INTERDISCIPLINARY LEARNING IN LAW SCHOOL

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I. INTRODUCTION

The first class I ever taught occurred six months after I had graduated from law school, when I was asked to fill in for an ill professor who was to teach more than fifty upper-level students Evidence Law.[1] I was well-qualified for the job based on traditional orthodoxy, having a Juris Doctor degree, taken a basic course in Evidence Law, and passed it. Of course, based on standards for other teaching jobs, I would not have been considered—I had no teaching experience at all, no teacher training, no trial experience, and actually did not perform in a distinguished manner on my Evidence Law final examination.[2] What could possibly go wrong?

The teaching was all about me—what topics I taught, what responses I gave, and what the class discussed. I hoped the students learned something, but I did not know if they did. Having no experience, I replicated what I liked about my law school professors and did the opposite of what I did not like about them. I scurried to figure out what I needed to cover, how I would cover it, what I wanted to do to engage the students, and how I would open and close each class, as well as its core content for its duration.

The one thing I unknowingly left out of my planning was the learning process. In a sense, I had invisible fences surrounding me in how I implicitly constructed a learning environment—I did not know what I didn't know. I drew from my own law school experience and heard about the experiences of others. But I had no idea of what was possible with regard to the learning process, not having been exposed to its importance or advancing understandings about it.

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* I want to express my appreciation and gratitude for having worked with Professor Catherine Carpenter, co-author and friend. She has impacted more people nation-wide than she could possibly know, and she remains a role model for many, including me.

1. It would have been nice to say I had prior practice as a teaching assistant, a co-teacher, or even a grade school teacher, but I had none. My entire experience was as a student, not a teacher.

2. Like many teachers, I began to understand the big picture of the course only after teaching it and looking at how the puzzle pieces fit together.

The invisible boundaries that limited me were just like being presented with a purple sweet potato. I was given a purple object not long ago during a meal and told, "This is a sweet potato."[3] I had never seen one before that looked like this—or realized there was such a thing.[4] Upon biting into it, with great trepidation, I was sold—it was creamy and sweet, just like a more traditional version. How could a sweet potato not be orange? How could it be tasty if it was not orange? Were these things grown in a faraway place or just an impostor created by a software program?

The sweet potato story underscores the primary point of this article—stretching past invisible teaching boundaries[5] can help students learn, hopefully better if not more. It argues that shifting the focus from the teacher and coverage of material to the student and the learning process, particularly utilizing interdisciplinary methods and approaches, could enhance the way the educational part of law school works. It suggests that creating a learner-centered enterprise could provide a different perspective for legal education and expanded ways to promote learning.

It is important to stress that the article does not suggest terminating or deviating from current pedagogies and practices, especially the Socratic Method and questioning techniques often employed in law schools. These student engagement practices have survived and flourished because they can be deployed effectively and instrumentally. So can the appellate case method and other traditional components of a legal education. What is offered is the idea that going beyond tradition and incorporating interdisciplinary learning techniques—even just a bit—might be a useful supplement to the line-up that dominates the law school terrain. The goal is to promote effective and healthy lawyering practices in the long-term for students, facilitating competency and satisfaction.[6]

The article supplies background on legal education orthodoxy, beginning in the era of Dean Christopher Columbus Langdell. It then summarizes some of the most significant educational neuroscience advances.

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3. A purple sweet potato is in part of the sweet potato family and mostly grows in warm climates such as Japan, Hawaii, and South America. Danielle Turner, *10 Facts About Purple Sweet Potatoes You Should Know*, TASTING TABLE (Apr. 8, 2024, 10:15 AM), https://www.tastingtable.com/1556367/facts-about-purple-sweet-potatoes/.

4. Trying to be polite, I poked at it, thinking, "there was really no such thing and this was the product of a marketing firm to sell a poor cousin of the sweet potato." The cultural anthropologist, Clifford Geertz, writes about how most knowledge is local. *See* CLIFFORD GEERTZ, LOCAL KNOWLEDGE: FURTHER ESSAYS IN INTERPRETIVE ANTHROPOLOGY (3d ed. 1983).

5. What I realized later is that I had invisible fences around me—my prior experiences set my expectations and I had developed a comfort level with my localized environment. If I didn't know about it, it must not exist.

6. *See* Gerald F. Hess, *Seven Principles for Good Practice in Legal Education*, 49 J. LEGAL EDUC. 367, 368-369 (1999).

Then it shows how the learning process can be stretched and augmented by including some of those advances within the legal education domain.

II. BACKGROUND: LEGAL EDUCATION ORTHODOXY

The traditional era of American legal education began in the 1870s, around the time when Christopher Columbus Langdell was named Dean of Harvard Law School,[7] revolutionized the then-common apprenticeship program,[8] and turned lawyering preparation into academic study on a national scale. Langdell terminated the part-time teachers at Harvard when he became dean, hired full-time professors, and embarked on a study of the science of law.[9] He created what appears to be the first or at least first lauded textbook of appellate case reports, on the subject of contracts.[10] The casebook created an economy of scale—one book could be used for an entire course at any law school in the country, with a surfeit of students and only one teacher standing before them.

