. § 877.03 provides one concrete example of disorderly conduct: "brawling or fighting." However, in a "closed universe" memo, that part of the statute can be left out for pedagogical purposes.

inductive. First, the writer should articulate the inductive generalization that the charge is generally supported by evidence that the defendant's conduct (A) caused a crowd to form and either (B) interfered with an officer's lawful duties or (C) put the officer in danger. Based on that working standard, the writer can state that the facts satisfy the inductive standard: the suspect both attracted a crowd and interfered with the officer making the arrest.

Next, it's time to analogize the precedent cases. Because analogy compares cases with the expectation that, if they resemble each other in several relevant ways, then they will likely share the same outcome,²²⁴ the writer must demonstrate that the specific relevant similarities between the chosen precedent and the untested facts support the stated conclusion. Because the relevant characteristics (A, B, C, or D) have already been described in the inductive generalization, it's sufficient to briefly connect them to the specific facts of the memo problem. Analogy, in this sense, further substantiates the reliability of the inductive process.

What I've described above does not differ significantly from analytical processes taught by the average legal writing professor. But I believe there's a significant additional benefit gained from reinforcing basic logic processes and terminology along the way.

d. Logic in Oral Advocacy

One final golden opportunity to reinforce basic logic is during the oral argument component of a first-year persuasive-writing class. Besides being a blood-curdlingly terrifying event forever etched in students' memories and an important rite of passage, the appellate oral argument is fertile ground for using and recognizing informal fallacy. Generally, the lead-up to the oral argument is preceded by several weeks of instruction on oral persuasion and, ideally, in-class practice. Students already exposed to the concept of informal fallacy would be more adept at responding to their opponents' positions, perhaps even identifying faulty logic by name. A student's argument that "opposing counsel asserts X, but that is without merit because (restate original premise for the ninth time)" can become "opposing counsel asserts X, which falls into the logical fallacy of hasty generalization and is, therefore, not a reliable result."

One way to achieve this benefit is to use class time to brainstorm every possible fallacious (but compelling)

²²⁴ ALDISERT, *supra* note 16, at 93.

argument that could be made in the context of an appellate-brief fact pattern. Do the facts of the case allow for an improper appeal to authority? Can an *ad hominem* argument be made against an unsympathetic witness? This exercise not only reinforces the meaning of individual fallacies in a practical way; it challenges students to test how far advocacy can stretch before it becomes no longer persuasive.

Introducing basic logic into the legal writing classroom, therefore, requires little substantive change to existing pedagogy. But if students learn that the familiar paradigms of legal writing are exactly the same logic principles introduced in orientation and reinforced in doctrinal classes, their ability to critically think about legal issues—and their overall comprehension—could significantly increase.

Conclusion

Legal education in the United States has evolved over time in response to economic and social change. But the social, educational, and technological changes of recent decades, which have noticeably altered students' ability to think critically, merit at least an adjustment in the way law schools teach. The time-tested methods of logic—even when pared down to their most practical and functional components—could begin to remediate some of the problems students face in the modern law-school classroom.