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COGNITION AND STAR TREK™: LEARNING AND LEGAL EDUCATION

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INTRODUCTION

When my son was very young, he loved toy trains. But when we purchased a train set for him, he was unable to assemble the individual cars into a train. Connecting two cars required a small twist of one of the cars before the mechanical coupling would connect. My husband repeatedly demonstrated the required twist. But even with multiple demonstrations, our son did not succeed in attaching the cars.

Later, I sat with our son and the train cars. As I wiggled the cars, so that the coupling caught, and assembled the train so that my son could play with it, I spoke in some detail about what I needed to do to make his train work. "Hold the engine, twist the coal car." Once the train was assembled, he played happily with it. But the plastic couplings tended to disengage with active play. They were, after all, designed to disengage easily so that children could add cars or reassemble the train into different configurations. Suddenly, I saw our son grasp the engine and the coal car and heard him say, "Hold the engine, twist the coal car" as he held the engine and twisted the coal car to engage the mechanical link.

I did not know then that learning theorists and empiricists would have described my son's preferred mode of learning as an aural one. But I did know that having him hear and hearing him speak (re-auditorize) the directions triggered his ability to learn and become the master of his train set. Like most human beings, his ability to process visually and through other modalities has

*Professor of Law, University of California, Hastings College of the Law. I am grateful to my colleagues, including Margreth Barrett, Terry Diggs, Paula Lustbader, Deborah Merritt, Lois Schwartz, Lois Weithorn, Keith Wingate, and Laurie Zimet, who provided invaluable counsel on the manuscript, as well as to my very capable research assistants Erin Blake and Amanda Tylicki. My thanks go also to my library liaison Chuck Marcus and to the editors of THE JOHN MARSHALL LAW REVIEW who helped in the publication process of this article, especially Lauren Sylvester, Jack O'Connor, and Oksana Koltko. Throughout this Article, I refer to the Star Trek™ television series. This Article, however, has not been sponsored or endorsed by the owners of the Star Trek trademark or series.

grown with maturity. But this experience of observing my son as a learner changed me as a teacher.

Reaching students through their preferred learning styles is one of the keys to effective teaching. Cognitive science research, particularly disciplines that study how the brain works and how people learn,[1] now provides a collection of additional keys that open the doors to learning.

Learning is the primary focus of education. "Learning to think like a lawyer is the main occupation of students' first phase in law school."[2] Helping students learn *how* to think like a lawyer presents a challenge for law professors. After all, many of us come to law teaching with little or no formal education or training about teaching and often with limited exposure to research about learning.[3]

In confronting this challenge, we can benefit from research in other disciplines. Although they do not all speak with one voice,

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1. DAVID W. JOHNSON, ROGER T. JOHNSON & KARL A. SMITH, ACTIVE LEARNING: COOPERATION IN THE COLLEGE CLASSROOM 1:6 (Interaction Book Co. 1991) (describing how "teaching" at the college level is moving toward "a new paradigm based on theory and research that has clear applications to instruction."); *see also* COMM. ON DEVELOPMENTS. IN THE SCI. OF LEARNING, HOW PEOPLE LEARN: BRAIN, MIND, EXPERIENCE, AND SCHOOL (John D. Bransford, Ann L. Brown & Rodney R. Cocking eds., 2000) [hereinafter HOW PEOPLE LEARN] (describing how cognitive science research helps explain how people learn); SHARAN B. MERRIAM, ROSEMARY S. CAFFARELLA & LISA M. BAUMGARTNER, LEARNING IN ADULTHOOD: A COMPREHENSIVE GUIDE (John Wiley & Sons, Inc. 3rd ed. 2007) (explaining how cognitive science research provides insight into how adults learn); WILBERT J. MCKEACHIE, PAUL R. PINTRICH, YI-GUANG LIN, DAVID A. F. SMITH & RAJEEV SHARMA, TEACHING AND LEARNING IN THE COLLEGE CLASSROOM: A REVIEW OF THE RESEARCH LITERATURE (Nat'l Center for Research to Improve Post Secondary Learning, 2d ed., 1990) (reviewing literature discussing cognitive science research and its application to teaching at the college level).

2. WILLIAM M. SULLIVAN, ANNE COLBY, JUDITH WELCH WEGNER, LLOYD BOND & LEE S. SHULMAN, EDUCATING LAWYERS: PREPARATION FOR THE PROFESSION OF LAW 87 (The Carnegie Foundation for the Advancement of Teaching 2007) (The word "accordingly" was omitted from the quotation in the text above).

3. Deborah J. Merritt, *Legal Education in the Age of Cognitive Science and Advanced Classroom Technology*, 14 B.U. J. SCI. & TECH. L. 39, 41 (2008). According to Professor Merritt, "[l]egal scholars and lawyers know surprisingly little about the cognitive science research that has unveiled new methods of harnessing the brain to work harder and smarter." *Id.; see also* Anthony S. Niedwiecki, *Lawyers and Learning: A Metacognitive Approach to Legal Education*, 13 WIDENER L. REV. 33, 36 (2006) ("To be a law professor, there is generally no requirement that a person have any training in teaching . . . . In my years of teaching, rarely have I seen any focus on whether a professor has been trained in how to teach, or whether a professor has any degrees in educational psychology, teaching, or learning theory. This general lack of experience and understanding of teaching and learning theory forces professors to teach like they were taught, or to make teaching decisions based on intuition instead of well-accepted learning theory." (footnotes omitted)).

researchers in education, cognitive and experimental psychology, and neuroscience, among other fields, offer fundamental insights that legal academics can use to improve teaching and learning in our classrooms.[4]

Over the past several decades, empirical researchers have conducted a substantial and growing number of studies on how people learn.[5] The research is wide ranging and includes studies of a variety of instructional approaches, from traditional lectures to multimedia presentations.[6] The results from many of these

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4. This article is not the first, of course, to note the value of applying cognitive science research to law teaching. *See, e.g.*, Merritt, *supra* note 3, at 40-51 (applying several important cognitive science insights, including research on visuals and personalization, to argue in favor of employing PowerPoint visuals in the classroom); John Batt, *Law, Science, and Narrative: A Symposium-Reflections on Brain Science, Electronic Media, Story, and Law Learning*, 40 J. LEGAL EDUC. 19, 43 (1990) (exploring "what brain science and dream research tell us about learning from narrative" and arguing that electronic narrative, like film, "is a potent learning medium."); *see also infra* notes 31-46 and accompanying text (illustrating that many educators already recognize the importance of students' learning styles). There is also a substantial body of scholarship on the value of active learning across disciplines. In calling for the application of cognitive science research to legal pedagogy (or andragogy), meaning adult learning, see generally MALCOLM S. KNOWLES, THE MODERN PRACTICE OF ADULT EDUCATION: FROM PEDAGOGY TO ANDRAGOGY (Chicago Association Press 1980), I join a growing chorus of voices within the legal academy. My research suggests, however, that this article is unique in its combination of the cognitive science insights described here with the application vehicle of the *Star Trek* clips for a large first-year law school class.

5. *See supra* note 1 and *infra* notes 47-171 and accompanying text (describing numerous empirical research studies on how people learn).

6. *See, e.g.*, Patricia Ann deWinstanley & Robert A. Bjork, *Successful Lecturing: Presenting Information in Ways That Engage Effective Processing, in* APPLYING THE SCIENCE OF LEARNING TO UNIVERSITY TEACHING AND BEYOND 19 (Diane F. Halpern & Milton D. Hakel eds., 2002) (illustrating basic components of effective learning and suggesting ways of presenting information that can induce this form of thought processing by college students); Richard E. Mayer, *Cognitive Theory and the Design of Multimedia Instruction: An Example of the Two-Way Street Between Cognition and Instruction, in* APPLYING THE SCIENCE OF LEARNING TO UNIVERSITY TEACHING AND BEYOND 55, 60 (Diane F. Halpern & Milton D. Hakel eds., 2002) (exploring ways in which cognition and teaching are intertwined through the example of multimedia instruction); *see also* Slava Kalyuga, Paul Chandler & John Sweller, *Managing Split-Attention and Redundancy in Multimedia Instruction*, 13 APPLIED COGNITIVE PSYCHOL. 351, 351-71 (1999) (evaluating how to reduce cognitive overload in multimedia presentations through investigating "alternatives to split-attention instructional designs"); Leonard Springer, Mary Elizabeth Stanne & Samuel S. Donovan, *Effects of Small-Group Learning on Undergraduates in Science, Mathematics, Engineering, and Technology: A Meta-Analysis*, 69 REV. OF EDUC. RES. 21, 21-51 (1999) (evaluating the effects of small group learning in science, mathematics, engineering, and technology for undergraduate studies); R.C. Dougherty et al., *Cooperative Learning and Enhanced Communication: Effects on Student*

studies are germane to our task as legal academics.

As a result of the research, this Article calls for innovation in one of the most foundational responsibilities entrusted to the legal academy—that of sparking and nurturing a student's ability to learn how to think theoretically, doctrinally, and practically about legal issues.[7] It is not a call for innovation for its own sake, but for innovation that draws on decades of extensive and growing, thoughtful research on how students actually learn. In this Article, I explore four insights about learning from the cognitive science research.[8] In large part, my choice of insights rests upon an underlying premise. As explained by empirical researchers in the field of educational psychology, one of the "most important paths toward fostering meaningful learning . . . [is] increas[ing] the learner's interest."[9] Similarly, neuroscientific research on the physical changes learning actually produces in the brain itself indicates that "paying close attention is essential to long-term . . . change."[10]

These results are consistent with the intuition of many educators. An interested learner is likely to be an engaged

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Performance, Retention, and Attitudes in General Chemistry, 72 J. OF CHEMICAL EDUC. 793, 793-97 (1995) (examining effects of cooperative learning and enhanced communications on undergraduate chemistry students in the areas of performance, retention, and attitudes); Geoffrey R. Norman & Henk G. Schmidt, *The Psychological Basis of Problem-Based Learning: A Review of the Evidence*, 67 ACAD. MED. 557, 557-65 (1992) (examining evidence on whether problem-based learning results in actual improvement in problem-solving skills, retention, interest in subject-matter, and self-directed learning); David T. A. Vernon & Robert L. Blake, *Does Problem-Based Learning Work? A Meta-Analysis of Evaluative Research*, 68 ACAD. MED. 550, 550-61 (1993) (evaluating research from 1970-1992 comparing problem-based learning with more traditional methods of learning in "health-related educational programs").

7. New approaches, consistent with emerging research, have passed over the law school threshold and form part of the offerings at most, if not all, law schools. (Consider, for example, clinical offerings, negotiation, and other simulation classes). But few new approaches have entered into the daily realm of the "core" first or second year, large class curriculum. It is primarily with those who teach in such forums that this article hopes to hold some sway.

8. Although the article focuses on these four primary learning constructs, the article benefits from and refers to empirical research about additional insights on learning, including learning as it relates to humor *see infra* note 187 and to feedback, *see infra* notes 207-209.

9. Richard E. Mayer et al., *A Personalization Effect in Multimedia Learning: Students Learn Better When Words Are in Conversational Style Rather Than Formal Style*, 96 J. OF EDUC. PSYCH. 389, 389 (2004). Professor Mayer and his colleagues' research studies were conducted in the context of multimedia learning, but this premise seems applicable much more broadly.

10. NORMAN DOIDGE, THE BRAIN THAT CHANGES ITSELF 68 (Penguin Books 2007) (citing Michael P. Kilgard & Michael M. Merzenich, *Cortical Map Reorganization Enabled by Nucleus Basalis Activity*, 279 SCIENCE 1714 (1998)).

learner, receptive to the types of effort involved in the learning activity. Thus, I have chosen four cognitive science insights to enhance interest and engagement in the classroom.[11]

First, this Article focuses on "active learning" and why we should encourage students to engage and fully participate in their own learning. Second, the Article explores the value of stories. The analysis of stories also considers how narratives can further our discussions of difference—how stories can connect us across cultures and differences and enable us to understand a multiplicity of perspectives.[12] Third, the Article addresses the pivotal role of the visual pathway and its importance to learning. Fourth, we turn to empirical work on personalizing the presentation style to increase learning.

Before introducing the four insights, Part I gives a very brief overview of some of the types of learning involved in thinking like a lawyer. Part II provides an introduction to relevant learning theories and learning modes while delineating each of the four insights and a number of research studies related to them. Part III then analyzes how a legal academic could apply these insights in a law school classroom, particularly in a large first-year class, and analyzes how these insights might enhance various aspects of learning to think like a lawyer.

I. THINKING LIKE A LAWYER

While those within and those outside the academy may debate the full range of substantive ideas and analytic skills that constitute thinking like a lawyer, I anticipate that most participants in legal education, as well as most practicing lawyers, would agree that the following is a critical subset of the range. Lawyers need to be able to understand how to distill principles from original legal source material, e.g., cases, statutes, and administrative regulations. Lawyers then need to be familiar with the relevant substantive legal principles that they distill. Most first-year curricula begin with a focus on both of these capabilities.

Beyond these initial (and key) abilities, thinking like a lawyer

11. There are a host of additional insights about learning that are relevant to student learning in law school. Other scholars have explored a number of these. *See, e.g.*, Brook K. Baker, *Beyond MacCrate: The Role of Context, Experience, Theory, and Reflection in Ecological Learning*, 36 ARIZ. L. REV. 287, 293-94 (1994) (advocating the importance of contextual real-world learning during law school).

12. In my experience, there are many important opportunities to explore issues of differences both directly and by analogy in a criminal law curriculum. Some of the more direct opportunities that I have pursued involve the *McQuirter*, (1953 Ala. App. LEXIS 323 (1953)), *Goetz*, (1986 N.Y. LEXIS 19388 (1986)), *McCleskey*, (481 U.S. 279 (1987)), and *Carr*, (580 A.2d 1362 (1990)), cases and the showing of the film *Defending Our Lives*, from Cambridge Documentary Films.

requires some mastery of a number of additional abilities. Of these, I raise three here. Good lawyers identify legal issues in unfamiliar or new scenarios.[13] Clients and witnesses generally relate a set of events to attorneys, who, in turn, need to be able to recognize the legal issues embedded in those narratives.[14] Second, good lawyers can effectively apply the legal principles relevant to those issues.[15] Third, lawyers analyze these issues using the relevant facts in order to investigate potential outcomes for the various participants and to strategize client-favorable approaches.

I do not pretend that this subset of thinking-like-a-lawyer abilities substitutes for the whole. For example, negotiating effectively,[16] developing empathy, and writing concisely and persuasively, among other capabilities, are often vital for effective lawyering. But I leave detailed exploration of those for another day or to other scholars. Identifying legal issues, applying the relevant law to them, and evaluating potential outcomes are critical to successful legal work. Developing approaches to help students learn these pivotal cognitive skills is the focus of the remainder of this Article.

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13. *See* REPORT OF THE TASK FORCE ON LAW SCHOOLS AND THE PROFESSION: NARROWING THE GAP, 1992 A.B.A. SEC.: LEGAL EDUC. AND ADMISSIONS TO THE BAR, *available at* http://www.abanet.org/legaled/publications/onlinepubs/maccrate.html (last visited Oct. 6, 2009) [hereinafter THE MACCRATE REPORT] ("Skill § 1: In order to develop and evaluate strategies for solving a problem or accomplishing an objective, a lawyer should be familiar with the skills and concepts involved in: 1.1 Identifying and Diagnosing the Problem; 1.2 Generating Alternative Solutions and Strategies; 1.3 Developing a Plan of Action").

14. *Id.* ("Skill § 3: In order to identify legal issues and to research them thoroughly and efficiently, a lawyer should have: 3.1 Knowledge of the Nature of Legal Rules and Institutions").

15. *Id.* ("Skill § 2: In order to analyze and apply legal rules and principles, a lawyer should be familiar with the skills and concepts involved in: 2.1 Identifying and Formulating Legal Issues; 2.2 Formulating Relevant Legal Theories; 2.3 Elaborating Legal Theory; 2.4 Evaluating Legal Theory").

16. *See* Melissa Nelken, *Negotiating Classroom Process: Lessons from Adult Learning*, 25 NEGOTIATION J. 181, 181-93 (2009) (analyzing philosophy and components of environments conducive to adult learning of negotiation skills). Developing good judgment is another critical lawyering ability that is involved in the evaluation of potential legal outcomes, but which also can and should be an explicit focus of legal education. *See* Mark N. Aaronson, *We Ask You to Consider: Learning About Practical Judgment in Lawyering*, 4 CLINICAL L. REV. 247, 247 (1998). Similarly, the capacity to tolerate ambiguity and uncertainty are part of the thinking-like-a-lawyer focus of this article, but also deserves explicit and additional classroom treatment.

II. RESEARCH ABOUT LEARNING[17]

A. Learning Paradigms

Learning theory offers at least three well-recognized models of how people (and sometimes other species) learn: behaviorism, cognitivism, and constructivism.[18] "[B]ehaviorists conceptualize[] learning as a process of forming connections between stimuli and responses."[19] Perhaps the most famous experiment demonstrating the principles of behaviorism involved Dr. Pavlov and his dogs' salivation response to the beating of a metronome (and other stimuli) that preceded feedings.[20] There, the dogs learned that food followed the sound of the metronome, and they began to salivate with the sound even when there was no food present.[21] Their brains formed a direct link between the stimuli of the sound and the salivation response.[22]

In the context of human learning, for example, one educator explains that "a student has learned to perform long division when, in response to a problem requiring long division (a stimulus), the student properly performs it (the desired response).... [T]he focus is on the response and not on the mental activity that causes a learner to develop the ability to make the desired response."[23]

In cognitivism, "learning is conceptualized as the modification of the learner's internal structure, such that a new experience alters the internal structure."[24] In contrast to behaviorism,

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17. The breadth of approaches to learning and the research on them are extensive. For purposes of this article, it was not possible to canvass the full scope of the materials on human learning.