Notably, Langdell did not create a "lawyering" school about how to become an actual lawyer, but rather a law school that focused on critical thinking and other cognitive skills, including critical reading and writing.[11] In the process, emotive and other skills (often called "soft" skills, such as

7. Langdell was Dean from 1870 to 1895, a long run for a dean, especially by today's standards, where the average is only around three or so years. Christopher Columbus Langdell, ENCYCLOPEDIA BRITANNICA, https://www.britannica.com/biography/Christopher-Columbus-Langdell (last visited Mar. 12, 2025).

8. The common legal education prior to Langdell's time was essentially an apprentice program, with any courses taught generally by part-time instructors. Ronald K. Scalise Jr., *Legal Education in the 21st Century: Looking Backwards to the Future,* FED. LAW. at 38 (August 2013).

9. *See* Ralph Michael Stein, *The Path of Legal Education from Edward I to Langdell: A History of Insular Reaction*, 57 CHI.-KENT L. REV. 429, 448, 451 (1981) (noting Harvard's shift in hiring "non-judge" professors based on their proficiency of teaching rather than their experience); Russell L. Weaver, *Langdell's Legacy: Living with the Case Method*, 36 VILL. L. REV. 517, 521-31 (1991) (explaining Langdell's belief that study of law is a science and "need not be taught by active practitioners").

10. *See, e.g.*, C.C. LANGDELL, A SELECTION OF CASES ON THE LAW OF CONTRACTS (1871).

11. Over the years, not everyone supported the mass production system of attorneys that was created. For example, see Gerald P. López, *Transform – Don't Just Tinker With – Legal Education (Part II)*, 24 CLINICAL L. REV. 247, 365-66 (2018).

interviewing or counseling)[12] were either ignored or relegated to irrelevancy status.[13]

A. Traditional Norms

The traditional norms of Langdellian legal education, particularly insularity[14] and exceptionalism, allowed law schools to flourish as members of the university academy while at the same time staking a claim to training students to become lawyers.[15] The system created an entrenched culture that had implicit understandings about teaching and learning.[16] This system still had considerable hidden costs. Insularity meant that a law school was still separate in its own space or building with its own set of rules, while still an attached piece of a university—unless of course it was free-standing on its own.[17] The rules for law schools were promulgated by the American Bar Association, a separate entity from other regulators overseeing the rest of the university.[18] Exceptionalism refers to the signature quality of legal education—learning how to think like a lawyer through unique methods generally not replicated even in law courses taken by undergraduate students.[19] A third norm involved the subject matter of courses, where an

12. These "soft skills," however, have been found to be important to competent lawyering. *See* Marjorie M. Shultz & Sheldon Zedeck, *Final Report: Identification, Development, and Validation of Predictors for Successful Lawyering*, 26-27 (2009), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1353554. This report was based on studying several thousand graduates of University of California Berkeley Law School and Hastings College of Law.

13. *See, e.g.*, Peter A. Joy, *The Uneasy History of Experiential Education in U.S. Law Schools*, 122 DICK. L. REV. 551, 551 ("In the early years of legal education in the United States, law schools devalued the development of practical skills in students, and many legal educators viewed practical experience in prospective faculty as a 'taint.'").

14. The insularity norm is marked by an acceptation of "silos," where professors often do not know what other professors are doing in their courses, how they are assessing students, or even what courses they are teaching. Mandi S. Mizuta, Silos in Higher Education Institutions: Shifting from Organization Phenomena to a Practice Framework for Equitable Decision-Making (Jun. 22, 2022) (Dissertation, Portland State University) (on file with the Portland State University Library).

15. *See* Ian Holloway & Steven I. Friedland, *The Double Life of Law Schools*, 68 CASE W. RES. L. REV. 397, 398 (2017).

16. *See* Yoram Harpaz, *Teaching and Learning in a Community of Thinking*, 20 J. CURRICULUM & SUPERVISION 136 (Winter 2005).

17. Southwestern Law School is one example of a long-standing school without being part of a university.

18. Am. Bar Ass'n, 2016-2017 ABA STANDARDS AND RULES OF PROCEDURE FOR APPROVAL OF LAW SCHOOLS v, vii (2016).

19. *See* Edward H. Levi, *An Introduction to Legal Reasoning*, 15 U. CHI. L. REV. 501 (1948) (describing in depth what legal reasoning is and how to "think like a lawyer"); *see also* Paul F. Teich, *Research on American Law Teaching: Is There a Case against the Case System*, 36 J. LEGAL EDUC. 167, 170 (1986) ("Advocates of the case method have contended that of all potential

instructor was guided by a course textbook, coverage of subject matter, and rigorous examination of legal doctrines and skills through appellate case report analysis.[20]

Some of the costs of a Langdellian education can be seen in the gaps between teaching and learning. For example, student assessment often occurred in a final summative examination after the teaching part of the course ended. In fact, in some schools, the final exam for year-long courses occurred in May, at the very end of the course.[21] These final exams were not used as part of the learning process, but mostly as a way to sort students for employment and an understanding of how one student's performance compared to others on that exam.

Another gap involved the learning environment. The learning environments of courses are shaped by the classrooms, the books, the pedagogy of the instructors, and other circumstances. Classes in many law schools tended to be large and, especially in the first year, included books filled with appellate cases. Teaching these cases through a question-and-answer method, generally labeled, "the Socratic Method,"[22] included a version of calling on students and sometimes many questions per student. The gap between teaching and learning resulted from the law school focus on cognition, where law was seen as an objective science, based on standards, reason, and *stare decisis* ("let the decision stand").[23] The cognitive emphasis[24] became "cognition only" in many quarters and led to an

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alternatives case instruction best teaches the inductive method used by the lawyer to discern the law and so best directly teaches the most critical lawyering skill—the ability to think like a lawyer.").

20. Arthur D. Austin, *Is the Casebook Method Obsolete?*, 6 WM. & MARY L. REV. 157, 157 (1965) ("In contemporary law schools the dominant method of educating students is through the use of the official reports of actual cases. Appellate decisions are selected and positioned in a 'casebook' so as to represent general legal principles or to illuminate the evolution of a modern theory of law.").

21. My first year Civil Procedure examination, for example, occurred at the end of the year. I vividly remember not knowing how to approach the very first essay on the exam and thinking that I would be looking for another career after the exam was over.

22. *See* Steven I. Friedland, *How We Teach: A Survey of Teaching Techniques in American Law Schools*, 20 SEATTLE U. L. REV. 1 (1996).

23. *Stare decisis* is Latin for "to stand by things decided." It offers the core concept of precedent. *See, e.g.*, Amy C. Barrett, *Stare Decisis and Due Process*, 74 U. COLO. L. REV. 1011, 1016 (2003).

24. One dean described legal education as follows:

> [The job of law professors is to] stress cognitive rationality along with "hard" facts and "cold" logic and "concrete" realities. Emotion, imagination, sentiments of affection and trust, a sense of wonder or awe at the inexplicable—these soft and mushy domains of the "tender minded" are off limits for law students . . . .

Roger C. Cramton, *The Ordinary Religion of the Law School Classroom*, 29 J. LEGAL EDUC. 247, 250 (1978) (exploring the structures of law and the American legal profession).

exclusion of emotion in the learning process.[25] The traditional orthodoxy called this cognitive focus "thinking like a lawyer."[26] As one commentator noted, "A core presumption underlying modern legality is that reason and emotion are different beasts entirely: they belong to separate spheres of human existence; the sphere of law admits only of reason; and vigilant policing is required to keep emotion from creeping in where it does not belong."[27] Another long-time law professor observed: students were taught "that tough-minded analysis, hard facts, and cold logic are the tools of a good lawyer, and [that lawyering] has little room for emotion, imagination, and morality."[28] The results of a "cognition only" approach to education often left emotive competencies far behind, with stress, anxiety, and depression left to fester on their own.[29]

B. Sink or Swim Learning?

To some, the legal education's rigor and critical thinking challenges were its trademark qualities. Learning, though, effectively became a "sink-or-swim enterprise"—those who did not learn were either placed on probation[30] or dismissed from the programs.[31] As one commentator noted about the first 100 years of law school: "Most law schools accepted all applicants who met their minimum entry requirements and then let the chips

25. Not all legal educators have thought emotion should not play a role in legal education. *See, e.g.*, Grant H. Morris, *Teaching with Emotion: Enriching the Educational Experience of First-Year Law Students*, 47 SAN DIEGO L. REV. 465, 468 (2010).

26. Kurt M. Saunders & Linda Levine, *Learning to Think Like a Lawyer*, 29 U.S.F. L. REV. 121, 121 (1994); *see also, e.g.*, James R. P. Ogloff et al., *More Than "Learning to Think Like a Lawyer": The Empirical Research On Legal Education*, 34 CREIGHTON L. REV. 73 (2000).

27. Terry A. Maroney, *Law and Emotion: A Proposed Taxonomy of an Emerging Field*, 30 LAW & HUM. BEHAV. 119, 120 (2006).

28. Gerald F. Hess, *Heads and Hearts: The Teaching and Learning Environment in Law School*, 52 J. LEGAL EDUC. 75, 78-79 (2002).

29. *See, e.g.*, Andrea M. Flynn et al., *Law School Stress: Moving from Narratives to Measurement*, 56 WASHBURN L.J. 259, 259 (2017). The mental health issues of law students and lawyers are not new. *See* G. Andrew H. Benjamin et al., *The Role of Legal Education in Producing Psychological Distress Among Law Students and Lawyers*, 11 AM. B. FOUND. RES. J. 225 (1986) (evaluating whether legal education diminishes law student emotional well-being).

30. As one advisory group notes, "At law schools throughout the United States, academic probation carries its own unique meaning. Each school has its own guidelines for determining what puts a student on academic probation. Generally, academic probation is triggered in law school if your cumulative GPA falls below a predetermined cutoff." Nick Dempsey-Klott, *Academic Probation and Disqualification In Law School*, JD ADVISING (https://jdadvising.com/academic-probation-and-disqualification-in-law-school/) (last visited Mar. 13, 2025).