18. Craig Rich, Barbara Mae Gayle & Raymond W Preiss, *Pedagogical Issues Underlying Classroom Learning Techniques, in* CLASSROOM COMMUNICATION AND INSTRUCTIONAL PROCESSES: ADVANCES THROUGH META-ANALYSIS 31, 33 (Barbara Mae Gayle, Raymond W. Preiss, Nancy Burell & Mike Allen eds., 2006) ("Although not comprehensive, the pedagogical literature often includes the behaviorist, cognitivist, and constructive paradigms of learning as the most salient and informative platforms for instructional practices."). I offer here no more than a very simplified description of these approaches.

19. HOW PEOPLE LEARN, *supra* note 1, at 6.

20. *See* IVAN P. PAVLOV, CONDITIONED REFLEXES: AN INVESTIGATION OF THE PHYSIOLOGICAL ACTIVITY OF THE CEREBRAL CORTEX 16-32 (G. V. Anrep ed. & trans., Oxford University Press 1927) (providing the series of lectures that Dr. Pavlov prepared on his work in experimental psychology, including the famous dog salivation experiment).

21. *Id.* at 21.

22. *See id.* at 22 (explaining that there was no observable difference in the dogs' responses to the metronome and the dogs' responses to being shown real food).

23. MICHAEL HUNTER SCHWARTZ, EXPERT LEARNING FOR LAW STUDENTS, 21 (Carolina Academic Press 2005).

24. Rich et al., *supra* note 18, at 34 (citing P. Grippin & S. Peters,

cognitivists are concerned with the internal processing within the brain that involves how we encode and retrieve information.[25]

In the third model, constructivists construe "learning as an interpretive, recursive, building process by active learners interacting with the physical and social world."[26] Constructing knowledge depends upon the pre-existing mental models of the learner. This means that as teachers and learners, even with ways of thinking that are quite new to our students, we do not write on a clean slate.[27] Students filter and modify the law school experience through their existing knowledge and understandings of the world. In turn, the new knowledge and ways of processing and interpreting information enable learners to then reconstruct the topography of their previous mental models to incorporate that new knowledge and ways of processing and interpreting information.

All three learning paradigms yield valuable perspectives on how we process information. Constructivism is "perhaps the most current psychology"[28] of contemporary learning theory. As Professor John Bransford, a pioneer and eminent scholar in the field of learning, explains, "[i]n the most general sense, the contemporary view of learning is that people construct new knowledge and understandings based on what they already know and believe."[29]

LEARNING THEORIES AND LEARNING OUTCOMES: THE CONNECTIONS, Lanham, MD: University of America Press, 1984).

25. *See* SCHWARTZ, *supra* note 23, at 21-23. Professor Schwartz explains that a cognitivist view,

> [H]as . . . crucial implications for students who wish to become expert learners [including]: Students must make active efforts to encode their new learning. Students must become experts at the various techniques for encoding new learning. As much as possible, students should try to draw analogies between what they are learning and what they already know so the new learning can connect to the prior learning already stored in their long-term memory. Students should try to organize their learning so that it can be readily stored in a schema. Students need to engage in 'deep processing' so that they develop automaticity with respect to knowledge and skills. Students should encode their new learning in multiple ways to allow easier recall.

Id. at 24; *see also* Paula Lustbader, *Construction Sites, Building Types, and Bridging Gaps: A Cognitive Theory of the Learning Progression of Law Students*, 33 WILLAMETTE L. REV. 315, 321 (1997) (describing and applying "'Learning Progression: a cognitive theory that explains the evolutionary learning process of law students").

26. Catherine T. Fosnot, *Constructivism: A Psychological Theory of Learning* in CONSTRUCTIVISM: THEORY, PERSPECTIVES, AND PRACTICE 8, 30 (New York: Teachers College Press, 1996).

27. HOW PEOPLE LEARN, *supra* note 1, at 10-11.

28. Fosnot, *supra* note 26, at 8. Catherine Fosnot contends, however, that constructivism "stands on completely new ground—often in direct opposition to both behaviorism and maturationism." *Id.*

29. HOW PEOPLE LEARN, *supra* note 1, at 10.

To create a learning environment conducive to constructivist learning, we can supply opportunities and support for our students to actively process new knowledge and relate it to existing knowledge. If we want students to recognize legal issues in unfamiliar settings, as well as to articulate and apply legal principles to those issues and evaluate the range of legal outcomes based on that application, then we should provide opportunities for students to engage in those mental exercises in ways that foster the incorporation of the new processing into the students' existing mental models.

To furnish those opportunities, we can draw upon the power of active learning, stories, visuals, and personalization as explained below in this Article. Before exploring those insights, however, in order to create a learning-friendly or, as it is more commonly called, a "learner-centered"[30] classroom, we should first take note of educational research that explains learners' preferred modes of learning. A preferred mode of learning, like the aural one for my son and his train, represents the most comfortable and perhaps natural learning style for an individual.[31] Educational theorists and practitioners now recognize at least five learning styles: (1) verbal, (2) visual, (3) oral, (4) aural, and (5) tactile and kinesthetic.[32]

Verbal learners process information most efficiently through writing and reading written textual sources.[33] You have undoubtedly had many verbal learners in your classroom, as it may be the preferred learning mode for most law students.[34] Visual learners who appear, perhaps, to be the next most common type of law school learner process information most efficiently when the presentation involves visual images, like pictures, diagrams, and other visual formats.[35] Their recollection of a professor's discourse may stem from the "professor's movements or visual aids."[36] Some data suggest that, while the number of visual learners may be increasing,[37] visual learners generally have been less academically successful in law school than their verbal learner peers.[38]

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30. *See, e.g.*, Gary A. Smith, *First-Day Questions for the Learner-Centered Classroom*, 17 NAT'L. TEACHING AND LEARNING FORUM 1, 1 (2008).

31. *See* M. H. Sam Jacobson, *A Primer on Learning Styles: Reaching Every Student*, 25 SEATTLE U. L. REV. 139, 142 (2001) (explaining that teaching to students' learning styles allows students to "learn how they learn best").

32. *See generally id.* (providing a clear and accessible overview of these modes of absorbing information).

33. *Id.* at 151.

34. *Id.*

35. *Id.* at 151-54.

36. *Id.* at 152.

37. *Id.* at 151.

38. *Id.* at 151-52. One scholar reports, for example, that "nearly all of the

Oral learners process information most efficiently through verbal discourse.[39] "For oral learners to thrive, they need to have opportunities to talk."[40] Aural learners process information most comfortably through listening.[41] Tactile and kinesthetic learners generally learn best by doing.[42] Experiential learning vehicles, like role-plays or other simulations, may facilitate the absorption of information by tactile and kinesthetic learners.[43]

Students, of course, generally rely to a greater or lesser degree on most, if not all five, of these methods for processing information.[44] Nonetheless, reaching a learner through his or her preferred learning mode can have a substantial positive effect on learning efficiency and outcomes for that student.[45] When designing an effective learning-friendly classroom community, professors can draw upon these understandings of preferred learning modes. By furnishing learning opportunities that involve reading, writing, speaking, visuals, role-play, reflection, movement, and discussion, we can reach more learners through their preferred learning methods. Combining an awareness of preferred learning styles with the learning insights described below, we can more effectively enable the whole class to learn.[46]

B. Learning Insights

1. Active Learning

"Learning is not a spectator sport. . . . [Students] must talk about what they are learning, write about it, relate it to past experiences, apply it to their daily lives. They must make what they learn part of themselves."[47] Students can learn as passive

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students who fail Legal Research & Writing at Willamette University College of Law are visual learners. Of the fifty-two students since 1995 who were required to take a remedial summer Legal Research and Writing course, thirty-nine were visual learners . . . ." *Id.* at 152 n.52. (analyzing why this disparity might occur and proposing remedial action in teaching methodologies to address the disparity). *Id.* at 141-72.

39. *Id.* at 151.

40. *Id.* at 154.

41. *Id.* at 151.

42. *Id.* at 155.

43. *Id.*

44. *Id.* at 151.

45. *See* Robin A. Boyle & Rita Dunn, *Teaching Law Students Through Individual Learning Styles*, 62 ALB. L. REV. 213, 215-16 (1998) (describing various studies that document the success and effectiveness of teaching strategies that take learning style into account).

46. Faculty Colloquium Materials and Videotape: Teach to the Whole Class: Barriers and Pathways to Learning (Paula Lustbader, Laurie Zimet & Gerry Hess 1997) (on file with the Institute for Law School Teaching, Gonzaga University School of Law) [hereinafter Teach to the Whole Class].

47. CHARLES C. BONWELL & JAMES A. EISON, ACTIVE LEARNING: CREATING

"receptacles of knowledge,"[48] but more and more research suggests that active learning helps our brains process and retain information more effectively.[49] To evaluate the research on active learning, it is helpful to have some definition of the term. Although there remains debate about the precise scope,[50] the following definition provides functional guidance for purposes of this Article:

> [A]ctive [L]earning[:] The process of having students engage in some activity that forces them to reflect upon ideas and how they are using those ideas. Requiring students to regularly assess their own degree of understanding and skill at handling concepts or problems in a particular discipline. The attainment of knowledge by participating or contributing. The process of keeping students mentally, and often physically, active in their learning through activities that involve them in gathering information, thinking, and problem solving.[51]

EXCITEMENT IN THE CLASSROOM 3 (Bryan Hollister ed. 1991) (quoting Arthur W. Chickering & Zelda F. Gamson, *Seven Principles for Good Practice in Undergraduate Education* 39 AAHE Bulletin 3, 3 (1987); Gerald Hess, *Principle 3: Good Practice Encourages Active Learning*, 49 J. LEGAL EDUC. 401, 402 (1999) ("Active learning is important for one fundamental reason: active involvement enhances learning. Researchers and leaders in postsecondary pedagogy agree that students learn better when they are actively involved in the learning process. In particular, active learning is effective in achieving many of the goals of legal education." (footnotes omitted)).

48. BONWELL & EISON, *supra* note 47, at 1 (quoting MICHAEL P. RYAN & GRETCHEN G. MARTENS, PLANNING A COLLEGE COURSE: A GUIDEBOOK FOR THE GRADUATE TEACHING ASSISTANT 20 (1989)).

49. *See id.* at 3 (quoting Patricia K. Cross, *Teaching for Learning*, 39 AAHE Bulletin 3, 4 (1987)) ("When students are actively involved in . . . learning . . . they learn more than when they are passive recipients of instruction."); *see also infra* notes 52-109 and accompanying text (describing research that finds that active learning promotes learning).

50. Writing in 1991, Bonwell and Eison noted that "[d]espite its frequent appearance in the literature on higher education, the term 'active learning' seems to lack an identifiable origin or a common definition." BONWELL & EISON, *supra* note 47, at 1.

51. THE GREENWOOD DICTIONARY OF EDUCATION 5 (John W. Collins III & Nancy P. O'Brien eds., 2003); Joel Michael, *Where's the Evidence that Active Learning Works?*, 30 ADV. PHYSIOL. EDUC. 159, 160 (2006). *See also* BONWELL & EISON, *supra* note 47, at iii & 2; Michael Prince, *Does Active Learning Work? A Review of the Research*, 93 J. ENGINEERING EDUC. 223 (2004) (citing BONWELL & EISON, *supra* note 47, at 2) ("*Active learning* is generally defined as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing."). Professor Prince notes that "[a]ctive learning is often contrasted to the traditional lecture where students passively receive information from the instructor." *Id.* *But see* Patricia Ann deWinstanley & Robert A. Bjork, *Successful Lecturing: Presenting Information in Ways That Engage Effective Processing*, *in* 89 APPLYING THE SCIENCE OF LEARNING TO UNIVERSITY TEACHING AND BEYOND 19, 23 (Diane

Given the breadth of this definition, the active learning umbrella embraces many teaching approaches. For example, it may include collaborative or cooperative learning.[52] It may involve problem solving or discussion.[53] It could involve role-play or writing opportunities. Such a broad definition also makes it difficult to evaluate the results from studies on active learning.[54] Different studies focus on different types of active learning.[55] Despite the recognized challenges, the value of active learning is well-documented.[56] For example, the author of a review of many studies on at least four types of active learning emphasizes that "considerable support exists for the core elements of active learning. . . . [and] extensive evidence supports the benefits of student engagement."[57]

Beyond the conclusions from this review of a broad swath of empirical studies on active learning, individual studies themselves merit some attention. For example, there is an easily implementable active learning approach called the "pause procedure."[58] This approach functions largely as its name suggests. An instructor stops presenting material to allow

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F. Halpern & Milton D. Hakel eds., 2002) ("Teachers can promote long-term retention of information presented in lectures by using strategies that require a high level of student engagement.").

52. *See* Prince, *supra* note 51, at 3-7 (analyzing research on active learning by separating approaches and evaluating studies under each category).

53. *Id.* at 5-6.

54. *See id.* at 1-3 (highlighting how sometimes literature on the topic uses different definitions of active learning and/or related terms, making it challenging to interpret the results); Michael, *supra* note 51, at 159 (explaining that as the database of education research grows, "it is becoming increasingly difficult to keep up with the literature").

55. *See, e.g.*, Prince, *supra* note 51, at 3-7 (analyzing different studies on active learning).

56. *See, e.g., supra* notes 52-53 and *infra* notes 57-109 and accompanying text (describing studies concluding that active learning has positive effects).

57. Prince, *supra* note 51, at 4. *See also* Joel A. Michael, *The Availability of Scientific Evidence for the Efficacy of Active Learning in Science* (1998), http://www.physiologyeducation.org/materials/bibliography.html (last visited Feb. 13, 2009) ("Active learning works! It *does* lead to greater retention of newly learned information. It *does* assist students to build robust mental models of whatever is being learned. It *does* help students develop the ability to solve problems. It *does* lead to more meaningful learning."); JOEL A. MICHAEL & HAROLD I. MODELL, ACTIVE LEARNING IN SECONDARY AND COLLEGE SCIENCE CLASSROOMS: A WORKING MODEL FOR HELPING THE LEARNER TO LEARN 3-158 (2003) (articulating how learning occurs and how active learning can provide an effective approach to increase student learning).

58. Kathy L. Ruhl, Charles A. Hughes & Patrick J. Schloss, *Using the Pause Procedure to Enhance Lecture Recall*, 10 TEACHER EDUC. AND SPECIAL EDUC. 14, 14 (1987) (noting commentary from 1976 about two pilot studies of the pause procedure).

students time to cooperatively process the material presented.[59] Studies on this procedure extend back at least to the 1970s.[60]

In a 1987 study, researchers analyzed the use of a pause procedure in which the lecturing instructor paused for two minutes three times during each of five forty-five-minute lectures.[61] The goal of this study was to determine if the pause procedure increased retention, a relevant skill in legal studies.[62]

"During the pause, subjects formed dyads and discussed lecture content (e.g., asked each other for clarification of concepts or caught up on notes)."[63] There was also a control group that listened to the same lectures without the pauses.[64] The experiment was conducted with two groups of students in each of two semesters, providing two sets of experimental results.[65]

In a series of recall tests used to measure the students' retention, the students who experienced the pause procedure performed statistically significantly better in both experiments than those who did not receive the pause procedure.[66] For example, in the free recall test, students in the pause groups obtained the highest mean score (109.50) and the second highest mean score (107.13).[67] In contrast, the scores of the two groups without benefit of the pause procedures were 82.00 and 77.81.[68] Pauses in this study increased retention.[69] Perhaps taking such pauses in law school classrooms—pauses that included not only a cooperative discussion and clarification of notes, but perhaps also a brief application to a problem—might enhance critical thinking skills as well as recall.

But who of us, you may ask, can afford to "lose" six minutes of presentation time in each class session? Research suggests that more of us can, or at least should, than perhaps we had realized. In an interesting empirical study, an assistant professor of medicine teamed with an educational specialist and a researcher to measure the effects of lecture information density on medical students' learning.[70] The researchers focused on the concern that

59. *Id.*
60. *Id.* at 18.
61. *Id.* at 15.
62. *Id.*
63. *Id.*
64. *Id.* at 16.
65. *Id.* at 15.
66. *Id.* at 17 ("Results of the present study indicate that 2-minute pauses . . . result in higher levels of immediate and long-term recall.").
67. *Id.* at 16.
68. *Id.* "In fact, the magnitude of the difference in mean scores between the two groups was large enough to make a difference of up to two letter grades, depending on cutoff points." BONWELL & EISON, *supra* note 47, at 11 (describing the results of the Ruhl et al., 1987 study on the pause procedure).
69. *Id.* at 17-18.
70. I. Jon Russell, M.D., Ph.D., William D. Hendricson & Robert J. Herbert,

"the volume of material introduced in medical school lectures and textbooks is so great that it probably exceeds the students' capacity to memorize and integrate it."[71] This volume of material promotes information-dense lectures as instructors attempt to cover more and more material in their lectures.[72]

To study the effect of lecture density, the researchers created three versions of a lecture on the same topic, each with a different information density.[73] The high-density lecture had new information in 90% of the sentences.[74] The medium had seventy percent new material.[75] The low-density lecture contained fifty percent new material.[76] During the time in each lecture that was not consumed by new material, the lecturer elaborated "[on] the main points, reemphasi[zed] . . . prior concepts, and periodic[ally] summari[zed]."[77]

The researchers divided 123 students randomly into three groups.[78] Each group underwent pretesting that demonstrated neither significant differences in their grade-point averages at medical school nor any significant differences in their pretest knowledge of the subject that was to be the focus of the lecture.[79]

After the lecture, the researchers administered two posttests.[80] The first followed on the heels of the lecture itself.[81] The second was a surprise test approximately two weeks after the lecture.[82] The post-tests demonstrated, to a level of statistical significance, that "students in this study learned and retained lecture information better when the density of new material was low. . . . The implication is that the amount of information a student can learn within the span of a lecture is limited and the lecturer actually defeats his purpose by exceeding that limit."[83]

Effects of Lecture Information Density on Medical Student Achievement, 59 J. MED. EDUC. 881, 881 (1984).