31. *See* J. Gordon Hylton, *Look to Your Left, Then Look to Your Right: Marquette University Law School, Fall 1919*, MARQUETTE UNIV. L. SCH. FAC. BLOG (Dec. 9, 2010), https://law.marquette.edu/facultyblog/2010/12/look-to-your-left-then-look-to-your-right-marquette-university-law-school-fall-1919/.

fall. Those who could handle the work continued to graduation. Those who couldn't either flunked out or dropped out."[32] Upon a first meeting with students, it was commonly said that deans would inform the students that they should look to the left of them and to the right of them because at the end of school, one of them would be gone.[33] Graduating from law school became a badge of courage as well as an indication that the person was learned in the law.

A myriad of assumptions has provided the base for the pedagogy and structure of law school. First and foremost, it has been assumed that expert teachers analyzing cases and teaching students to "think like lawyers" was a terrific way to impart the critical lawyering skills for those embarking on a career in law. Langdellian casebooks still serve as the primary source material, teachers are still experts with little or no training in the teaching and learning enterprise—although there is now an Institute for Law School Teaching and Learning for those teachers wishing to share their knowledge and learn from others[34]—and scholarship remains embedded as the key to career advancement, not excellence in teaching.

Yet, going beyond the invisible boundaries surrounding the silos of legal education reveals a different landscape, like traveling to a foreign country that might do things much differently than at the home location. Some interdisciplinary approaches to teaching and learning have shown that there are significant advantages to combining techniques from multiple disciplines to enhance the learning process for graduate (and other) students.

III. EDUCATIONAL NEUROSCIENCE ADVANCES

Disciplines outside of the law have found different and successful models of learning. One discipline, in particular, has shown how learning

32. *Id.* Dismissal often occurred at the end of the first year of law school but could occur after any semester, even after the first one. *Id.*

33. Mr. Hylton writes:

> At all most every law school founded before 1960, a story is told about a past dean who addressed incoming classes by telling them: "Look to your left and then to your right, and three years from now, only one of you will still be here." The softer version of the story ended "and only two of you will still be here." The story is probably apocryphal in its origins, although it was certainly used by later deans to emphasize the difficulty of legal study. Today, the story is usually told to illustrate how lax legal education has become in the modern era [. . .] [e]ven Harvard Law School did not reject a qualified applicant until 1939.

Id.

34. The Institute for Law School Teaching and Learning, centered at Washburn Law School and McGeorge Law School, was started by law professors interested in teaching and learning, including Gerry Hess and Michael Hunter Schwartz. INST. FOR L. TEACHING & LEARNING, https://lawteaching.org/ (last visited Mar. 14, 2025).

can be maximized or at least improved—educational neuroscience.[35] This amalgam of disciplines, including cognitive science (how the processes of learning work),[36] psychology (examining the conscious and unconscious mind),[37] educational theory (how people learn),[38] and perhaps most importantly, neuroscience,[39] offers legal education and lawyers different ways to participate in the learning process.

For learning, paying attention matters.[40] This is important if the information is to be retained in short-term memory.[41] In the digital age, attention is a sought after commodity with a great deal of competition from websites and apps. Studies have found that doing several tasks at once—called multi-tasking—generally is not beneficial to the actor.[42] In fact, it effectively means people will be doing multiple things poorly at the same time.[43]

A. The Unconscious Brain

The brain is effectively a three to four pound pattern-seeking device that includes competing sub-systems.[44] It is a pattern-seeking device. It holds the capability to learn in the short term and in the long term. The neuroscience advances have uncovered that most of our decisions are not a

35. Educational neuroscience refers to the collection of disciplines involving thinking, such as cognitive science, neuroscience, psychology, and educational theory. This amalgam of disciplines offers differing perspectives of the human brain. *See* EDUCATIONAL NEUROSCIENCE (Denis Mareschal, Brian Butterworth & Andy Tolmie eds., 2013).

36. *See* Michael S.C. Thomas, *Learning, Remembering, Forgetting*, HOW THE BRAIN WORKS, http://www.howthebrainworks.science/how_the_brain_works_/horses_for_course / (last visited Mar. 13, 2025).

37. *Id.*

38. Alice M. Thomas, *Laying the Foundation for Better Student Learning in the Twenty-First Century: Incorporating an Integrated Theory of Legal Education into Doctrinal Pedagogy*, 6 WID. L. SYMP. J. 49, 67-68 (2000).

39. Neuroscience itself can be viewed as a conglomeration of neurology, psychology and biology. Usha Goswami, *Neuroscience and Education*, *in* THE JOSSEY-BASS READER ON THE BRAIN AND LEARNING 33 (Jossey-Bass Publishers eds., 2008).

40. TERRY DOYLE & TODD ZAKRAJSEK, THE NEW SCIENCE OF LEARNING: HOW TO LEARN IN HARMONY WITH YOUR BRAIN 5-6 (2013).

41. DANIEL T. WILLINGHAM, WHY DON'T STUDENTS LIKE SCHOOL?: A COGNITIVE SCIENTIST ANSWERS QUESTIONS ABOUT HOW THE MIND WORKS AND WHAT IT MEANS FOR THE CLASSROOM 63 (2009).

42. *Why Multitasking Doesn't Work*, THE CLEVELAND CLINIC (Mar. 10, 2021), https://health.clevelandclinic.org/science-clear-multitasking-doesnt-work.

43. *Id.*

44. DAVID EAGLEMAN, INCOGNITO: THE SECRET LIVES OF THE BRAIN 109-10 (2011) ("I propose that the brain is best understood as a team of rivals . . . . [In reality,] brains are made of competing subsystems.").

product of conscious thought.[45] Instead, most of what we do is through unconscious brain operations, often the product of multiple parts of the brain.[46] This means that cognition and emotion often operate together, not as solo actors. To maximize the speed of human reactions to the environment, the brain bases much of its quick decision-making on generalized patterns. If people see a snake, they might often jump back, without endeavoring to determine if it is a harmful snake.

B. Memory

1. Ebbinghaus' Forgetting Curve

In 1886, the psychologist Hermann Ebbinghaus, who set out to examine the brain and memory, made a very important discovery about recall, which has now been memorialized as Ebbinghaus' Forgetting Curve.[47] This curve shows how long it takes on average to forget information that has been retained by ordinary people.[48] Ebbinghaus found that memory disappears over time.[49]

2. Distributed Practice

The neuroscience has studied what kinds of activities can help memory and recall. For example, it has been found that context, narrative, and distributed practice—also called 'spaced repetition'—help memory.[50] Doing

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45. Ed Yong, *Unconscious Brain Activity Shapes Our Decisions*, NAT'L GEOGRAPHIC (Apr. 13, 2008), https://www.nationalgeographic.com/science/article/unconscious-brain-activity-shapes-our-decisions#:~:text=Soon%20tentatively%20suggests%20that%20the,'t%E2%80%9D%20than%20free%20will.

46. *Id.*

47. *See, e.g.*, *Ebbinghaus Forgetting Curve (Definition and Examples)*, PRAC. PSYCH. (Nov. 9, 2023), https://practicalpie.com/ebbinghaus-forgetting-curve/ ("The Ebbinghaus forgetting curve is a graphical representation of the forgetting process. The curve demonstrates the declining rate at which information is lost if no particular effort is made to remember it.") The curve was included in Ebbinghaus's book, *Memory*. *Id.*

48. *Id.*

49. "Left to itself every mental content gradually loses its capacity for being revived, or at least suffers loss in this regard under the influence of time. Facts crammed at examination time soon vanish, if they were not sufficiently grounded by other study and later subjected to a sufficient review. But even a thing so early and deeply founded as one's mother tongue is noticeably impaired if not used for several years." HERMANN EBBINGHAUS, MEMORY: A CONTRIBUTION TO EXPERIMENTAL PSYCHOLOGY 4 (Henry A. Ruger & Clara E. Bussenius trans., Teachers College, Columbia University 1913) (1885), https://archive.org/details/memorycontributi00ebbiuoft/page/n6.

50. *See, e.g.*, *Ebbinghaus Forgetting Curve*, *supra* note 47 ("[W]hen the material is being repeated at strategically spaced intervals, the brain reconstructs the memory and strengthens it in

things over and over again are helpful to memory. On a brain science level, "neurons that fire together, wire together."[51] Instead of looking at things as simply being encoded like on a recording device, human brains have been found to have stronger storage and retrieval strength if the encoding has been reinforced multiple times.[52] We can see this when driving to a new location versus driving home, which we can do almost with "muscle memory" because we have taken a route so many times. With the new route, we will use a GPS or other assistance because even if we have gone that way once or twice, we have not imprinted it sufficiently on our brains.

According to the neuroscience, each time we pay attention to a subject, our brain's neurons connect.[53] These connections are not simply like turning on and off a light. Instead, paying attention to things causes the brain to change its biology and physically adapt to inputs and sensory stimuli.[54] This idea is like artificial intelligence connections, that change each time a command is given. Our brains are simply not the equivalency of a computer.

A better way to understand our brains is that they are effectively pattern-seeking devices. The brains will seek out patterns around it to make quick responses that otherwise likely would take too long if a person relies on the conscious thinking process.[55] One example involves driving a vehicle, which require many quick split-second responses that would be inadequate if only using the conscious brain to decide the best process.

Quizzes[56] can serve as one type of distributed practice. A quiz can help repack information in a person's memory, expand a person's understanding of the types of questions asked in an area as well as the types of questions students should be able to answer in an area. They also provide feedback, upon timely return of correct answers, about a student's progress in understanding material or the development of skills—or both. Quizzes also offer the prospect of immediate feedback, which is a clear advantage over longer essay tests that require time to evaluate and grade.[57]

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the process . . . . We can recall information and concepts better if we learn them in the course of several spread-out sessions.")