71. *Id.*
72. *Id.* at 881-82.
73. *Id.* at 882-83.
74. *Id.* at 884.
75. *Id.*
76. *Id.*
77. *Id.* at 882.
78. *Id.* at 884-85.
79. *Id.* at 884.
80. *Id.*
81. *Id.*
82. *Id.*
83. *Id.* at 887. The researchers in this study do caution that the study is limited in scope, having focused on only one lecture topic and one instructor and one population of students. *Id.* It is also important to note that, although the students in the low-density lecture showed the greatest gain in retention of the material presented in the low-density lecture, it does not appear that the researchers tested how much the students who heard the high-density lectures retained of the additional material not included in the low-density lecture. *See generally id.* In other words, although the students in the low-

This study suggests that sometimes less is more when it comes to students' actually learning material. Here, less coverage translated to more learning of the targeted material. Covering less in a law school classroom would leave more time for students to process and engage actively with the material. It should also leave time for a "pause" during which students can do that.

Another study, comparing interactive engagement versus traditional methods, warrants discussion.[84] This was a survey study that analyzed the test results of 6,542 students in 62 introductory physics courses.[85] Of these, 14 courses used traditional teaching methods.[86] According to the study's author, those traditional courses relied "primarily on passive-student lectures, recipe labs, and algorithmic-problem exams."[87] Interactive engagement courses, in contrast, made use of methods "designed at least in part to promote conceptual understanding through interactive engagement of students . . . ."[88]

The study sought to determine if "the classroom use of [interactive engagement] methods [could] increase the

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density lecture were the most successful in retaining the most information from what they received on the topic tested, it is possible that the students in the high density lecture retained more information of the total material with which they were presented.

84. Richard R. Hake, *Interactive-Engagement Versus Traditional Methods: A Six-Thousand Student Survey of Mechanics Test Data for Introductory Physics Courses*, 66 AM. J. PHYS. 64, 64-71 (1998). Supported in part by a National Science Foundation grant, Professor Hake of the Indiana University Department of Physics solicited pre/post-FCI test data and post-test MB data from teachers in the field of introductory physics courses. *Id.* at 64. He used the following modes of solicitation, namely, e-mail postings on the PHYS-L and PhysLrnR nets and requests at colloquia and meetings of teachers in the relevant field. *Id.* Professor Hake's article addresses the concern that such methods tend to be biased because faculty self-select whether to report and "tend[] to pre-select results which are biased in favor of outstanding courses which show relatively high gains on the FCI." *Id.*

> When relatively low gains are achieved (as they often are) they are sometimes mentioned informally, but they are usually neither published nor communicated except by those who (a) wish to use the results from a 'traditional' course at their institution as a baseline for their own data, or (b) possess unusual scientific objectivity and detachment. Fortunately, several in the latter category contributed data to the present survey for courses in which interactive engagement methods were used but relatively low gains were achieved.

Id. Professor Hake notes that he included "all traditional course pre-/post-test data" of which he was aware in time for inclusion in the study, but that "[m]ore such data undoubtedly exists but goes unreported because the gains are so embarrassingly minimal." *Id.* at 64-65.

85. *Id.* at 65.

86. *Id.*

87. *Id.* (italics omitted).

88. *Id.* (italics omitted).

effectiveness of introductory mechanics courses . . . ."[89] The author concluded that "it appears that the present interactive engagement courses are, on average, more than twice as effective in building basic concepts as traditional courses."[90]

Of course, introductory mechanics is not law school contracts. Nonetheless, the basic underlying principles of how the brain learns—by engaging students in contemporaneously processing information by constructing and modifying existing mental models of the world—are similar. Constructivist learning principles apply to both. In a contracts classroom, the professor could assign students the task of identifying the contested contracts issues in an unfamiliar scenario as a cooperative exercise among small groups of students[91] and then could discuss the groups' responses with the whole class. Students' understanding of issue identification receives a hands-on, interactive applied work out in this class exercise. As a result of this exercise, students can, as constructivist learners, reshape the landscape of their mental models of the substantive concepts and skills required to identify legal issues, making this knowledge part of their own knowledge base.[92]

Contemporary examples of the movement away from lecture-style teaching to hands-on engagement abound. Massachusetts Institute of Technology ("M.I.T.") has formally made the switch and replaced its introductory freshman physics lecture approach with small classes involving hands-on, collaborative, and interactive learning environments.[93] M.I.T.'s action complements similar ones at universities like Harvard, the University of Colorado, and Rensselear Polytechnic Institute.[94]

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89. *Id.* (italics omitted).

90. *Id.* at 66 ("Assuming . . . that [gains] is a valid measure of course effectiveness in promoting conceptual understanding.").

91. The cooperative approach can serve to encourage students to explain their understanding of the issues under discussion. *See generally* Michelene T. H. Chi, Nicholas De Leeuw, Mei-Hung Chiu & Christian LaVancher, *Eliciting Self-Explanations Improves Understanding*, 18 COGNITIVE SCI. 439 (1994) (providing an interesting, albeit small-scale study on the value of students explaining their understanding of material that they were reading).

92. Lustbader, *supra* note 25, at 326 ("Students first must develop substantive schemata. Students arrive at a new experience with existing schemata (contexts) based on their past experience. As they receive new information, they give it meaning according to how it fits into their existing schema. As they refine their understanding of new information, they identify the connections between the concepts. This enables them to expand or modify existing schemata or create new ones." (footnotes omitted)).

93. *See* Sara Rimer, *At M.I.T., Large Lectures Are Going the Way of the Blackboard*, N.Y. TIMES, Jan. 13, 2009, at A12, *available at* http://www.nytimes.com/2009/01/13/us/13physics.html (last visited Jan. 14, 2009) (discussing M.I.T.'s transition in physics courses to interactive learning).

94. *Id.*

A further dimension of active learning merits discussion here. Active learning can be a competitive, cooperative, or individualistic endeavor, and sometimes a combination of those approaches. For example, students in a class could all be assigned a problem to solve individually, perhaps with an emphasis on being the first person to generate a correct solution—a competitive individualistic approach. Or the professor could assign the same problem to small groups of students to solve together through a cooperative approach.[95] Researchers who specialize in evaluating these approaches explain:

> Over 375 studies have been conducted over the past 90 years to give an answer to the question of how successful competitive, individualistic, and cooperative efforts are in promoting productivity and achievement. . . . When all of the studies were included in the analysis, the average student cooperating performed at about 2/3 a standard deviation above the average student learning within a competitive . . . or individualistic situation. . . . Cooperative learning promotes higher achievement than does competitive or individualistic learning. . . . Cooperative learning, furthermore, resulted in more higher-level reasoning, more frequent generation of new ideas and solutions (i.e., process gain), and greater transfer of what is learned within one situation to another (i.e., group to individual transfer) than did competitive or individualistic learning.[96]

The learning researchers, who performed the meta-analysis summarized above, underscore that "[c]ooperative learning promotes a greater use of higher level reasoning strategies and critical thinking than do competitive or individualistic learning strategies."[97] The value of cooperative learning is of particular

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95. For a description of cooperative and collaborative approaches, *see* Clifford S. Zimmerman, *"Thinking Beyond My Own Interpretation:" Reflections on Collaborative and Cooperative Learning Theory in the Law School Curriculum*, 31 ARIZ. ST. L.J. 957, 961 (1999) ("Cooperative learning and collaborative learning do have different aims: cooperative learning focuses on individual mastery of the subject via a group process, while collaborative learning focuses on group work toward a unified final product.").

96. JOHNSON, JOHNSON & SMITH, *supra* note 1, at 2:12 (emphasis and internal references omitted). One response to the challenge of evaluating the body of research appears in the form of meta-analysis. Stacy L. Young, Timothy G. Plax & Patricia Kearney, *How Does Meta-Analysis Represent Our Knowledge of Instructional Communication?*, *in* CLASSROOM COMMUNICATION AND INSTRUCTIONAL PROCESSES: ADVANCES THROUGH META-ANALYSIS 379, 380 (Barbara Mae Gayle et al. eds., 2006). "A meta-analysis is a set of statistical procedures designed to combine data and assess results across primary studies that address a common topic. . . . [Meta-analyses] can provide answers to important research questions, particularly when results of primary studies conflict." *Id.*

97. JOHNSON, JOHNSON & SMITH, *supra* note 1, at 2:14 ("Cooperative learning experiences, for example, promote more frequent insight into and use of higher-level cognitive and moral reasoning strategies than do competitive or

significance to us as law professors trying to help students develop the analytical frameworks necessary to think like lawyers. Yet in a national questionnaire on teaching techniques in legal education, "[i]n first year courses . . . only seventeen percent of the respondents who teach those courses stated they used small group methods."[98]

The empirical researchers who conducted the meta analysis above on cooperative, individualistic, and competitive approaches emphasize research that suggests "at least three elements of teaching make a difference in college students' gains in thinking skills: (1) student discussion, (2) explicit emphasis on problem-solving procedures and methods using varied examples, and (3) verbalization of methods and strategies to encourage development of metacognition."[99] I want to draw the reader's attention to these three components of cooperative environments that can foster critical thinking skills. Each of the three involves students actively processing and applying their knowledge. In law, this metacognition, the developing of a student's own awareness of learning processes themselves, can take students beyond learning to think like a lawyer to learning how lawyers think.[100]

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individualistic learning experiences (effect sizes = 0.93 and 0.97 respectively)." (citations omitted)). For a thoughtful discussion of the value and application of cooperative learning in law school, see Vernellia R. Randall, *Increasing Retention and Improving Performance: Practical Advice on Using Cooperative Learning in Law Schools*, 16 T.M. COOLEY L. REV. 201, 204 (1991) ("The benefits of Cooperative Learning have been well documented. Considerable research shows that Cooperative Learning produces higher achievement, reduces student attrition, increases critical thinking, betters attitudes toward subject matter, increases social support, improves social adjustment, and increases appreciation for diversity. My use of Cooperative Learning has demonstrated that the often elusive and uncertain goals of increasing retention and improving performance for minority and other 'at-risk' students can be attained." (footnotes omitted)).

98. Steven I. Friedland, *How We Teach: A Survey of Teaching Techniques In American Law Schools*, 20 SEATTLE U. L. REV. 1, 30 (1996).

99. JOHNSON, JOHNSON & SMITH, *supra* note 1, at 2:14 (citing W. McKeachie, *Teaching Thinking, Update* 2(1), 1 (1988)).

100. Merritt, *supra* note 3, at 71 ("It no longer suffices to teach students how to think like lawyers. Instead, it is necessary to teach them how and why lawyers think the way they do, as well as the many styles of thinking that lawyers adopt."). On the importance of metacognition as part of the law school curriculum, *see* Lustbader, *supra* note 25, at 324-25 ("Cognition is the way in which we think about, approach, obtain, and process information. Metacognition is the study of how we cognate. Metacognition can best be understood as two separate processes. First, students must understand their own cognitive style and then select a study method that fits not only this style, but also the teaching style and the subject matter. Second, students must assess their study method. Their accuracy in this assessment of what they have learned is essential." (footnotes omitted)); Niedwiecki, *supra* note 3; *see also* Paul T. Wangerin, *Learning Strategies for Law Students*, 52 ALB. L. REV. 471 (1988) (discussing metacognition).

Of course, successful cooperative learning "depends on how faculty members structure interdependence in the learning situation. . . . Students can obstruct as well as facilitate each other's learning. Or they can ignore each other."[101] Locating students in physically proximate seating and providing time for interaction are not guarantees of positive cooperative learning. An instructor can enhance the likelihood of positive learning by providing explicit guidance on expectations for how the group dynamic should proceed. Fortunately, educational researchers have provided substantial guidance on how to elicit successful cooperative learning.[102]

A professor, whose law school has adopted a cooperative learning paradigm in its academic support program, describes additional important benefits of cooperative learning environments.[103] She reports:

> Cooperative Learning can help the professor teach a diverse student group. More importantly, Cooperative Learning contributes to the ability of a lawyer to work with a diverse group of people. . . Cooperative Learning environments improve gender and racial interactions. Cooperative Learning teaches tolerance based on respect. Research shows that Cooperative Learning results in students liking each other more 'regardless of individual differences in ability level, sex, disabling conditions, ethnic [and racial] membership, social class differences or task orientation.'[104]

Another particularly important feature of small collaborative group work deserves emphasis. Students often perceive law school classrooms as intimidating environments, especially in large first-year courses.

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101. JOHNSON, JOHNSON & SMITH, *supra* note 1, at 2:4.

102. *See id.* at 2:4-2:11, 4:1-4:19 (providing a detailed discussion of the characteristics of "promotive interaction" and techniques to achieve such interaction). *See generally* Elizabeth G. Cohen, *Restructuring the Classroom: Conditions for Productive Small Groups*, 64 REV. OF EDUC. RES. 1 (1994) (detailing a variety of cooperative learning conditions and techniques). *See also* Randall, *supra* note 97, at 203-04 (describing important components for successful cooperative learning environments).

103. Randall, *supra* note 97, at 222.

104. *Id.* (quoting DAVID W. JOHNSON ET AL., ACTIVE LEARNING: COOPERATION IN THE COLLEGE CLASSROOM 1:4-1:12 (1991)). Professor Randall notes: "Since 1990, the University of Dayton has had an academic support program. Since 1994, the program has used Cooperative Learning. Cooperative Learning has resulted in significant improvement in student dismissal rates and overall performance of students who participated in the program. This has been particularly true for African-American students." *Id.* at 234 (footnotes omitted). *See* Elaine Fredericksen, *Minority Students and the Learning Community Experience: A Cluster Experiment* (Presented at the 1998 CCCC, on file with the author) (providing a report on the value of collaborative learning in fostering academic success for Hispanic undergraduate students at the University of Texas at El Paso).

> Survey research indicates that fear of public speaking is quite common among the general population of adolescents and adults. College students, in particular, frequently experience communication apprehension in the classroom. Such speech anxiety, however, can be significantly reduced if students are given the opportunity to first express themselves in the more comfortable social context of a small group of peers.[105]

A group of educational scholars also suggests that "[s]tudents whose primary language is not English may especially find their anxiety reduced by working in cooperative learning groups in college classes."[106] As the research demonstrates, encouraging students to learn together (and from each other) offers a constellation of benefits.[107]

The body of research results demonstrating improved learning for active cooperative small group approaches is impressive. In addition to the extensive empirical support for active learning, the results from the empirical studies on active learning are also consistent with constructivist learning theory. In concert with the emerging views about how people learn, educational researchers contend "that learning occurs when students . . . build knowledge structures by discovering their own answers and solutions. . . . [A]ctive learning occurs when students create their own interpretations and integrate current experiences with past knowledge about a given concept."[108] Similarly, writing explicitly about constructivism, educators explain that "[l]earning involves the active construction of meaning by the learner."[109] In

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105. JOHNSON, JOHNSON & SMITH, *supra* note 1, at 2:6-7 (citing M. Motley, *Taking the Terror Out of Talk*, 22 PSYCHOL. TODAY 46, 46-49 (1988); J. Bowers, *Classroom Communication Apprehension: A Survey*, 35 COMM. EDUC. 372, 372-78 (1986); M. Neer, *The Development of an Instrument to Measure Classroom Apprehension*, 36 COMM. EDUC. 154, 154-66 (1987)).

106. JOHNSON, JOHNSON & SMITH, *supra* note 1, at 2:7.

107. For a discussion of stress and learning, *see infra* notes 195-198 and accompanying text.

108. Craig Rich, Barbara Mae Gayle & Raymond W. Preiss, *Pedagogical Issues Underlying Classroom Learning Techniques*, *in* CLASSROOM COMMUNICATION AND INSTRUCTIONAL PROCESSES: ADVANCES THROUGH META-ANALYSIS 3, 35 (Barbara Mae Gayle, Raymond W. Preiss, Nancy Burrell & Mike Allen eds. 2006) (citing B.A. MARLOWE & M.L. PAGE, CREATING AND SUSTAINING THE CONSTRUCTIVIST CLASSROOM (1998)). *See also* Claire H. Major & Betsy Palmer, *Assessing the Effectiveness of Problem-Based Learning in Higher Education: Lessons from the Literature*, 5 ACAD. EXCHANGE Q. 1, 1 (2001) (citing K.P. Cross, *Opening Windows on Learning: The Cross Papers*, number 2. Mission Viejo, CA, League for Innovation in the Community College and Educational Testing Service) ("Students construct knowledge; they do not take it in as it is disseminated, but rather they build on knowledge they have gained previously.").

109. Joel Michael, *Where's the Evidence that Active Learning Works?*, 30 ADV. PHYSIOLOGICAL EDUC. 159, 160 (2006) (emphasis omitted). *See also* R. Driver, R. Asoko, J. Leach, E. Mortimer & P. Scott, *Constructing Scientific*

both theory and empirical research, active learning has by now earned a well-documented pedigree as a preferred instructional approach.[110]

Active learning is, as the above and perhaps your own experiences reflect, not a new concept.[111] Many law professors use forms of active learning.[112] The Socratic method, a pervasive first-year teaching vehicle,[113] can meet the definition of active learning, at least for the student(s) being questioned and, perhaps, for other students who are closely following the dialogue.

Scholars who focus on learning question, however, "the assumption that law students are actively engaged while a dialogue proceeds between a single student and a professor."[114] As one scholar explains, "[t]his may be true for a handful of students

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Knowledge in the Classroom, 23 EDUC. RESEARCHER 5, 7 (1994) (discussing how, under the constructivist view, scientific knowledge is "actively built up" by the learner).

110. *See, e.g., infra* note 111 (providing examples of the growing numbers of scholars who advocate active learning approaches to teaching). *But see* Cavanaugh, *infra* note 130 (finding no statistically significant improvement in using active learning approach during a video versus passive approach to watching science videos); and notes 242-257 and accompanying text (describing research on the relative equivalence of various group teaching methods, as measured by exam performance).

111. A growing number of scholars within the legal academy advocate the use of active learning approaches. *See, e.g.,* Robin A. Boyle, *Employing Active-Learning Techniques and Metacognition in Law School: Shifting Energy from Professor to Student*, 81 U. DET. MERCY L. REV. 1 (2003); June Cicero, *Piercing the Socratic Veil: Adding an Active Learning Alternative in Legal Education*, 15 WM. MITCHELL L. REV. 1011 (1989); Gerald F. Hess, *Heads and Hearts: The Teaching and Learning Environment in Law School* 52 J. LEGAL EDUC. 75, 102 (2002); Paula Lustbader, *From Dreams to Reality: The Emerging Role of Law School Academic Support Programs*, 31 U.S.F. L. REV. 839 (1997); Randall, *supra* note 97. Scholars in other disciplines also have been advocating active learning approaches for decades.

112. Active learning approaches, for example, are an integral component of clinical legal education in the U.S. today.

113. Friedland, *supra* note 98, at 28 ("According to the Questionnaire, an overwhelming majority of those who taught first year classes used what they perceived to be the Socratic method. A majority of the professors who responded to the Questionnaire, 383, taught first year courses. Out of those 383, 370 or ninety-seven percent, used the Socratic method at least some of the time in first year classes. This data indicates that the Socratic approach remains firmly entrenched in legal education. Thirty percent of those who used the Socratic method did so 'most of the time,' and forty-one percent used it 'often.' Of those remaining, twenty-one percent used it 'sometimes' and only five percent stated that they 'rarely' used it. Thus, the common assumption that the Socratic dialogue dominates law teaching methodology is corroborated by this survey." (Footnote omitted)).

114. Boyle, *supra* note 111, at 3. In Professor Boyle's assessments of student learning styles at St. John's University between 1996 and 2003, she discovered that "depending on the year, merely nineteen to thirty percent of [the incoming] students have a strong preference for auditory learning." *Id.* at 2.

who have learning-style strengths in auditory learning. But most students do not learn well this way and would learn better if they were engaged in truly active learning."[115]

Even if the Socratic method qualifies as an active learning approach for some students, empirical research conducted at the University of Pennsylvania Law School ("Law School") suggests that law professors may want to expand their repertoire of active learning vehicles beyond the Socratic dialogue.[116] These researchers studied data involving students enrolled at the Law School between 1987 and 1992.[117] The research relies on four types of data: academic performance data (981 students), survey questionnaire data (distributed to all 712 students enrolled in the law school in 1990 with 366 students responding), narrative response data (104 students), and focus group, meeting, and observation data collected by the researchers.[118]

Through a triangulation of the databases described above, the researchers concluded "that the law school experience of women in the aggregate differs markedly from that of their male peers."[119] The research indicated that, in particular,

> [M]any women are alienated by the way the Socratic method is used in large classroom instruction, which is the dominant pedagogy for almost *all* first-year instruction. . . . [The study's] data suggest that

115. *Id.* at 3; *See also* Randall, *supra* note 97, at 206 ("First year law classes usually have between 70 and 90 students. It is through the faculty's skill at questioning that we assume the students develop analytical skills. However, even the best of socratic questioners can only actively and effectively engage four to eight students per fifty minutes. Thus, within the typical socratic classroom environment, most students are passive participants in the learning process." (footnotes omitted)); Linda S. Anderson, *Incorporating Adult Learning Theory into Law School Classrooms: Small Steps Leading to Large Results*, 5 APPALACHIAN J.L. 127, 134 (2006) ("Practices based on adult learning theory are much more interactive than traditional lectures or Socratic dialogues. Interactive learning is expected by GenX students and is effective with all students. Incorporating these techniques into the law school classroom will improve our teaching and our students' learning." (footnote omitted)). Consider also, for example, Professor Anderson's "Thinking Aloud Paired Problem-Solving" exercise as a variation on the pause procedure. *Id.* at 138.

116. Lani Guinier, Michelle Fine, Jane Balin with Ann Bartow & Deborah Lee Stachel, *Becoming Gentlemen: Women's Experiences at One Ivy League Law School*, 143 U. PA. L. REV. 1, 3 (1994). Professor Guinier and her research colleagues do note that the research is preliminary and that the target law school was, in their view, a "typical, if elite, law school stratified deeply along gender lines." *Id.* at 2. The primary focus of the study was not the Socratic method, but more generally on the learning and experience of female law students at the University of Pennsylvania during the relevant period. *Id.*

117. *Id.* at 2.

118. *Id.* at 2-10.

119. *Id.* at 2.

> many women do not 'engage' pedagogically with a methodology that makes them feel strange, alienated, and "delegitimated."[120]

These findings furnish additional grounds for seeking teaching approaches beyond the Socratic dialogue.[121]

In light of the emerging criticisms and limitations of the Socratic approach as the primary active learning vehicle[122] and the relative prevalence of lecture as a secondary vehicle, much of first-year law school curricular instruction is still delivered through approaches that may involve little or no active learning in the classroom.[123] Given the abundance and strength of the research

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120. *See id.* at 3-5 (explaining that the study "document[ed] substantial material consequences for those women who exit the Law School after sustaining what they describe as a crisis of identity. These women graduate with less competitive academic credentials, are not represented equally within the Law School's academic and social hierarchies, and are apparently less competitive in securing prestigious and/or desirable jobs after graduation").

121. A commentator, summarizing views of proponents of the Socratic method, notes that proponents suggest that "it helps students develop sophisticated legal reasoning, independent thinking, and verbal skills" among other advantages. Hess, *supra* note 111, at 81. Professors Hartwell and Hartwell conducted an interesting study on whether supplementation to a traditionally-taught Socratic method first-year course produced significant educational improvement. Steven Hartwell & Sherry L. Hartwell, *Teaching Law: Some Things Socrates Did Not Try*, 40 J. LEGAL EDUC. 509, 509-10 (1990). They concluded that "law faculties interested in educational reform should proceed cautiously if they are considering the option of offering supplementary learning opportunities." *Id.* at 522.

122. Criticisms of the case method and the Socratic method abound in the literature. *See, e.g.*, John O. Sonsteng with Donna Ward, Colleen Bruce & Michael Petersen, *Legal Education: A Legal Education Renaissance: A Practical Approach for the Twenty-First Century*, 34 WM. MITCHELL L. REV. 303, 335-37 (2007) (criticizing both the case method and the Socratic method of law teaching). *But see* Laurel Currie Oates, *Did Harvard Get It Right?*, 59 MERCER L. REV. 675, 717-18 (2008):

> Langdell and Harvard almost got it right. Langdell got it right in that students are more likely to develop adaptive expertise if, from the beginning, they engage in activities that require them to analyze data and invent their own solutions. He got it wrong, however, in not having students engage in that analysis and invention in environments that resembled, as closely as possible, the environments in which students would be using what they learned. In addition, Langdell got it wrong when he relied solely on the casebook method. Having prepared students to learn, he should have added lectures or exercises that corrected misconceptions and made explicit the principles that he wanted students to learn.

123. Friedland, *supra* note 98, at 29 (reporting that 31% of survey respondents indicated that they used lecture "at least some of the time" in first-year courses); Boyle, *supra* note 111, at 3-4. Boyle indicates that, "[l]aw professors increasingly are teaching with 'active learning' strategies for the reason that actively engaged students absorb complex material better than if they have been taught traditionally. Nevertheless, law professors generally seem resistant to embracing new teaching strategies." *Id.* "Lectures, even at their most eloquent and persuasive, possess a major inadequacy, viz., they fail

on the potential value of incorporating active learning, I write to encourage myself and my colleagues in the legal academy to consider greater use of in-class active learning approaches.

First steps in this direction might involve a short turn-to-the-person-next-to-you pair exercise in which students compare their understanding of a principle just discussed or work to solve a problem based upon material they have prepared for class or the instructor has just presented.[124] Like the "pause procedure" studies, these activities enable students to directly participate in thinking about the substance of the subject under study and reflect and apply what they are hearing and seeing. Active learning does not require elaborate mock courtroom proceedings. An active learning experience might simply involve a brief writing opportunity. You could require students to analyze a problem you have created, a newspaper account of a legal issue, or even a relevant cartoon.

These active learning options can reach students who learn through writing (verbal learners), those who learn orally by speaking—because the small group approach increases the amount of air time available per student, and those who learn aurally by listening. This may be especially important for students who have been raised with active and experiential methods. Such students may constitute today and in the future a substantial portion of our classroom audience.

2. Stories

In considering how people process information, a second insight may help inform our teaching. It invokes the value of stories.[125] Empirical cognitive science researchers, who study

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to provide the learner with the opportunity to practice using the knowledge under the guidance of a skilled mentor." Sandra J. Berkowitz, *Developing Critical Thinking Through Forensics and Communication Education: Assessing the Impact Through Meta-Analysis*, *in* CLASSROOM COMMUNICATION AND INSTRUCTIONAL PROCESSES: ADVANCES THROUGH META-ANALYSIS 43, 49 (Barbara Mae Gayle, Raymond W. Preiss, Nancy Burrell & Mike Allen eds. 2006) (quoting M. N. Browne & K. Freeman, *Distinguishing Features of Critical Thinking Classrooms*: 5 TEACHING IN HIGHER EDUC. 301, 303 (2000)). "These weaknesses do not mean that one should never lecture. Rather, lecturers need to realize that they can model critical thinking skills and balance lecturing with other teaching techniques." *Id* at 49.; *see* Russell et al., *supra* note 70, at 881-89 (providing an example of an empirical study on how to make lectures more effective); *see also* deWinstanley et al., *supra* note 6 (discussing additional approaches to make lectures more effective).

124. *See* M.K. Smith et al., *Why Peer Discussion Improves Student Performance on In-Class Concept Questions*, 323 SCI. 122, 122-24 (2009) (providing an interesting empirical study on how discussion with peers can improve student answers to in-class conceptual questions).

125. *See* Daniel A. Farber & Suzanna Sherry, *Telling Stories out of School: An Essay on Legal Narratives*, 45 STAN. L. REV. 807, 807-08 (1993)

recall and narrative, indicate that "in general, narratives are recalled much better than are expository texts."[126] These researchers explain that "[n]arratives are recalled well because readers bring to them a well-worked-out schematic structure to organize the text during comprehension and to guide retrieval at recall."[127] For example, in a study conducted by these researchers, narrative "texts were recalled twice as well"[128] overall as were expository-interference texts.[129] This does suggest that people are good at remembering stories and may be better at remembering stories than expository text generally. For the purposes for which I propose using stories, this is critical.

Nonetheless, the research on learning, memory, and narrative is complex. Although we may be very good at remembering stories, if I understand the research results, it is not evident that people learn factual content better from stories than from expository text.[130]

("concluding that stories can significantly contribute to our understanding of the law.").

126. Walter Kintsch & Sheryl R. Young, *Selective Recall of Decision-Relevant Information from Texts*, 12 MEMORY & COGNITION 112, 113 (1984). Other researchers in the field note that "[m]any studies in which content is not controlled across genre have shown that memory for narrative content is better than that for expository content." Michael B.W. Wolfe & Joseph A. Mienko, *Learning and Memory of Factual Content from Narrative and Expository Text*, 77 BRIT. J. OF EDUC. PSYCHOL. 541, 541-42 (2007) (citing e.g., A.C. Graessert, K. Hauft-Smith, A.D. Cohen, & L.D. Pyles, *Advanced Outlines, Familiarity, and Text Genre on Retention of Prose*, 48 J EXPERIMENTAL EDUC. 281-90 (1980), Kintsch, *supra* at 112-17, M.B.W. Wolfe, *Memory for Narrative and Expository Text*, 31 MEMORY & COGNITION 359-64 (2005)).

127. Kintsch, *supra* note 126, at 113

128. *Id.* at 116. The researchers were conducting a study comparing recall of "interspersed decision-relevant target information" among different genres. One genre was the story. The researchers embedded three target items of factual content, which seemed tangential or largely unrelated to the story, into the narrative. The narrative was about a date at a restaurant and the social interactions between the two persons on the date, but the target information was about, for instance, whether the stockholders of the restaurant would "receive a dividend this year." *Id.* As the researchers discuss, "the NARRATIVE texts were recalled twice as well as the INTERFERENCE texts overall, but . . . the target sentences were recalled with only a nonsignificant difference between conditions." *Id.*

129. Subjects in the study also had more overall recall of narrative texts than of expository-descriptive (as opposed to interference) texts, although not to the level of twice as much recall. *Id.* at 115.

130. *Id.* at 116; Wolfe, *supra* note 126, at 557. For an empirical study analyzing the use of science fiction film, including *Star Trek*, to teach science, see Terence Cavanaugh, Effect of Using Repurposed Science Rich Feature Films with Varying Levels of Student Activity in Middle Grades Science Instruction (Aug. 1998) (Ph.D. Dissertation, University of South Florida), *available at* http://www.unf.edu/~tcavanau/ projects/research.htm. The author found that students watching the repurposed video, a Star Trek clip, performed statistically significantly better in post-viewing tests than students

For example, researchers compared student knowledge and memory in a study on the functioning of the circulatory system.[131] They concluded "neither narrative nor expository genre appears to be uniformly superior as a means for delivering content to students, replicating earlier findings showing no difference between these genres."[132]

I take from this research that educators should be cognizant of the purposes for which they use stories. If the purpose is for transmitting factual content, particularly if the content is not closely related to the stories, stories may not be the most effective vehicle. If, however, the purpose is to remember the narrative itself, and the story is then a basis for application of other critical faculties, using stories may prove effective.

Beyond the formal empirical research, as a scholar in the field of adult learning notes, stories are "'[t]he oldest and most natural form of sense making.'"[133] For millennia, we have used stories to make sense of the world and of new knowledge.[134] Through

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who watched more traditional educational videos; Cavanaugh also found no significant differences between an active approach to student interaction during the video versus a passive approach during the video. *Id.* at 65.

131. Wolfe *supra* note 126 at 541-42. In contrast to those studies in which researchers exposed research subjects to pre-existing stories, a study involving students in constructing their own narratives about the material to be learned produced striking results on longer-term retention. Gordon H. Bower and Michal C. Clark, *Narrative Stories as Mediators for Serial Learning*, 14 PSYCHON. SCI. 181, 181-82 (1969). Although the immediate recall of both the control group and the narrative-construction group in the study was almost identical, those subjects who constructed their own narratives, using the words that were the basis of the study, recalled six to seven times as much of the material in a test of longer-term recall as compared to the control group. *Id.* Perhaps having students construct stories (hypotheticals) as part of the class activities would produce enhanced retention results.

132. Wolfe, *supra* note 126, at 557 (citing W. Kintsch & S.R. Young, *Selective Recall of Decision-Relevant Information from Texts*, 12 MEMORY AND COGNITION 112-17 (1984); C.M. Roller & R. Schreiner, *The Effects of Narrative and Expository Organizational Instruction on Sixth-Grade Children's Comprehension of Expository and Narrative Prose*, 6 READING PSYCHOL.: AN INT'L Q. 27 (1985)).

133. SHARAN B. MERRIAM, QUALITATIVE RESEARCH: A GUIDE TO DESIGN AND IMPLEMENTATION 32 (2d ed. 2009) (quoting D.H. Jonassen & J. Hernandez-Serrano, *Case-Based Reasoning and Instructional Design: Using Stories to Support Problem Solving*, 50 EDUC. TECH. RES. & DEV. 66 (2002)).

134. Jill Sinclair Bell, *Narrative Research in TESOL, Narrative Inquiry: More Than Just Telling Stories*, 36 TESOL Q. 207, 207 (2002). According to Bell:

> Narrative inquiry rests on the epistemological assumption that we as human beings make sense of random experience by the imposition of story structures. That is, we select those elements of experience to which we will attend, and we pattern those chosen elements in ways that reflect the stories available to us. . . . A key way of coming to understand the assumptions held by learners from other cultures is to examine their stories and become aware of the underlying assumptions

stories, we integrate past experience with new concepts and perspectives. This process implicates the essence of constructivist learning.

In legal teaching, stories have long been a foundation of classroom engagement. Cases, after all, are stories.[135] In the stylized courtroom play, there is generally a protagonist and an antagonist, whose interactions are the chronicle.[136] Experts in the field of adult learning explain that "storytelling, in various forms—such as fiction, case studies, exemplars from practice, role-playing, or critical incidents—is a common means of engaging students in understanding concepts, principles, or theories."[137]

"Storytelling is a natural human experience and it is one of the foremost ways we learn in any situation. . . . [S]tories must always be interpreted because it is interpretation that calls us to thinking and to action in learning."[138] Good stories are memorable. They often resonate and remain with students. Students can draw upon their experience with the story to remember how their pre-existing knowledge was modified or solidified by application to a new context. Stories can speak to us on many levels. They are rich forms of communication.

Good lawyering also commonly involves telling good stories—stories that will resonate with the listener.[139] As a former trial lawyer, I recall the (sometimes panicked) search for a story to

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that they embody.

Id.

135. Over the past couple of decades, there has emerged a body of scholarship involving historical research about prominent legal cases to supplement the teaching of those cases. *See, e.g.*, Paul L. Caron, *Back to the Future: Teaching Law Through Stories*, 71 U. CIN. L. REV. 405, 406-20 (2003) (discussing one of a series of "law stories" books, using the tax-focused book as an illustration of the pedagogical benefit of this approach). This research underscores the value of narrative in legal pedagogy.

136. My thanks to my colleague Professor Terry Diggs for reminding me about this simple but elegant parallel between court cases and stories.

137. MERRIAM ET AL., *supra* note 1, at 210 (citing L. M. BAUMGARTNER & S. B. MERRIAM, ADULT DEVELOPMENT AND LEARNING: MULTICULTURAL STORIES (Krieger Publishers 1999)).

138. Sharon L. Sims & Melinda M. Swenson, *Preparing Teachers and Students for Narrative Learning*, 1 J. OF SCHOLARSHIP OF TEACHING AND LEARNING 1, 5 (2001).