51. DONALD HEBB, THE ORGANIZATION OF BEHAVIOR, INTRODUCTION 62 (1949), *noted in* Sarah Ferguson*, Donald Olding Hebb*, CANADIAN ASS'N FOR NEUROSCIENCE, https://can-acn.org/donald-olding-hebb/ (last visited Mar. 16, 2025).

52. *See Ebbinghaus Forgetting Curve*, *supra* note 47.

53. *See* DONALD HEBB, *Intro.* to THE ORGANIZATION OF BEHAVIOR, at xix (1949).

54. *Id.* at 44.

55. *Id.* at 44-50.

56. Quizzes have been defined as "a short informal test." QUIZ, CAMBRIDGE DICTIONARY, https://dictionary.cambridge.org/dictionary/english/quiz (last visited Mar. 12, 2025).

57. *See, e.g.*, Roberta E. Dihoff et al., *Provision of Feedback During Preparation for Academic Testing: Learning is Enhanced by Immediate but Not Delayed Feedback*, 54 THE PSYCH. RECORD 207, 207-31 (2004).

3. Schema

> "A picture held us captive. And we could not get outside it, for it lay in our language and language seemed to repeat it to us inexorably." - Ludwig Wittgenstein.[58]

The brain creates schemas or structures as a way to organize all of the inputs that it receives.[59] These schemas provide a compact way to learn and store things. It is like a GPS, used to create routes for a trip or a way to maintain an understanding of who multiple people are after just meeting them.

Legal education and the law courses within it have their own schemas or big pictures, as do areas within the law. Changing the picture in our minds about our courses and the curriculum can have a huge impact on what we teach and the relationship between teaching and learning.[60]

We have pictures of the substantive content of courses as well. An example is due process of law,[61] which can be divided into five different doctrines or subparts. These five subparts can be organized as a list, or placed within a more memorable object, such as a house. By doing so, this assists the ability to recall the five doctrines.

4. Heuristics

Another reason to pay attention to the neuroscience is that the unconscious brain creates heuristics, meaning fast-thinking mental shortcuts.[62] These shortcuts are quick, easy, and effortless, which is one reason why they are used. When we see a snake on a path or another car merging into our lane of traffic, our brains generally will tell us that it needs a response to take us through prompt remedial action. The problem with fast

58. LUDWIG WITTGENSTEIN, PHILOSOPHICAL INVESTIGATIONS 115 (P.M.S. Hacker & Joachim Schulte eds., G.E.M. Anscombe et. al. trans., rev. 4th ed. 2009)

59. Kendra Cherry, *What is Schema Psychology*, VERY WELL MIND (May 13, 2024), https://www.verywellmind.com/what-is-a-schema-2795873.

60. Such mind pictures can have a significant impact on teaching and learning. As one commentator suggested: "[T]he practice of traditional schooling is based on four 'atomic pictures': learning is listening; teaching is telling; knowledge is an object; and to be educated is to know valuable content. To change this practice of schooling, educators must replace these pictures in their consciousness." Yoram Harpaz, *Teaching and Learning in a Community of Thinking*, 20 J. OF CURRICULUM AND SUPERVISION 136, 136-57 (2005).

61. *See* U.S. CONST. amend. V, XIV, § 1 (the Fifth Amendment Due Process Clause applies to the federal government, and the Fourteenth Amendment Due Process Clause applies to states and their subdivisions).

62. *See* Benjamin Frimodig, *Heuristics: Definition, Examples, and How They Work*, SIMPLY PSYCH. (Oct. 24, 2023), https://www.simplypsychology.org/what-is-a-heuristic.html.

and easy shortcuts is that they are often wrong. These shortcuts thus lead to unconscious bias, not just for some but for all of us.

One example is the so-called Competency Heuristic. This heuristic indicates that people may believe they are more competent than they actually are.[63] A study surveyed people and asked a basic question: Who believes they are above-average drivers?[64] This question was answered by many drivers, and the results fully supported the heuristic – a whopping 93% of the respondents believed they were above-average.[65] This was not Lake Wobegon, the fictional town where everyone was above average;[66] 93% could not be above average unless mathematics changed its principles.[67]

IV. PROPOSAL: USE INTERDISCIPLINARY APPROACHES TO EXPAND THE LEARNING PROCESS

Given the silos created in legal education and the invisible limitations resulting from traditional norms, such as the insularity of law school from other disciplines in the university, it has been easy to replicate and continue the dominant law school traditions, especially the emphasis on teaching over learning. Yet, legal education would be shortchanged if it did not at least consider supplementary or complementary learning approaches from other disciplines. The goal would not be to supplant historical methods but to utilize additional tools to make learning more effective.

This idea can be seen in many areas of problem-solving in current society. These areas have problems that use interdisciplinary tools to attack them, including computer science, algorithms, data, psychology, the Internet, the Internet of Things, and much more. If multiple disciplines are commonly used to solve complex and nuanced problems in areas such as engineering, biotechnology, health science, and space technology, that indicates it might just be worthwhile using an equivalent multidisciplinary collaboration within the legal education domain.