139. *See, e.g.*, Marc A. Fajer, *Can Two Real Men Eat Quiche Together? Storytelling, Gender-Role Stereotypes, and Legal Protection for Lesbians and Gay Men*, 46 U. MIAMI L. REV. 511, 512-605 (1992) (analyzing the importance of storytelling in legal discourse to counter "pre-understandings"); *see also* Philip N. Meyer, *Visual Literacy and the Legal Culture: Reading Film as Text in the Law School Setting*, 17 LEGAL STUDIES FORUM 73, 74 (1993) ("After graduation, however, most lawyers operate as storytellers, subjective and passionate voices advocating client stories in a predominantly narrative oral culture."). There are courses at a number of law schools that use film as their primary text.

scaffold a closing argument. Furnishing examples of narratives can thus also help students focus on narrative as a lawyering skill.

I have found another feature of stories of particular value in learning. Stories can connect us across cultures and differences.[140] They can help prepare students for clients from diverse backgrounds. They can help students understand how culture and difference may contribute to perspective. Stories, including those that "are fictional accounts, . . . draw us in, they allow us to see from another's perspective."[141] As the authors of a text on learning in adulthood have observed, "[i]n today's multicultural classrooms we cannot assume the rest of the world sees things the way we do."[142]

A legal scholar, commenting on the role of narratives, suggests that stories can also "show that what we believe is ridiculous, self-serving, or cruel. . . . They invite the reader [or perhaps viewer] to suspend judgment, listen for their point or message, and then decide what measure of truth they contain. They are insinuative, not frontal."[143] In these ways, stories provide a platform for discussion of issues of difference that we may wish to introduce or pursue.

Stories are an integral component of legal practice and of legal pedagogy. Part of the challenge, then, is enhancing methods to use them effectively in developing students' critical analytical skills as well as deepening student understanding of cultural norms and contexts.

3. Visuals

Visual images connect powerfully into our brain's circuitry. According to one brain researcher and educator, "[v]ision trumps all other senses. We are incredible at remembering pictures."[144]

The basic message that visuals can enhance our recall finds much support in the empirical research literature.[145] For example,

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140. The *Star Trek* series itself offers a wonderful example of this principle. *See, e.g., Star Trek: The Next Generation: Darmok* (television broadcast Sept. 28, 1991) (examining the interactions between the crew of the Enterprise and the Tamarians, where the captain and crew have to attempt to interpret the Tamarian language and use a story to try to communicate).

141. MERRIAM ET AL., *supra* note 1, at 210.

142. *Id.*

143. Richard Delgado, *Storytelling for Oppositionists and Others: A Plea for Narrative*, 87 MICH. L. REV. 2411, 2415 (1989)(footnote omitted).

144. Dr. John Medina, *Brain Rules*, 2008, http://brainrules.net/ (last visited Aug. 14, 2008).

145. Empirical research conducted in the 1960s focused on the ability of subjects to recognize whether a photograph in a lengthy sequence of photos was a repeated photo at intervals up to 360 days after the initial viewing. *See, e.g.*, Raymond S. Nickerson, Bolt Beranek & Newman Inc., *A Note on Long-Term Recognition Memory for Pictorial Material*, 11 PSYCHON. SCI. 58, 58 (1968) (concluding that the results of their study "indicate substantial

in a pair of experiments gauging what students remembered from an Introductory Psychology course, researchers asked students to complete a free-recall response sheet listing what they remembered from the course.[146]

> [B]oth studies . . . showed that students remembered vivid anecdotes and demonstrations. In Study 1 the seven most frequently remembered items . . . were activities or videos. Also of the most frequently remembered items from Study 2, all but [one] had some vivid instructional technique accompanying it—five had videos and one had a controversial lecture and subsequent discussion . . . .[147]

Research in other realms of cognitive psychology may also inform our use of visual depictions to supplement auditory presentations.[148] Studies have shown that "the human cognitive system consists of two distinct channels for representing and

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retention of briefly presented pictorial information over fairly long periods of time"); *see also* Sayed Y. Mousavi, Renae Low & John Sweller, *Reducing Cognitive Load by Mixing Auditory and Visual Presentation Modes*, 87 J. EDUC. PSYCHOL. 319, 319 (1995) (reporting on empirical study regarding auditory and visual presentation modes for geometry problems and noting that "[e]ffective working memory may be increased by presenting material in a mixed rather than a unitary mode,"). Of course, not all students in all contexts increase their learning with visuals. *See, e.g.*, Richard E. Mayer & Valerie K. Sims, *For Whom is a Picture Worth 1000 Words? Extensions of a Dual-Coding Theory of Multimedia Learning*, 86 J. EDUC. PSYCHOL. 389 (1994) (finding more positive effects for high-spatial ability students to view and listen to computer-generated animation than for low-spatial ability students in the study).

146. Scott W. VanderStoep, Angela Fagerlin & Jennifer S. Feenstra, *What Do Students Remember from Introductory Psychology?*, 27 TEACHING OF PSYCHOL. 89, 92 (2000).

147. *Id.* The authors of the study noted, however, limits to the connection between the recall of the item and "whether these videos and activities helped students remember the course concepts any better." *Id.* at 90. It is interesting to note that the instructions to the study participants, apart from stating that researching "college students' memory for course concepts" was part of the professor's research, did not indicate explicitly that the students should provide discussion of the relevance of the remembered item. *Id.* at 89. Instead it called upon students to list the items. *Id.*

In the second experiment, the procedure was the same, "except that the instructions included no references to specific activities (e.g., videos)." *Id.* at 91. Students were simply asked to "think back on the semester as a whole, and report to me the first 10 things that come to your mind as you answer the question: What do you remember from this course?" *Id.* at 91.

148. For a study of interactive videos versus lecture or linear videos, see Frank Sharman, Kevin Hogan, & Tony Cooke, *The Evaluation of Interactive Video in Law Teaching*, 24 LAW TEACHER 112, 114-15 (1990) (comparing lecture to linear video consisting "primarily of a talking head delivering the lecture" with still and moving pictures while interactive video "was interactive only in a somewhat limited sense" allowing students to choose portions of the video to watch in any order or multiple times" and offering "sets of short tests" that students could choose whether to complete).

manipulating knowledge: a visual-pictorial channel and an auditory-verbal channel."[149] Based upon research in this domain, the goal is to provide stimuli through both channels without overloading either. "According to the cognitive theory of multimedia learning, . . . [s]tudents learn more deeply from a multimedia explanation than from a verbal explanation."[150] Some of the research studies indicate that the most effective learning occurs with the simultaneous presentation of related visual and auditory information.[151]

An empirical study conducted on cognitive load and retention and transfer is instructive.[152] The experimenters divided 98 students into smaller groups.[153] The researchers then used computer programs to present information on how lightning works.[154] Some groups received only visual information; some only auditory; and some a combination of pictures and words.[155] The researchers then tested the students on retention and transfer of the information.[156] A multivariate analysis of the students' scores illustrated that "students learn best when the instructional materials present two representation codes rather than one, as a result of the relatively higher performance obtained with relatively lower cognitive load."[157]

For a law school classroom, application of this type of

149. Richard E. Mayer, *Cognitive Theory and the Design of Multimedia Instruction: An Example of the Two-Way Street Between Cognition and Instruction*, *in* APPLYING THE SCIENCE OF LEARNING TO UNIVERSITY TEACHING AND BEYOND 55, 60 (Diane F. Halpern & Milton D. Hakel eds., 2002) (citation omitted). For a study evaluating how to reduce split-attention effects in multimedia presentations, see Slava Kalyuga, Paul Chandler & John Sweller, *Managing Split-Attention and Redundancy in Multimedia Instruction*, 13 APPLIED COGNITIVE PSYCHOL. 351, 351-71 (1999).

150. Mayer, *supra* note 149, at 62.

151. *Id.* at 60, 64 (citing eight studies indicating that presenting the auditory and visual information simultaneously produced deeper learning than presenting the two types of information serially). Professor Mayer also conducted research indicating that "adding interesting but irrelevant material to a multimedia presentation [like video clips] can overload one of the channels" and have a negative effect on learning. *Id.* at 65.

152. Roxana Moreno & Alfred Valdez, *Cognitive Load and Learning Effects of Having Students Organize Pictures and Words in Multimedia Environments: The Role of Student Interactivity and Feedback* 53 ETR&D 35, 41 (2005). Not all studies have concluded that multimedia presentations have a significant positive effect on learning. *See generally* Stephen M. Smith & Paul C. Woody, *Interactive Effects of Multimedia Instruction and Learning Styles*, 27 TEACHING OF PSYCHOL. 220 (2000) (finding that multimedia primarily benefited those students with high visual orientation and may even reduce performance of students with verbal orientation).

153. Moreno & Valdez, *supra* note 152, at 36, 37-38.

154. *Id.* at 37-38.

155. *Id.* at 36-37.

156. *Id.*

157. *Id.* at 41.

research hypothesis might involve the concurrent presentation of animation or visual images and narration of the important points illustrated by that animation or those images.[158]

The research may also speak, however, more generally with respect to the "Multimedia Principle" in which "[d]eeper learning [results] from words and pictures than from words alone."[159] Further support for the enhanced learning available through encoding involving both the auditory and visual channels (dual encoding) comes from a series of empirical experiments that studied, not only contemporaneous visual and auditory presentations, but also sequential ones.[160] These educational researchers found that "[t]he results of this experiment demonstrated that regardless of whether the two sources of information (diagram and statements) were altered to simultaneous or successive presentation, a dual mode of presentation was superior."[161] Thus, their studies suggested "that the advantage of the visual-auditory procedure occurs irrespective of whether the material is presented simultaneously or successively."[162]

Perhaps the advantages of dual encoding can apply to auditory information that students then use to analyze visual

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158. Merritt, *supra* note 3, at 47-48.

159. Mayer, *supra* note 149, at 63.

160. Mousavi, Low & Sweller, *supra* note 145, at 324-28.

161. *Id.* at 327.

162. *Id.* at 326. The time differential between the auditory and visual presentations was quite short, apparently a matter of seconds or moments. *Id.* These authors also offer an explanation of why their results do not necessarily conflict with results by earlier researchers finding simultaneous presentations superior to successive ones. *Id.* at 327. In another succeeding experiment, the Mousavi group also found results consistent with the experiment discussed above in the text. *Id.* "Again, the results indicate the beneficial effects of presenting instructional material in a mixed auditory and visual mode. The fact that we did not obtain a significant interaction indicates that the modality effect is probably due to increased working memory capacity under dual-mode presentation conditions rather than to sequential or simultaneous presentation of information." *Id.* at 327-28. Not all research has found substantial improvement in learning when visual media was used. *See* BONWELL & EISON, *supra* note 47, at 33.

> For instance, an extensive review of the literature synthesizing results of 74 separate studies of visual based instruction in the college classroom found that, in comparison to conventional teaching (presumably lecturing), students' achievement increased only slightly when visual-based techniques were used and that even this advantage was less pronounced when the same instructor taught both classes (Cohen, Ebeling, and Kulik 1981). When used as a platform for delivering content, therefore, visual-based instruction has not yet been shown to be significantly better than lecturing—perhaps because simply viewing a 50-minute film or videotape does not actively involve students any more than listening to a 50-minute lecture.

Id.

images. In my anecdotal experience, I have found that the use of video/DVD or other images as a basis for identifying legal issues and applying legal principles appears to be effective. In this context, perhaps the auditory encoding supplemented, albeit not necessarily concurrently, with application of the auditory information to a visual portrayal may benefit from the added encoding of a visual image.[163] The goal here is to embed the analytical thinking-like-a-lawyer processing with the visual image and auditory signals to enhance retention of the processing.

Similarly, scholars note that a "meta-analysis of the literature on research [about visual-based instruction] found that the use of motion pictures, television, videotaped recordings and still media in nursing education, coupled with opportunities for responses from students (active learning), produced a significant positive change in students' attitudes and retention."[164] According to the scholars, "[t]he study suggests the importance of using media as the focal point for interactive techniques. Rather than simply serving as a substitute for a content lecture, however, media are best used as triggers for such activities as class discussion about the special significance of the content or as the basis of a short analytical essay about the implications of the events shown."[165] This research seems to support a more general proposition about the value of using visual and/or narrated imagery, like a DVD clip, to support problem-solving analysis (active learning).

A failure to use visuals means that we are missing a

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163. Benjamin V. Madison III, *The Elephant in Law School Classrooms: Overuse of the Socratic Method as an Obstacle to Teaching Modern Law Students*, 85 U. DET. MERCY L. REV. 293, 313-15 (2008).

> [F]indings show that persons with one dominant way of learning can benefit from receiving information in another way. . . [E]ven assuming the majority of a law class process information verbally . . . these same students benefit from visual presentations that challenge them to integrate the topic. A student in the same class who has a strong visual-orientation likely will fail to grasp the material as effectively, if at all, without the visual aids. In other words, visual presentations help everyone in the class, but for those with a visual orientation, the visual component is crucial. Other research suggests that forcing a student who prefers one way of learning to use a different approach has multiple benefits. Learning not only in one's preferred method, but also in other less dominant methods, may actually enhance the student's recall of a topic. Again, the emerging evidence supports the use of more than one type of teaching method in order to challenge students to learn in different ways. (footnotes omitted).

Id.

164. BONWELL & EISON, *supra* note 47, at 34 (citing Joy Schermer, *Visual Media, Attitude Formation, and Attitude Change in Nursing*, 36 EDUC. COMMUNICATION TECH. J. 197-210 (1988). *But see* Cavanaugh, *supra* note 130 (finding no statistically significant improvement in using active learning approach during a video versus passive approach to watching science videos).

165. BONWELL & EISON, *supra* note 47, at 34

fundamental pathway to memory and learning for many, if not most, of our students. In particular, we may be disserving our students who are primarily visual learners. I do understand that the use of visuals may be daunting for those faculty who themselves rely primarily on other learning modes. But we can enlist the help of our visual learners. For instance, we can ask students to submit suggestions for and diagrams and representations of concepts that they have created about the material we are studying that we might not otherwise envision ourselves. Students are usually very flattered to have their work used[166] by a professor later in the course or in future semesters. In addition to being flattered, having a student prepare a teaching aid reinforces the learning for that student. Moreover, first-year students, who are generally novice learners in the legal domain, may prepare materials that expose more steps in the process—steps that expert teachers may perform automatically and neglect to surface in their explanations. In this way, student visuals may more effectively reach other novice learners.

4. Personalization

My fourth selection of an insight about learning that may be useful to our teaching derives from a series of controlled experiments that focused on the effects of a conversational versus a formal style of presentation.[167] In the experiments, researchers changed the recorded presenter's use of the word "the" to the word "your" twelve times in a "narrated animation" about the human respiratory system.[168] The three experiments yielded statistically significant results about the learners' performance on transfer tests (the application of a concept learned in one environment to another context).[169] Those learners exposed to the personalized presentation performed substantially better on the transfer tests compared to those students exposed to the impersonal presentation.[170]

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166. With appropriate credit, of course.

167. *See* Merritt, *supra* note 3, at 46-50 (describing potential benefits of cognitive science research for legal education); Mayer et al., *supra* note 9, at 389-91 (indicating based upon empirical work that use of conversational, rather than formal, language can enhance learning). I want to thank Professor Deborah Merritt through whose scholarship I was introduced to the personalization and various of the multimedia studies.

168. Mayer et al., *supra* note 9, at 391.

169. *Id.* at 392-94.

170. *Id.* Consistent with the experimenters' predictions, the two groups of learners did not perform significantly differently on retention tests. *Id.* at 391-93. The experiments themselves did not yield definitive results on whether the improvements were a direct function of the learners' interest. *Id.* at 392-94. To measure learners' interest, in Experiment 2, the researchers tried measuring how often the subjects in the two groups smiled and

In evaluating the theoretical ramifications of this research, the experimenters contend that "[p]ersonalization increases the learner's interest, increased interest causes the learner to exert more effort to engage in active cognitive processing during learning, and an increase in active cognitive processing during learning results in deeper learning, which is manifested in improved transfer performance."[171]

One legal scholar, in arguing for the application of cognitive science principles to the law school classroom and specifically their application to the use of PowerPoint, explains that:

> Psychologists have suggested at least three reasons why personalization may deepen learning. First, encouraging listeners to think of themselves as a reference point may enhance their interest in the subject, which produces more active cognitive processing.[172] Second, personalizing information may help listeners relate new data to existing mental schema; extending mental frameworks in this manner encourages deeper learning.[173] Finally, listeners may respond to the social cues of conversational tone; because another person is addressing them, they feel a 'commitment to try to make sense out of what the speaker is saying.'[174] . . . Whichever of these routes accounts for the effect, a professor can increase students' understanding—particularly their ability to apply principles to new situations—simply by adopting a conversational tone.[175]

Although the personalization studies are limited in scope, they strike me as noteworthy. Their results are also consistent with observations of the effect of role-play in our law school classrooms. I am not alone in observing that students are generally engaged and invested if they become the actors in the scenario under discussion.[176] The classroom involves and depends

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comparing those numbers. *Id.* at 392. Since, however, none of the students in either group smiled, this did not effectively support the interest portion of the hypothesis. *Id.* at 393. The researchers also tested whether students perceived the material as more interesting when it was personalized. With respect to student interest ratings, the researchers concluded: "there is not statistically significant evidence that personalization affects students' ratings of interest, but there is a trend in the predicted direction . . . approaching significance [in Experiment 3]." *Id.* at 393.

171. *Id.* Professor Mayer's and his colleagues' research studies were conducted in the context of multimedia learning, but this finding seems applicable more broadly.

172. Merritt, *supra* note 3, at 50 (citing Mayer et al., *supra* note 9, at 391).

173. *Id.* (citing Mayer et al., *supra* note 9, at 394).

174. *Id.* (quoting Richard E. Mayer, *Principles of Multimedia Learning Based on Social Cues: Personalization, Voice, and Image Principles, in* THE CAMBRIDGE HANDBOOK OF MULTIMEDIA LEARNING 31, 202 (Richard E. Mayer ed., 2005)).

175. *Id.*

176. Boyle, *supra* note 111, at 23. "Kinesthetic learners are law professors' biggest challenge because these students learn in a way that is so different

upon them in a much more personal way than the abstract discussion of the affairs of others. Perhaps, the taking on of a role is a little like the personalization of "your" in the experiment. Suddenly, everything applies directly to the particular student.

Active learning methods, stories, visuals, and personalization can all garner student interest and enhance students' learning environment. A legal academic can call upon their power in various combinations. With these pedagogical building blocks in hand, we turn now to explore one approach for invoking them collectively in a large first-year law school classroom.

III. APPLYING INSIGHTS FROM THE RESEARCH ON LEARNING TO THE LAW SCHOOL CLASSROOM

A. Introduction

In this portion of the Article, I offer examples of classroom exercises that apply the above insights. Each example furnishes a springboard for students to recognize the legal issues, identify the overarching principles involved, and evaluate those issues in light of the identified principles. Each focuses on students applying their learning, their developing thinking-like-a-lawyer abilities to an unfamiliar story. Each problem-solving exercise[177] calls upon students to engage in active learning. Each uses a visual and narrated story as the subject of analysis. The final section of Part III considers several potential drawbacks and qualifications to the use of these exercises.

The three examples employ excerpts from *Star Trek™ The Original Series* and from *Star Trek™: The Next Generation.* Substantively, the scenarios chosen correspond to important topics in the study of criminal law. I imagine that a professor of property, torts, civil procedure, or contracts could also select scenarios from *Star Trek* or other popular media culture that would serve as a springboard to apply the learning insights

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from traditional law school methods. Kinesthetic learners learn by doing. Role-playing is one suitable teaching technique that engages kinesthetic learners." *Id.*

177. For an interesting critique of problem-based learning as the primary learning vehicle in a medical school context, see generally Mark A. Albanese & Susan Mitchell, *Problem-Based Learning: A Review of Literature on Its Outcomes and Implementation Issues*, 68 ACAD. MED. 52 (1993) (urging caution in converting to a curriculum based exclusively or almost exclusively on problem-based learning). The article recommends "a program that develops students' basic science framework in instructor-directed study for a portion of the first part of the curriculum, coupled with a parallel and integrated PBL thread that allows students to explore clinical cases in increasing complexity commensurate with their developing understanding of basic science." *Id.* at 78.

described in Part II above.[178]

I chose the *Star Trek* series, in part, because so many episodes raise legal issues. The *Star Trek* mission, "to boldly go where no man has gone before,"[179] translates into recurrent encounters with other legal systems and values. The series furnishes a rich platform for delving into cultural and legal conflict.[180] I also find the material useful because, most often, it is not explicitly about criminal law and lawyers. I contrast this removed or indirect treatment of criminal law issues with the much more direct treatment in a series like *Law and Order*, for example. This level of remove calls upon students to enter into the story. It also raises uncertainties about jurisdiction and applicable legal codes and encourages students to identify these uncertainties as part of uncovering the legal issues.

In some instances, I use a clip to introduce class discussion of a topic from the reading. In others, the scenario serves as a review exercise or opportunity to think more deeply about a topic. The difficulty level of the exercises varies. I describe three excerpts here to give an idea of the types of use one might make of them and how specifically one might employ them. For each of the three stories, I provide the plotline, discuss relevant legal doctrine, and analyze how the cognitive science research suggests that use of such stories can enhance learning.

B. The Stories, the Doctrine, & Cognitive Science

1. The Vengeance Factor[181]

a. The Story

The first exercise is based upon a "Next Generation" episode entitled, *The Vengeance Factor*.[182] At the start of the exercise, I inform students about what will be expected of them. Then, in

178. Law professors in other fields have documented their use of *Star Trek* in their classrooms. *See, e.g.*, K.J. Greene, *"There's No Business Like Show Business": Using Multimedia Materials to Teach Entertainment Law*, 52 ST. LOUIS U. L.J. 765, 769 (2008); Michael P. Scharf & Lawrence D. Robert, *The Interstellar Relations of the Federation: International Law and "Star Trek: The Next Generation"* 25 U. TOL. L. REV. 577, 577-612 (1994).

179. Used frequently in introductory sequences of televised Star Trek™ episodes.

180. At least one collected set of essays takes the *Star Trek* series and the worlds it creates as its primary scholarly subject. STAR TREK: VISIONS OF LAW AND JUSTICE (Robert H. Chaires & Bradley Chilton eds. 2003).

181. *Star Trek: The Next Generation: The Vengeance Factor* (television broadcast Nov. 20, 1989).

182. For additional information about using this clip, see the discussion in KATE E. BLOCH, TEACHER'S MANUAL: PART II, at 603 (2006), which is Part II of the Teacher's Manual for the criminal law course book, KATE E. BLOCH & KEVIN C. MCMUNIGAL, CRIMINAL LAW: A CONTEMPORARY APPROACH (2005).

order to limit the clip to about ten minutes' duration, I narrate a brief overview of the plotline of the story up to the scene that appears at the start of the clip. For our purposes, I relate here the relevant plotline to make concrete the continuing discussion of the approach. (Alas, I lack the benefit of visual animation in this format, so a written narrative will have to suffice.)

> Story One: The Vengeance Factor
>
> Unbeknownst to all the other characters in the story, certain members of the crew of the Starship Enterprise discover that one individual in a peacemaking delegation from another planet, Yuta, has had her own DNA transformed into a weapon of destruction. The transformation took place between eighty and one hundred years earlier. Since that time, Yuta has been traveling the galaxy to annihilate all the members and descendents of a now almost-extinct opposing clan. With a simple touch, she transmits a virus deadly to all members of the opposing clan.
>
> We enter the visual with Yuta present in a meeting on the opposing clan member's (her target's) ship. Yuta's leader has asked Yuta to serve the opposing clan member a drink of brandy. As Yuta approaches the opposing clan member carrying the beverage, an officer from the Enterprise crew beams into the meeting space to announce Yuta's treachery and prevent her from touching the opposing clan member. The crew member reveals Yuta's secret and orders her to halt in her approach to the opposing clan member. She fails to halt. The crew member blasts her with a stunning warning. She continues to approach. The officer fires again. When, despite a final warning, Yuta appears to begin to move her body, the officer fires and kills Yuta.

b. The Doctrine

In the criminal law realm, this scenario offers a wealth of material to discuss. The most fundamental question for many is whether Yuta committed the crime of attempted murder. Although students readily conclude that Yuta had a mental state of purpose to kill, the scenario raises the question of whether Yuta committed a sufficient act to constitute attempt here. How close to murdering her target did Yuta have to get to qualify for attempted murder? Using a variety of tests for the conduct element of attempt, did Yuta attempt to murder the enemy clan member? If so, when?

Is she liable, for instance, under the unequivocality test, in

which we measure whether:

> [A] person's conduct, standing alone, unambiguously manifests her criminal intent. It is as if the jury observed the conduct in video form with the sound muted (so as not to hear that actor's potentially incriminating remarks), and sought to decide from the conduct alone whether the accused was attempting to commit the offense.[183]

Pursuant to this test, is Yuta trying to kill the clan member, serve him brandy, or just move out of the line of fire? Can we count the transformation of her DNA as conduct? Even if we can, could an argument still be made that conduct is always ambiguous, at least perhaps, until the actor performs the final act in the sequence of necessary events to carry out the crime?[184] If conduct remains ambiguous until the final act, because Yuta has not actually touched the opposing clan member, can we conclude that her conduct alone was unambiguous? Maybe she just would have served the clan member the brandy and waited for a more private setting in which to apply the touch of death, or maybe she just would have moved out of the line of fire.

In contrast to the unequivocality test, is she liable under the Model Penal Code ("MPC") test? This test, often providing for much more encompassing attempt liability, requires that the actor "purposely does or omits to do anything that, under the circumstances as [she] believes them to be, is an act or omission constituting a substantial step in a course of conduct planned to culminate in [her] commission of the crime."[185] Did she take a substantial step here? If so, when? Under the MPC test, was she liable for attempted murder 80 to 100 years ago when she had her DNA modified? Was the modifying of her DNA to contain a virus deadly only to opposing clan members a substantial step in her course of conduct planned to culminate in the murder of the opposing clan member?

The contrast between the likely point at which a sufficient act is found under each of these tests may be stark, with some students arguing that the sum total of Yuta's acts may still not have fulfilled the requirements of the unequivocality test while her acts may have fulfilled the requirements of the MPC test 80 to 100 years ago. In this way, the clip supplies an effective way to explore the range of legal tests for the conduct element of attempt and the consequences that depend on which test a jurisdiction selects.

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183. *See* JOSHUA DRESSLER, UNDERSTANDING CRIMINAL LAW, 429 (4th ed. 2006).

184. *Id.* at 429-30.

185. MODEL PENAL CODE § 5.01(1)(c) (ALI 1985). The Code further requires that "conduct shall not be held to constitute a substantial step . . . unless it is strongly corroborative of the actor's criminal purpose." *Id.* § 5.01 (2).

Beyond the pivotal attempt question, there also lies an opportunity to discuss whether we prosecute people posthumously or confine our system to prosecution and punishment of only the living (and why). Moving beyond Yuta's liability, the scenario raises the potential liability of the crew member who ultimately killed Yuta. Does he have a "defense of others" argument or a chance to claim a law enforcement defense? From the perspective of a criminal law curriculum, the *Vengeance Factor* excerpt is a platform for studying or reviewing the substantive legal doctrines of the crime of attempt and the defenses of others and official force, at a minimum.

c. Cognitive Science Insights Applied

The question then becomes, by using this media clip, how can the four learning insights of Part II above help students develop their thinking-like-a-lawyer skills and maybe even "how lawyers think" skills. First, because the clip itself is a visual narrative, initial application of two of the four insights, using visuals and stories, is inherent in the choice of the media clip. The story draws the viewer in. It is engaging. This supports the premise underlying the selection of all four learning insights—that the medium chosen piques or increases the learner's interest. Increasing the learner's interest may then increase the likelihood of improved student learning.[186]

In terms of drawing the viewer in, on a pure entertainment level, these episodes were designed by professionals to engage a large audience. While our students are a captive audience, the professionals who developed these scenarios had to persuade you to keep the television tuned to their show even through the commercials (or at least engage you sufficiently to convince you to return to the show after the commercials). A meta-analysis of studies on learning also suggests that entertainment, in particular humor, can have at least a small positive impact on learning.[187]

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186. *See supra* note 9 (providing an example of how personalization can increase learning).

187. *See* Diane M. Martin, Raymond W. Preiss, Barbara Mae Gayle & Mike Allen, *A Meta-Analytic Assessment of the Effect of Humorous Lectures on Learning* 295, *in* CLASSROOM COMMUNICATION AND INSTRUCTIONAL PROCESSES: ADVANCES THROUGH META-ANALYSIS (Barbara Mae Gayle, Raymond Preiss, Nancy Burell & Mike Allen eds. 2006) (conducting a meta-analysis of the relationship between humorous lectures and learning). The authors analyzed the results of 21 independent experiments that involved a total of 4,801 participating individuals. *Id.* at 300. Their overall conclusion follows:

> Our fundamental conclusion is that classroom humor produces some effects on learning, although the basic reasoning about humor and learning may be equivocal. . . . Humorous lectures are associated with a very small increase in cognitive or objective learning. . . . The effect

More specifically, beyond the learning advantages of visuals and stories, to benefit from the personalization research, I can assign roles to the students (e.g., intergalactic prosecutor or defense counsel). Partaking of the responsibility of thinking and acting in role personalizes the learning experience. The students are no longer abstractly analyzing the affairs of others. Instead, they are the attorney actors for the assigned client. This is an easy adaptation. It requires no elaborate role creation. You simply change the students' perspective and investment by giving them a role in the analysis of the clip in your class. Addressing the assembled class of counsel as "you" then becomes appropriate (e.g., you are the attorney for Yuta, what arguments can you, as her attorney, make?). The empirical studies on personalization indicate that a simple change from the abstract or third person to the personalized second person can provide improvement in student learning.[188] Moreover, the assumption of role may also facilitate learning for tactile and kinesthetic learners.[189]

To enjoy the powerful advantages of active learning, you can select from a myriad of active learning vehicles. One such vehicle is a brief writing exercise: you can ask students to write brief responses to questions that focus them on a particular thinking-like-a-lawyer skill. With the students as intergalactic prosecutors or defense counsel, you might ask: What potential doctrinal issues in criminal law does Yuta's behavior raise? This inquiry directs the intergalactic prosecutors and defense counsel to identify legal issues from the story, not unlike, perhaps, a client's narrative. If students have absorbed principles from earlier criminal law classes, they should then narrow in on the question of whether Yuta committed an act sufficient to qualify for attempt liability under one of the applicable principles or standards defining conduct. In other words, this exercise encourages them to focus on the first of the three lawyering capabilities analyzed here, identifying the legal issues. The writing format furnishes each student with an active learning opportunity and may prove especially useful to the verbal learners in your classroom who tend

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> sizes for perceived learning are moderate and positive. . . . Using classroom humor tends to increase perceptions of learning. It is noteworthy that the magnitude of this perception is much larger than the average effect size of humor and learning measured by objective tests and recall measures. Students tend to believe that humor is associated with learning, although the evidence of this belief is rather tenuous.

Id. at 303-04.

188. *See supra* note 167-175 and accompanying text (describing empirical experiments that support the correlation between personalization and learning).

189. Role assumption offers many additional advantages for learning to think like a lawyer in the broader sense of exploring the professional role.

to process most effectively through reading and writing.

An alternative active learning format, which could be used with the same substantive inquiry to elicit greater mastery of the issue identification thinking-like-a-lawyer skill, would be a collaborative or cooperative exercise (turn to the person or two people next to you).[190] The collaborative or cooperative format holds the promise of delivering the host of advantages that the empirical research, examined earlier, associated with students working together on a critical reasoning task. The empirical research indicated, for example, that this cooperative format tends to elicit "more higher-level reasoning, more frequent generation of new ideas and solutions . . . and greater transfer of what is learned within one situation to another"[191] than the individual or competitive approaches.

In addition, cooperative learning is of particular importance for twenty-first century students and attorneys who will learn and work with a diverse multicultural group of colleagues and clients.[192] As noted earlier, research suggested that cooperative learning can positively affect interactions and perceptions among diverse groups of individuals. [193]

Moreover, small group work serves as an effective format for those who learn both orally, through verbal discourse, and aurally, through listening. Finally, a small group exercise, like this one, furnishes students, who might otherwise be intimidated about speaking before the full class, an opportunity to practice or preview their thoughts in front of a less formidable audience[194] before the class reconvenes together to review the analyses. Students who participate rarely, if at all, in the full class format may participate more if given this preview opportunity.

In addition to the entertainment value discussed above, the somewhat more relaxed (or perhaps less intimidating) environment that small group cooperative learning enhances may also serve to reduce students' stress in the classroom. Scholarship on the negative impact of law school stress generally[195] and stress caused by particular teaching approaches indicates that stress can

190. As indicated above, see notes *supra* 95-106 and accompanying text (describing benefits of and the use of cooperative and collaborative learning exercises for which there exists much helpful guidance on how to structure the experience to make the experience positive and productive).

191. JOHNSON, JOHNSON & SMITH, *supra* note 1, at 2:12.

192. Randall, *supra* note 97, at 222.

193. *Id.* and text accompanying note 104 *supra*.

194. JOHNSON, JOHNSON & SMITH, *supra* note 1, at 2:6-7.

195. Stephen B. Shanfield & G. Andrew H. Benjamin, *Psychiatric Distress in Law Students*, 35 J. LEGAL EDUC. 65, 69 (1985). "The results of this study reveal that law students have higher rates of psychiatric distress than either a contrasting normative population or a medical student population." *Id.*

undermine learning.[196] Of course, not all stress is negative; some stress can enhance motivation in a positive way.[197] But excessive and chronic stress limits learning.[198] The engaged interactive cooperative approach does not eliminate stress but should reduce its negative force, thus promoting engagement rather than ulcers or paralyzing inaction.

By using this media clip, our students benefit from the clip as a story. They also benefit from its visual characteristic. As a visual depiction, it triggers intake through our visual pathway and cognitive visual encoding. The studies described in Part II underscored that visuals can enhance recall.[199] Based on this research, students are more likely to remember the visuals and the stories in those visuals.

But remembering the clips by themselves is only the beginning of the road to helping students identify, analyze, and evaluate legal issues. We want to tie the clips to the legal analysis, to the thinking-like-a-lawyer abilities. Here, we draw

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196. *Id.* at 70 ("The stress of learning by case analysis using the Socratic method has been the topic of considerable discussion in the literature. Indeed, research reveals that law students rate themselves as having more academic distress than medical students." (footnotes omitted)); SCHWARTZ, *supra* note 23, at 17 ("[T]he nature of law school teaching produces stress. Students are on the spot in class, are expected to learn vicariously."). For a more detailed analysis of the causes of elevated stress in law school, *see* G. Andrew H. Benjamin et al., *The Role of Legal Education in Producing Psychological Distress Among Law Students and Lawyers*, 1986 AM. B. FOUND. RES. J. 225, 247-52 (1986) (suggesting that being overwhelmed for first-year students, being bored for third-year students and concurrent employment commitments, along with poor student-faculty ratios, and lack of focus by legal education on development of interpersonal skills can all contribute to psychological stress among law students).

197. B.A. Glesner, *Fear and Loathing in the Law Schools*, 23 CONN. L. REV. 627, 644-45 (1991). "A certain amount of tension and anxiety can be useful in motivating individuals to do their best. The stress of law school can lead students to forge strong alliances among their colleagues. The tension of a well-directed Socratic dialogue can motivate students to learn subject matter and develop independent learning skills. Successfully meeting and overcoming a frightening challenge in law school makes courage easier the next time around. Yet studies of stress in law school and the experience of psychological counselors of law students indicate that not all law school stress is productive or motivational." *Id.* (footnotes omitted)). *See also* Hess, *supra* note 111, at 80.