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63. *See* Kendra Cherry, *How the Dunning-Kruger Effect Works*, VERY WELL MIND (July 1, 2024), https://www.verywellmind.com/an-overview-of-the-dunning-kruger-effect-4160740 (describing the Dunning-Kruger effect as a "type of cognitive bias in which people believe they are smarter and more capable than they are").

64. Olga Svenson, *Are We All Less Risky and More Skillful than Our Fellow Drivers?*, 47 ACTA PSYCHOLOGICA 143, (1981).

65. *See* Alex Lightman, *Get Real: Why Over 90% of Americans Think They are Above Average Drivers and How to Know Precisely Who Is and Is Not a Good Driver*, CTR. FOR SMART TRANSP. (Mar. 15, 2017), https://www.smarttranspo.com/blog/2017/4/15/get-real-why-over-90-of-americans-think-they-are-above-average-drivers-and-how-to-know-precisely-who-is-and-is-not-a-good-driver.

66. Svenson, *supra* note 64, at 144-46.

67. This shows how self-assessments are often skewed.

One readily available tool is educational neuroscience. It can expand the learning toolbox, before and after classes, as well as in the classroom itself.[68] Significantly, these additional opportunities before and after class do not necessarily require the teacher to spend extra time and effort in doing so.

The new ideas can be short and involve remote technology, such as adopting podcasts.[69] The before and after class supplements could augment classes in a way that would be helpful to many students as well.

Interdisciplinary applications stretch the learning process. Some of the specific applications follow.

A. Before Class

There are many opportunities to guide students before class in addition to an assignment of text pages to read in a syllabus. While students often figure out what exactly the readings are intended to achieve, many wait to think about the material and their big questions until the actual class session.

1. Asking Questions

The orchestra conductor in a class is generally the teacher. Yet, that does not have to be the case. Students can be given the equivalent of class questions in writing before the class occurs. These questions can alert students about what they should be looking for in preparing for class. For example, students can be asked how the erroneous jury instructions could be changed for the better, why the judge ignored one argument and accepted another, or how the three cases on the same subject create a synthesized rule.

The rationale for asking questions in advance does not solely derive from educational neuroscience, but pragmatism and the value of having some time to reflect. Why wait to launch the questions without opportunity to think about them, digest them, and apply them? That is consistent with law practice, where preparation for oral argument, trial, or a client meeting all have the general opportunity to prepare in advance. The questions can direct students how to structure their preparation and what to emphasize in reading the material.

This idea also shapes not only the specific material, but the types of practices—such as asking questions as a regular habit—that will help with their careers. If students are seeking questions rather than just answers, they

68. *See* Janet M. Dubinsky & Arif A. Hamid, *The Neuroscience of Active Learning and Direct Learning*, 163 NEUROSCIENCE AND BIOBEHAVIORAL REVS., Aug. 2024, at 2.

69. Just because the teacher's generation grew up learning face-to-face in class with a particular methodology and course book does not mean succeeding generations must do the same.

will be better able to spot issues and develop strategies and practices in solving a problem.

2. Preview Quizzes

Quizzes do not only have to occur after a topic to evaluate a student's knowledge. They can occur before a topic as well to offer quiz-takers an opportunity to explore the parameters of the topic before working through the subject matter in a more systematic manner. In this way, the quizzes are part of the learning process, not simply serving as a summative assessment used to rank and sort student performance.

3. A Preview Topic Problem

Before defining the important concepts of a unit, students can be given the type of problem they will confront in the unit in a parallel to a preview quiz. This type of preview is consistent with a GPS program that shows the different routes of a trip, each of which might be viable depending on the circumstances.[70] A preview topic problem can describe a real-world problem or offer a hypothetical. In one textbook, for example, a homicide chapter has an introductory problem about Phil Spector, the famous music producer who shot and killed a young actor, Lana Clarkson, who was an invited guest in his house.[71] The case was used to offer an example of criminal homicide and how sentencing for unlawful killings provides numerous issues on its own.[72]

4. Preparation Guidance

A teacher also can provide more detailed guidance on how to prepare for a class or for the unit with written or oral guidance. This idea goes beyond just assigning pages to read in a textbook. It helps prepare the students for the skill of reading in a directed fashion—what to look for, emphasize, and mine in the material. Thus, a teacher can include in the syllabus what to spot, emphasize, and evaluate, in a case, chapter, or other reading.

70. A preview topic problem can describe a real-world problem or offer a hypothetical, created by the teacher for the particular class.

71. STEVEN I. FRIEDLAND ET AL., CRIMINAL LAW: A CONTEXT AND PRACTICE CASEBOOK 204 (Carolina Academic Press 2024).

72. *Id.*

C. During Class

1. Create Schemas

Since the brain will create schemas or pictures to support the learning process, why not have teachers also do the same for students? This can occur through drawings on the board, photos, or diagrams.

2. Note-taking Breaks: Verification

We assume that students will take copious and accurate notes, providing the correct emphasis on the important points in a class. These assumptions can be verified through a brief note-taking break within a class so that students get feedback on their interpretation of a class in almost real time. Students could verify what might be important in the class thus far and whether their notes are indeed accurate and organized in a useful fashion. The break could involve students engaging with a neighbor to compare notes, or include the teacher, who can provide subtle or explicit guidance on what students should be taking away from the class.