198. *See* Hess, supra note 111, at 80 ("Stress inhibits students from receiving and processing *information* when anxiety distracts them from the learning task. For example, they may cope with anxiety by focusing on what they perceive to be the primary task (learning legal rules) and may ignore other relevant parts of the task (the social, historical, and political aspects of a case). Stress also interferes with students' abilities to organize and store information. . . . Prolonged exposure to stress can cause burnout and withdrawal from active engagement in their education.") (footnotes omitted).

199. *See supra* notes 145-162 and accompanying text (providing studies and analysis on visuals and learning).

upon the remaining two learning insights, active learning and personalization. Based on the research, students who are actively and personally invested in the analysis of the excerpts should be more likely to encode and retain the analysis of the visual story in their mental maps.[200]

You can use active learning vehicles for each of the thinking-like-a-lawyer capabilities. You can move students from identification of legal issues to application of the appropriate legal standards and to evaluation of the case, by asking whether, as intergalactic prosecutors, from a doctrinal perspective they have the evidence to prove any charge beyond a reasonable doubt. Or if you are seeking to have students perform a broader evaluation of the case, you might ask normatively whether they should file any charge in the case at all.[201]

If changing the word "the" to "your" twelve times in a recorded animation can have a statistically significant effect on students' learning, I can only imagine the kind of impact that the regular use of the personalization effect, combined with active learning approaches, might have.

I have often used this *Vengeance Factor* episode as a review for attempt. It is my perception that most students are highly engaged and are able to identify the legal issues and analyze them. I am frequently surprised (and delighted) when so many students remember and apply the different tests, for that act element of attempt, relatively skillfully at subsequent opportunities. In this sense, my observations over the years about the effectiveness of applying the four learning insights are highly consistent with the results of the research on those insights described in Part II.

2. *Plato's Stepchildren*[202]

a. The Story

A second, more complex problem-solving example derives from an episode entitled, *Plato's Stepchildren.*

200. The evidence on improved learning outcomes for active learning approaches is quite substantial. *See, e.g.,* notes 52-109. But not all studies have found that active approaches improve learning. *See, e.g.,* Cavanaugh, *supra* note 130 (finding no statistically significant improvement in using active learning approach during the video versus passive approach to watching science videos).

201. There might be some interesting civil procedure jurisdictional issues here too.

202. *Star Trek: The Original Series: Plato's Stepchildren* (television broadcast Nov. 22, 1968).

Story Two: Plato's Stepchildren

In this episode, the inhabitants of a planet lure the Enterprise crew to their small community. All but one of the inhabitants of the planet have developed profound psychokinetic powers. The inhabitants use their power to enslave the one member who lacks any psychokinetic power. This member, Alexander, is at the mercy of every other inhabitant. Responding directly to their psychokinetic manipulations of him, and against his will, Alexander performs almost all work that requires physical exertion.

Because the planet lacks a physician and the inhabitants are prone to serious complications from wounds (apparently from lack of exercise and movement of their limbs), the inhabitants decide to force the Enterprise doctor to remain on their planet.

In the Enterprise crew's efforts to resist the inhabitants' unilateral decision to detain the doctor, the Enterprise crew investigates the source of the inhabitants' psychokinetic powers. The crew discovers that the secret to the inhabitants' psychokinetic powers resides in a chemical reaction caused by chemicals on the planet interacting with hormones released by the human pituitary gland. They then manufacture the compound that creates the psychokinetic strength. In the ensuing struggle between the inhabitants' leader and the captain of the Enterprise, each of the two manipulates Alexander using psychokinesis so that he alternately threatens the captain and then the inhabitant leader with a sword. In the background, the remaining inhabitants, sitting in the audience, cheer, while watching the struggle.

b. The Doctrine

Students generally find this episode, like *The Vengeance Factor*, engaging. They pay attention and are drawn into the story. The story itself is rife with criminal law (and probably torts) issues. When brandishing the sword over the captain's head, has Alexander committed a voluntary act, which we usually understand to involve a voluntary bodily movement?[203] His limbs are moving and no one is physically pushing his limbs to move. He is not having a seizure, nor is he asleep or unconscious. Are his

203. *See generally* JOSHUA DRESSLER, UNDERSTANDING CRIMINAL LAW 93-97 (4th ed. 2006) (describing voluntary act requirement).

movements then somehow legally voluntary? How should the law judge "voluntariness" in this context? If Alexander's movements are involuntary, is he the victim of battery or assault?

When the inhabitant leader uses psychokinesis to manipulate Alexander to have him try to attack the captain with the sword, has the inhabitant leader committed an act? Does psychokinesis qualify under the traditional voluntary bodily movement approach? If so, and the leader intends to kill the Enterprise captain using Alexander in this way, is the leader then guilty of attempted murder? The episode raises two disparate perspectives on the voluntary act requirement. Alexander's limbs are moving when he brandishes the sword. Is this an act that is criminally punishable? The inhabitant leader's limbs are not moving. Should his psychokinesis qualify as an "act," subject to criminal punishment? Students must confront the question of whether a traditional legal definition of "voluntary bodily movement" is adequate for this context.

Could the cheering by the inhabitants seated in the audience to this struggle make them accomplices?[204] Have they committed acts sufficient to brand them as complicitors? If by cheering, the audience seeks to encourage the inhabitant leader to kill the Enterprise captain, and if they want their leader to actually kill the captain, the audience members may possess the mental state required of complicitors. But does their applause constitute a sufficient act? Here, the question is not whether their clapping constitutes a voluntary bodily movement but rather whether the law should view their act as sufficient and sufficiently connected to the inhabitant leader's behavior to support criminal liability.

Analysis of the scenario encourages students to parse the concept of "act" closely and to think more broadly about how to apply it to a different physical universe than the one in which we commonly find ourselves.

And beyond the collection of doctrinal and policy quandaries related to the legal standard for an "act," does self-defense theory protect the captain in his responsive threatening of the inhabitant leader? Anyway, you get the idea. This excerpt surfaces a plethora of important curriculum for a criminal law course and for learning to think like a lawyer.

c. Cognitive Science Insights Applied

Like the earlier episode, by choosing the media clip, you naturally benefit from the visual and story learning insights. You could, of course, choose to employ similar personalization through

204. For professors who teach the famous case of *Wilcox v. Jeffrey, King's Bench Division*, 1 ALL ENG. REP. 464 (1951), this clip raises a useful review and application opportunity.

roles, this time perhaps with students as judges or judicial clerks analyzing and evaluating the legal issues. Because this episode is more complex, it may lend itself to additional opportunities to apply the research about learning. For example, the complexity of this episode offers a valuable occasion to use the pause procedure. Here, it may help to stop the video and encourage students to begin identifying legal issues at intermittent stages in the story. You could stop the clip to have students point out salient facts or anticipate likely legal issues or just to ensure understanding of the unfolding chronicle. Similarly, one empirical study on showing video clips in a classroom indicates that "videotapes are more effective when shown with methods that help students focus on relevant information and encourage active participation."[205] Another study, however, showed no significant difference in learning between an active approach during a video and a passive approach while watching the video.[206]

During or at the end of the story, one might have students gather in small groups, with the three or four students sitting nearby or even just the student sitting adjacent. The instructor might begin by assigning the groups the thinking-like-a-lawyer responsibility of identifying the legal issues they perceive. Once the groups have produced a list, you can have groups swap lists and compare, and then have a class discussion about the items that appear or fail to appear on the lists.

Once students have a list of appropriately identified legal issues, you can assign them the task of articulating or writing the principles that they anticipate would apply to each of the identified issues. Once each group has produced a list of principles, the swap and class discussion approach furnishes immediate feedback to students of each group.

The importance of feedback for students is well documented.[207] In particular, students need feedback because "[r]esearch on self-assessment in college students shows that learners generally overestimate their mastery"[208] or "potential

205. *See, e.g.*, David S. Kreiner, *Guided Notes and Interactive Methods for Teaching with Videotapes*, 24 TEACHING OF PSYCHOL. 183, 185 (1997) (studying the impact of using more active methods of presenting videotapes to enhance learning). *But see* Cavanaugh *supra* note 130.

206. Cavanaugh, *supra* note 130.

207. *See, e.g.*, Paul T. Wangerin, *"Alternative" Grading in Large Section Law School Classes*, 6 U. FLA. J.L. & PUB. POL'Y 53, 54 (1993) ("[T]he grading system used in most law school classes, the system that primarily relies on the use of a single end-of-term essay exam, is not consistent with generally accepted theory regarding grading in higher education. This theory indicates that a much better grading system involves frequent testing and frequent feedback"); *infra* notes 208-209 (providing examples of how feedback may be important for students).

208. William R. Balch, *Practice Versus Review Exams and Final Exam*

mastery"[209] "of material before testing as well as their performance after testing."[210] The exchange of and evaluation of other groups' lists and class review of them can help students adjust their studying by providing feedback on their success in mastery of these thinking-like-a-lawyer abilities.[211]

With large classes, it is challenging for the faculty instructor to provide individualized feedback to guide a student on his/her mastery or failure to master the rudiments of the course. This peer feedback, both in the small group and with the faculty review when the class reconvenes as a large group, supplies a relatively low-cost means of giving feedback to each student or small group of students. The feedback follows quickly after the learning exercise, enabling students to rewrite their mental maps to encode improved analyses of the identification and application of legal standards and evaluation of the potential outcomes.

In light of the multiplicity of issues in the story, the instructor can also use this episode to guide students in learning to organize complex multivariable legal problems. Applying the learning insights to these excerpts combines engagement with intellectual rigor.

If you use complex hypotheticals as assessment tools, particularly if you use them as part of the final examination for the course, this exercise works as practice for students in preparing to undertake such assessments (as well as reviewing the underlying legal principles). Commonly, hypotheticals or problems in a course text relate specifically to the particular legal issues in that section or subsection of the text. Students often lack the opportunity to analyze problems that cover a range of issues in the subject matter under the guidance of the faculty member. Media excerpts, like *Plato's Stepchildren*, unlike problems or hypotheticals that relate to only a particular issue in a case or a text, call upon students to juggle a number of legal issues and potential outcomes simultaneously.

These problem-based exercises also respond to the concern

Performance, 25 TEACHING OF PSYCHOL. 181, 181 (1998) (citing W.R. Balch, *Effect of Class Standing on Students' Predictions of Their Final Exam Scores*, 19 TEACHING OF PSYCHOL. 136 (1992)); Kristen P. Sjostrom & Alan Marks, *Pretest and Posttest Confidence Ratings in Test Performance by Low-, Medium-, and High-Scoring Students*, 21 TEACHING OF PSYCHOL. 12 (1994)).

209. Balch, *supra* note 208 (citing V. Prohaska, *"I know I'll get an A": Confident Overestimation of Final Course Grades*, 21 TEACHING OF PSYCHOL. 141 (1994)).

210. *Id.* (citing, *inter alia*, W.R. Balch, *Effect of Class Standing on Students' Predictions of Their Final Exam Scores*, 19 TEACHING OF PSYCHOL. 136 (1992)).

211. If I were choosing additional insights about learning to borrow from cognitive science, the importance of feedback to students would be high on my list.

that legal academics "do not test what they teach."[212] A legal educator observes:

> [O]ften during the first year curriculum [legal academics] 'teach by the case method and actually test by the problem method.' Typically, first-year law students are greeted in the first weeks of school with massive reading assignments of appellate court opinions (the standard Case Method) followed by class periods which engage in some form of Socratic dialogue regarding those cases. At the end of the semester, although taught by the Case Method system, typically they are presented with the standard three-hour exam with loaded fact patterns providing complicated legal problems for which they have received little or no explicit training.[213]

To the extent that we have been failing to prepare our students for the assessment tools we use, the types of active-learning vehicles envisioned here should begin to address these failings.

Using these visual accounts adheres to the "less is more" approach, which the study on lecture density endorsed.[214] Providing the time and opportunities for students to learn to construct the cognitive pathways necessary to identify legal issues, apply the appropriate standards, and evaluate legal positions effectively, we will have gone far in fulfilling our "prime directive"[215] as first-year law school educators.[216]

3. Let That Be Your Last Battlefield

a. The Story

The third episode, entitled, *Let That Be Your Last Battlefield*,[217] furnishes an opportunity to address difference and discrimination in the context of analyzing the elements of the crime of theft and those of the defense of necessity.

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212. Cathaleen A. Roach, *A River Runs Through It: Tapping into the Informational Stream to Move Students from Isolation to Autonomy*, 36 ARIZ. L. REV. 667, 673 (1994) (footnotes omitted).

213. *Id.* (citations omitted).

214. *See supra* note 70 and accompanying text (describing the study on lecture density and medical students).

215. The *Star Trek* crew was governed by a "prime directive."

216. Many of the benefits of the learning insights could also perhaps be gained through the use of carefully selected real stories from, for example, a clinical program's caseload at a law school.

217. *Star Trek: The Original Series: Let That Be Your Last Battlefield* (television broadcast Jan. 10, 1969).

Story Three: Let That Be Your Last Battlefield

In this episode, the Enterprise crew encounters a shuttlecraft that has been taken from a Star Base. They discover an occupant in distress, Lokai, within the craft. Once aboard the Enterprise, the captain accuses Lokai of stealing the shuttlecraft. Lokai claims a necessity defense for his use of the vehicle. In support of his necessity claim, he explains that he is a political refugee, having been condemned to death for seeking freedom from oppression for members of his race on his home planet, Cheron.

As the episode unfolds, the grounds of his necessity claim emerge. A second individual from Cheron, Bele, boards the Enterprise seeking to return Lokai to Cheron. To the Enterprise crew, both Lokai and Bele appear to be of the same race. Each of them appears one half black and one half white, in contrast to the "monotone" skin color of the members of the Enterprise crew. When Captain Kirk voices his confusion, Bele points out that he is white on the left side and black on the right and that Lokai's skin color is the reverse. Bele contends that therefore Lokai is a member of an "inferior breed."

b. The Doctrine

Within the frame of Lokai and Bele's racial animosity,[218] students can explore the underlying doctrines of theft and necessity as well as the legal and larger socio-political themes of difference and discrimination.

Is it theft, if, as Lokai claims, he was ultimately planning to return the shuttlecraft (i.e., he was just borrowing it to escape his pursuer)? Has the element of theft, which requires an "intent to permanently deprive the owner," been met? Would it be met if the borrowing were to be for an extended period, e.g., a year or a hundred years? Would it be met if the borrowing put the craft at substantial risk of destruction?

If a court were to construe Lokai as possessing an adequate intent to permanently deprive the shuttlecraft owner to meet the requirements of theft, could Lokai then invoke the necessity defense? Could Lokai meet requirements that courts often associate with common law necessity?[219] For example, was Lokai confronted by a "clear and imminent danger"?[220] Would the fact

218. Lokai uses the term "monotone" to describe the skin color of members of the Enterprise crew and Bele uses the term "inferior breed" to describe Lokai in the episode.

219. *See* DRESSLER, *supra* note 183, at 311.

220. *Id.*

that Bele had been pursuing Lokai for 50,000 years be relevant to this requirement? Would a reasonable person anticipate that appropriating the shuttlecraft would abate the danger?[221] Was there no effective "legal" means of avoiding the danger?[222] Could Lokai, for example, have sought protection from the Federation of Planets, without appropriating the shuttlecraft? Had those who made the law against theft already weighed the choice of evils and struck the balance differently than did Lokai?[223] In our intergalactic example, which laws should control, the ones of the planet Cheron or those of the Federation from which the shuttlecraft was appropriated? Necessity also commonly requires that the actor enter into the circumstances with legally "clean hands," i.e. not be at fault in creating the situation that gave rise to his necessity claim.[224] How might a court interpret and apply this requirement here? In some jurisdictions, the claim is further limited to evils created by natural, as opposed to man-made, emergencies.[225] What impact might this limitation have on Lokai's claim?

Does the common law necessity defense provide an appropriate and viable opportunity to raise discrimination as a basis for claiming the defense? How might Lokai's circumstances be similar to or different from, for example, prosecutions under the Jim Crow laws and the legal arguments available to individuals accused in those cases? More generally, how does the criminal legal framework address Lokai's claim that he is escaping life-threatening political injustice and discrimination? How can or should legal systems address claims like Lokai's in the criminal law realm?

Students might then contrast the above common law analysis with an analysis under the MPC approach to the necessity defense. Under the MPC, the actor's conduct finds protection, subject to some limitations, if the actor "believes"[226] that his conduct is:

> [N]ecessary to avoid a harm or evil to himself or to another . . . provided that: (a) the harm or evil sought to be avoided . . . is greater than that sought to be prevented by the law defining the offense charged; and (b) neither the Code nor other law . . . provides exceptions or defenses dealing with the specific situation involved.[227]

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221. *Id.* at 312.
222. *Id.*
223. *Id.* at 313.
224. *Id.*
225. *Id.*
226. MODEL PENAL CODE, § 3.02(1) (1985).
227. *Id.* § 3.02. The Code also requires that no legislative purpose plainly appears to exclude the necessity claim. *Id.* § 3.02(1)(c).

Students can evaluate how Lokai would fare under this arguably broader conception of the necessity claim. Which harms or evils are measured here? How should society measure the harms or evils of discrimination? Analysis of the common law and MPC approaches to the defense, as applied to the set of circumstances of the excerpt, supplies a ready platform for reaching some foundational issues about the intersection of discrimination and a criminal justice system as well as doctrinal issues about theft and necessity.

c. Cognitive Science Insights Applied

This excerpt offers the benefits, in terms of the visual presentation of a story and the opportunities to use personalization through roles and a variety of active learning approaches, which were available with the earlier two excerpts. Like the earlier excerpts, instructors can use it to scaffold students in their construction of the mental models needed to identify, analyze, and evaluate legal issues.