3. Good to Better?

In law school, we often will look at a model answer or the best way to approach a problem. Yet, for many students working on developing skills, it is helpful to take a mediocre response and, through redrafting, make it better. An illustration follows.

Question: North Carolina adopted a law making it a class A2 misdemeanor to "drive while distracted." Joan was driving home from Winston-Salem to Greensboro when she heard a "ping" indicating she had received a text. She quickly glanced at her phone. A message from her mother appeared, saying, "The operation went well!" As Joan went to dial her mother, the car in front of her suddenly stopped, and Joan, although looking up with one eye all the time, could not slow down in time and bumped the car. There were no injuries and there appeared to be little damage to the car that was hit (although it ended up costing $1,500 to replace its bumper). When the police arrived, Joan was charged with violating the North Carolina law, "driving while distracted."

If you represented Joan, what arguments would you make on her behalf? Explain.

Answer: Joan likely did not drive while distracted because she was not distracted when the accident occurred. She was driving like most others would at that time. In addition, the statute is vague. The Void for Vagueness Doctrine extends to North Carolina from the Fifth Amendment of the U.S.

Constitution, through the Incorporation Doctrine of the Fourteenth Amendment of the U.S. Constitution. The word "distracted" in the statute is clearly unconstitutionally vague. Without further elaboration in the statute, it is not clear to the prosecution what is needed to get a conviction.

Students could be asked how they would improve the answer and why this kind of reflection is not often done as part of law school courses.[73]

D. After Class

1. Quizzes

Quizzes not only serve as a way to rank and sort student performance but offer great promise as part of the learning process. A quiz can help solidify a student's knowledge through spaced repetition and become a part of the learning process. The quiz can also correct what students recall from a class or book so they do not take inaccuracies and use those as their understandings of the rules. Further, the quiz can show students how to organize the rules better in their brains—every time a student touches a topic, the brain reorganizes and reshuffles the information. Thus, a quiz, whether it is high stakes and "counts," or low stakes and just has to be completed as part of the course expectations, is useful on multiple levels.

2. After Class

Many students conclude a class by closing their computers and then going straight to their next class or appointment. By the time this next requirement occurs, much of what students have learned has floated away. Consequently, students would benefit from after-class reviews and discussion. This notion of repacking a class, like repacking a car for a trip after sitting and looking at all of the suitcases for a bit, can assist the learning process as a form of spaced repetition. Students also can pack differently upon hearing about the material again, and can obtain a clearer understanding of what occurred in the class.

V. CONCLUSION

Traditional legal education has been a secure component of the American university system for more than 150 years.[74] It has utilized well-

73. *Id.* at 88-89 (discussing this problem).

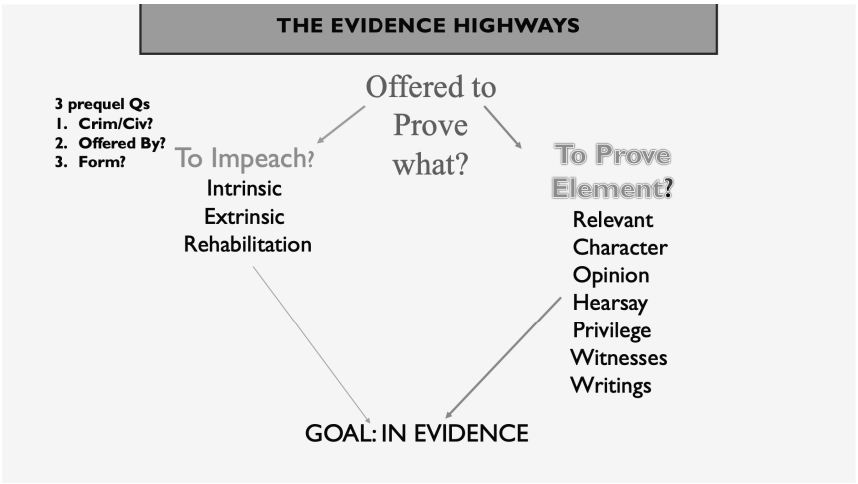
74. Law schools started well-before that, when Tapping Reeve, a Princeton teacher, started the Litchfield Law School in Connecticut in 1784. *See, e.g.*, Livia Gerson, *The Origins of American Law Schools*, JSTOR DAILY (Dec. 30, 2017), https://daily.jstor.org/daily-author/livia-gershon/.

entrenched pedagogies and methods in teaching students in a graduate law program how legal problems can be analyzed through critical thinking. Historical norms and culture have emphasized teaching over the learning process and, for decades, utilized a "sink-or-swim" approach to student learning. Yet, in the digital era, many problems in different disciplines are resolved using interdisciplinary techniques. Legal education could benefit from interdisciplinary learning approaches, particularly from advances in educational neuroscience and how people learn. These additional methods can be used to supplement or complement existing approaches and expand the learning tool box.

APPENDIX

A. Schema: The Big House of Due Process

B. Schema: The Evidence Highways



C. Schema: Hearsay