This excerpt has the added benefit of a specific focus on difference and discrimination. The basis of Lokai's invocation of the necessity defense is his explanation that he is the victim of unjust and discriminatory treatment due to the color of his skin. Racial discrimination is a fundamental consideration in any examination of the U.S. criminal justice system. This excerpt surfaces this issue of racial discrimination explicitly.

The fictional twenty-third century setting of *Star Trek* lets us explore issues related to difference and discrimination in as direct a way as the instructor and the students find productive. Lokai's particular factual situation is perhaps one step removed from both our interactions about race in the classroom and those in the real world around us. In this way, use of the excerpt allows characters in the story to supply perspectives that may be different from those held by a significant number or a majority of students. Having a character furnish such a perspective can relieve the pressure, sometimes felt by students who may share that character's perspective, of feeling responsible for supplying that perspective or their own experiences in subsequent class discussions.[228] The conflict in the excerpt about racial

228. Consider the comments of an ethnically diverse group of ten law students who shared some of their thoughts about their law school experiences with Professor Charles R. Calleros on the question of supplying perspective:

> Members of the Student Group, however, cautioned against the practice of repeatedly calling upon students of color or other "outsiders" to articulate the perspective of groups that they apparently represent. Many students who take pride in bringing diverse perspectives to the law school classroom nonetheless view themselves as unique individuals with a complex array of experiences and views rather than as

discrimination can help the professor gauge the class' ability to discuss race in a meaningful way that is sensitive to a variety of perspectives.

The analogy from Lokai's circumstances to racial discrimination in the U.S. criminal justice system requires but a very small leap. In this way, the excerpt can serve as a bridge to a more real-world confrontation with issues of discrimination. I would not, of course, confine discussions of issues of difference and discrimination to the realm of fictional space,[229] but that domain can serve to introduce or extend discussions about these important issues.[230]

Let That Be Your Last Battlefield can serve as a medium through which cognitive science insights help your students think like lawyers and confront fictional and real-world contemporary legal issues from doctrinal, policy, and theoretical perspectives.

4. Addressing Potential Drawbacks and Qualifications

The learning insights studied here and their application to first-year law school teaching hold much promise for improving students' cognitive engagement and thinking-like-a-lawyer capabilities. But no approach is without potential limitations or drawbacks and qualifications. This section addresses two potential drawbacks and two qualifications.[231]

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spokespersons for larger groups. Although on many occasions they may express a perspective that is shared by a larger group, instructors should not assume that a student has a special perspective on any given topic simply because her personal characteristics differ from those of the majority of her classmates.

Charles R. Calleros, *Training a Diverse Student Body for a Multicultural Society*, 8 LA RAZA L.J. 140, 160 (1995) (footnotes omitted).

229. *See supra* note 12 (providing examples of more direct opportunities to treat topics relating to difference and discrimination in a criminal law course).

230. When raising issues of discrimination, issues that are likely in themselves to have a disparate impact on the individual students in the classroom, an instructor may wish to give particular thought to selecting the active learning vehicle that would work best.

For instance, there are risks and benefits to a small group approach here. They will depend, in part, on how comfortable the class is with a small group structure and the established boundaries and protocol of the class environment. With appropriate guidance, a small group can enable students to speak openly and candidly about difference and discrimination in a way that students might not speak in front of a large class. This candor can promote greater understanding among the small group members and a forum for addressing misconceptions. Small groups, however, because they cannot be constantly monitored by the instructor also may result in misunderstandings and offense. If an instructor chooses a small group approach, it will be valuable to have a means for students to alert instructors to small group interaction that raises concern.

231. More generally, with respect to the empirical and other research work described in this article, most of the empirical studies generally, and relied

One important drawback to using engaging media clips is that it can defy student expectations.[232] Some students are likely to object to this non-traditional, non-conventional approach, either to you directly, or in your course evaluations. They may perceive this approach as not serious and not scholarly or even just inappropriate for legal education. In my experience, the likelihood that students will perceive and raise these concerns depends upon a number of factors. For instance, if you teach in the first semester of the first year and have colleagues in the same section who use less conventional teaching methodologies, you are probably less likely to encounter student resistance or negative response. If, however, your teaching schedule places you in the second semester and you the lone faculty member in your section to use non-traditional teaching methods, you are likely at greater risk of incurring student skepticism. Other factors may also, of course, influence student response to your choices. If you anticipate defying student expectations, it can be helpful to prepare for and address such responses. It may be worth a few moments of class time or brief discussion in the syllabus to share some of the research on learning that supports your choice of learning vehicles and demonstrates a superior learning outcome for students through the applied cognitive science insights.[233]

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upon here, were not conducted specifically on law school education. *See supra* note 6 (illustrating examples of empirical studies not focused on law school education). Frequently, the substantive material upon which students in the studies focused stemmed from science, math, engineering, or psychology. *Id.* It is also worth noting that even a study that produced statistically significant results may relate directly only to particular types of learning. For example, the study may measure retention in the short or in the long term, or it might measure the ability to apply the learning to other situations (transfer), or it may, although perhaps less commonly, measure specific critical thinking skills. Consequently, the studies may not have gauged precisely the types of learning that we seek to nurture as legal academics. Moreover, even when the type of learning is similar or the same, applying the empirical work beyond the precise context in which the researchers conducted the study may still involve a leap. I also want to acknowledge that a thorough evaluation of the methodology and validity of each of the studies and of the meta-analyses cited in this article was beyond the scope of the article.

For a discussion of a number of limitations to using active learning in particular, see Hess, *supra* note 47, at 403-06 (providing a thoughtful discussion of a number of potential drawbacks specifically to active learning, including student expectations, institutional priorities, covering content, time needed to prepare, class size, "[t]eachers' [s]elf-[d]efinition," and risk).

232. Hess, *supra* note 47, at 403-04 ("Barriers to Active Learning: *Students' Expectations* Some students resist active learning methods. For many of them, the educational experience before law school has been largely passive, listening and taking notes is the comfortable and familiar way of learning. . . . These students often view discussion, simulation, and other active methods as a waste of time."(footnotes omitted)).

233. *See id.* at 404 ("You can explain that because students learn best in different ways, you will employ a variety of teaching and learning methods to

Another approach about which I have read and that I plan to try also involves persuasion, but this time through another lens.[234] Using a set of three questions, a professor of undergraduate courses has engaged students in identifying the types of learning that they think are most important in their education and in the course, from "[a]cquiring information" to "[l]earning how to use information and knowledge in new situations" to "[d]eveloping lifelong learning skills."[235] The students found all the listed types of learning important.[236] The professor then inquired about which types could be pursued effectively outside of class by the students' reading and reviewing course materials and which types of learning did students think "would be best achieved in class *working with your classmates and me.*"[237] Students readily concluded that fact acquisition was within their grasp outside of class, but that the other learning goals "seemed more complicated and would profit from peer and instructor influence."[238] Using this technique, the professor achieved student "buy in" for the move to active learning vehicles.[239] According to the professor, the "buy in" resulted not only in "fostering better learning performance on exams but also" raised his "teaching evaluations . . . to their highest levels."[240] Not a bad ancillary consequence.

I do prefer to enlist students' cooperation, or at least share the reasoning behind the teaching approaches that I advocate and employ. I have found positive, although not universal, support from students when I share a little of the "why" of the non-conventional teaching strategies I plan to use. A few of my students have continued to profess a preference for more lecture or more Socratic dialogue. I do not know if this stems from certain students' genuine metacognition about their own preferred learning modes,[241] or whether the professed preference derives from having defied their expectations by using teaching methods different from other colleagues in the section or than they believe work well for them. In the end, I am proactive in the hope of persuading students that those who actually study how the brain learns can help me help them learn more effectively. (I should add

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help all students succeed. . . . As for the students who believe that legal education consists of memorizing The Law, you can extend their horizons through active learning methods that expose them to complexity and ambiguity.").

234. Smith, *supra* note 30, at 1-4.

235. *Id.* at 2.

236. *Id.*

237. *Id.* at 3.

238. *Id.*

239. *Id.* at 2, 5.

240. *Id.* at 4.

241. *See* Hess, *supra* note 47, at 404 (maintaining that "students have different learning styles: some prefer passive methods and others active").

that a fair number of my students over the years have explicitly acknowledged their appreciation of the use of non-traditional teaching vehicles.)

The second drawback relates to the time commitment necessary to prepare non-traditional approaches. In effect, for an experienced law professor, this is the time delta to modify a well-orchestrated and thorough lecture or Socratic approach to a different teaching technique. For a new professor, this is the time investment in initial creation of class materials. For the new professor, crafting a comprehensive and thoughtful set of teaching materials using traditional or non-traditional teaching methods will be a substantial investment. It may be less daunting to make that initial investment in applying current cognitive science research than is the change for a professor with existing materials with which she has been comfortable.

Preparation of class materials is time consuming and I do not mean to minimize the effort needed to change from a well-prepared set of class notes and materials to a new one. But, if we are the teachers of the next generation of lawyers, legislators, judges, and law teachers, then the responsibility to seek out and invest ourselves in understanding and employing the most effective teaching methods is ours. And it need not be all or nothing. The shift to applying the cognitive science research can be gradual rather than overnight. Next semester, one might try one or two applications of the research. As these applications accumulate in your materials from semester to semester, your teaching approaches and materials will increasingly reflect the benefits of the cognitive science research. Although legal academics find ourselves more and more in an environment of heightened scholarship demands, our commitment to educating our students in the classroom should not diminish.

Turning to the qualifications, first, I have not conducted empirical testing on the efficacy of the approach I propose here.

Second, there is empirical research suggesting that the use of particular teaching methods for large group instruction may have little or no effect on overall group performance as measured by a final examination in a course.[242] For example, in an empirical study conducted at Brigham Young University Law School, a professor compared student performance in Evidence courses for

242. *See, e.g.*, Edward L. Kimball & Larry C. Farmer, *Comparative Results of Teaching Evidence Three Ways*, 30 J. LEGAL EDUC. 196 (1979) (reporting on the results of an empirical study conducted at Brigham Young University Law School); Paul F. Teich, *Research on American Law Teaching: Is There a Case Against the Case System?*, 35 J. LEGAL EDUC. 167, 168 (1986) ("Extensive research conducted in non-law post-secondary contexts has convincingly demonstrated that conventional group teaching approaches tend to function equivalently in their overall impact on student achievement.").

which he used three different teaching methods.[243] One section used a traditional casebook method; one used a problem method with problems the professor had developed and a "Hornbook"; and the third used a self-instruction method, using materials created by the professor as well a "Hornbook" on the subject.[244] The final examination had an essay, multiple-choice, and fill-in-the blank components.[245]

The three groups of students did show some differences in performance on the final examination.[246] For instance, according to the researcher, "the Problem method was significantly superior to the Self-instruction approach in preparing students for essay questions."[247] But "overall examination performance was only slightly affected by the various methods used to teach the course."[248] The professor concluded, "[T]he data do not allow us with confidence to differentiate between the Casebook method and the other two teaching methods."[249]

A scholar reviewing research on law teaching in the U.S., as well as research on other post-secondary teaching, found much support for conclusions similar to the Brigham Young study conclusion about relative equivalence in group teaching methods.[250] Still, this scholar also noted research that signaled apparent exceptions to the general equivalence of performance based on group teaching methods.[251] These exceptions included computer-aided instruction, particularly as a supplement, and cooperative learning approaches.[252] For some student populations, these exceptions also included "videotape as an instructional medium."[253]

This scholar posits two explanations for the general equivalence results.[254] First, he suggests that "learning characteristics of intellectually mature students are too complex and too variable to be uniformly affected by any single teaching method."[255] Second, he writes that "research shows that the multiple skill-objectives of the post-secondary course vary so widely in their contours . . . that no single group approach can be

243. Kimball, *supra*, note 242, at 196-99.
244. *Id.*
245. *Id.*
246. *Id.* at 200-02.
247. *Id.* at 202.
248. *Id.*
249. *Id.*
250. Teich, *supra* note 242, at 168.
251. *Id.* at 177, 181.
252. *Id.*
253. *Id.* at 181.
254. *Id.* at 168.
255. *Id.*

effective in all of even most content and skill areas."[256] He suggests that more individualized teaching approaches would be more effective, approaches that "take into account the uniqueness of each student and the individuality of his or her traits or aptitudes."[257]

While the approach I propose does not provide as individualized a curriculum as perhaps computer-aided instructional modules might, by drawing on the empirical cognitive research and incorporating a wide variety of teaching vehicles, it does aim to be more responsive than traditional lecture or Socratic dialogue to the individual learning modes of students with different preferred learning styles within the larger group. In this way, I hope to tailor the teaching to the most effective learning styles of more students in the large-group setting.

In addition, the research suggesting that teaching method per se may have little impact on examination performance does stand in distinct contrast to the extensive empirical research, for example, on cooperative learning that demonstrates statistically significant improvements in a number of types of learning, including critical thinking, for students when professors use cooperative learning approaches.[258]

Finally, a recent empirical study conducted in a law school involving law students also suggests that choice of teaching method can yield important positive results with respect to student exam performance.[259] The researchers in this study sought to test whether exam performance improves if students "are given practice exams that are similar to the actual exam"[260] along with responsive feedback on the practice exams and "explicit instruction on strategies for improving learning."[261] The researchers found that there was "a significant difference in performance . . . with those students receiving the [practice opportunities, feedback, and strategies], on average, faring better"[262] on both essays of the exam.

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256. *Id.*

257. Based on the research, to individualize instruction, Professor Teich recommended, inter alia, consideration of computer-aided instruction systems. *Id.* at 182.

258. *See supra* notes 58-99 and accompanying text. *See also* Teich, *supra* note 242, at 181.

259. *See* Andrea A. Curcio, Gregory Todd Jones & Tanya M. Washington, *Developing an Empirical Model to Test Whether Required Writing Exercises or Other Changes in Large-Section Law Class Teaching Methodologies Result in Improved Exam Performance*, 57 J. LEGAL EDUC. 195 (2007).

260. *Id.* at 201.

261. *Id.*

262. *Id.* at 198.

CONCLUSION

Each of the exercises described above benefits from the insights of the learning research. Each invokes the benefits of visual encoding. This may enable students to better recall the approach to analysis that the students perform on the stories. Instead of just having the words, they have encoded images related to their analysis of the relevant legal issues. A picture may be worth a thousand words if it helps students construct a better understanding of how to analyze a client's narrative and assess a case. From the study that investigated what students remembered from a psychology course, researchers found that students often remembered the videos—the visual features of the course.[263] Using such features as cooperative active learning platforms to trigger higher order critical thinking skills holds the promise of enhancing the learning of such skills by our students.

Each excerpt involves a story. The story is a rich vehicle that draws the learner in and furnishes the raw material for the legal analysis. Stories provide flexibility to faculty to explore issues with depth and directly or less deeply as an initial foray into issues that may challenge class comfort.

Each excerpt is a platform for active learning approaches. Each can be personalized by assigning a simple role. Each offers an opportunity for my students to enlarge their understanding and ability to identify, analyze, and evaluate the legal issues embedded within it. Consistent with the learning insights, these excerpts can help my students prepare for the life narratives of the clients of their future legal careers.

Similarly, these exercises further "themes that run throughout much of the learning theory research."[264] These themes emphasize the importance of reaching students to a greater extent through their various preferred learning styles. As one scholar summarizes:

> [E]ach student learns differently. Some learn best by visual methods (writing, charts, etc.); some learn best by auditory methods (lecture or student verbalization). Some students are abstract thinkers; others are concrete thinkers. Therefore, when teaching to a classroom of students, it is optimal to combine some form of all of these techniques in order to reach the largest number of students.[265]

By using visual story-based cooperative interactive problem-

263. *See* VanderStoep, *supra* note 146, at 89-92 (showing that students most frequently remembered vivid (visual) instructional techniques from the course).

264. *See* Roach, *supra* note 212, at 682.

265. *Id.* In this domain, Paula Lustbader, Gerald Hess & Laurie Zimet's work on "Teaching to the Whole Class" is highly instructive. Teach to the Whole Class, *supra* note 46.

solving and writing techniques, we enhance the likelihood of reaching students who learn better through visual input, through concrete application, through auditory input, through oral channels, through aural input, through kinesthetic approaches, as well as those who learn best through a combination of methods.

Beyond the clips themselves, the class discussions based on the clips often provoke laughter in our efforts to apply twenty-first century legal concepts to the sci-fi world of The Enterprise. We laugh together, which, so long as it does not distract from the learning, is, in my view, almost always a plus in a law school classroom. Laughter that emerges from the class discussion seems to help set my students at ease, reducing tension and enabling them to focus on complex analysis in a more relaxed way.[266] I often think the enterprise (small "e") then feels less intimidating.

Moreover, most of our students have grown up in a world of fast-paced visual stimuli. In our classrooms sits a generation of minds attuned to IM'ing, video games, and TiVo.[267] If it simultaneously can enhance learning, I am not averse to meeting them at least partway with respect to the teaching vehicles I choose.

Application of the insights from cognitive science may, so far, have proven the less traveled path for legal academics.[268] But it is time we journeyed there to make the difference in the learning of our students and ourselves. We can create learning-friendly and learner-centered classroom communities where all the students in the class sculpt and resculpt the topography of their mental models to understand how to think like lawyers and how lawyers think.

In the end, it is not what we teach but rather how and what students learn that should be the focus of our classroom community. Applying the insights of researchers who study how human beings learn furthers that aim.

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266. *See supra* note 187 and accompanying text (showing that humor can have at least a small positive impact on learning and discussing "disagreement" about "why humor might result in greater comprehension and recall." *Id.* at 296.).

267. Although I also use clips from recently-released films during the course, in this instance, by using older media materials, I am not plot-spoiling for films newly-released on DVD.

268. Robert Frost, *The Road Not Taken*, *available at* http://www.poets.org/viewmedia.php/prmMID/15717.