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Lessons Learned About Classroom Teaching from Authoring Computer-Assisted Instruction Lessons

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**LESSONS LEARNED ABOUT CLASSROOM TEACHING
FROM AUTHORIZING COMPUTER-ASSISTED
INSTRUCTION LESSONS**

Barbara Glesner Fines[†]

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I. INTRODUCTION

All good teaching has certain common elements. The teacher must select and master the subject matter and skills to be taught, organize learning activities that will actively engage students with that subject matter and allow practice of those skills, and provide prompt and constructive feedback. This article describes one tool for improved teaching: translating one's teaching into computer-assisted instruction. Computer-assisted lessons can be useful for students by providing an efficient and interactive method for learning, and supplementing or reviewing class materials.¹

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1. See Elizabeth G. Adelman, *CALI Lessons in Legal Research: Alternatives to Reading About Research*, 15 PERSP.: TEACHING LEGAL RES. & WRITING 25–30 (2006)

The process of authoring a computer-assisted lesson yields lessons for teachers in designing other learning activities and in-classroom teaching. This article describes the experience and observations of the author and discussions with other law faculty who have authored computer-assisted lessons through the Center for Computer-Assisted Legal Instruction (CALI[®])² authoring process.³ The article first describes the process of authoring CALI

(noting overwhelmingly positive student and faculty response to the integration of CALI lessons into the legal research curriculum at Georgia State University College of Law, with professors reporting that students who completed the CALI lessons tended to ask more insightful questions in class and to score higher on exams); Richard Warner et al., *Teaching Law with Computers*, 24 RUTGERS COMPUTER & TECH. L.J. 107 (1998) (noting the pedagogical benefits of using computer-assisted instruction); see also GERALD F. HESS & STEVEN FRIEDLAND, *TECHNIQUES FOR TEACHING LAW* 153–54, 165–66 (1999).

2. CALI is a federally-registered trademark of the Center for Computer-Assisted Legal Instruction. CALI: CENTER FOR COMPUTER ASSISTED INSTRUCTION, <http://www.cali.org> (last visited Nov. 17, 2011).

3. Many of the observations in this article are based upon my own experience working with the CALI authoring process and working with other CALI authors. Because I have not provided citations to external sources for many of my observations about CALI lesson authoring, my editors have requested that I detail that experience. I first began working with computer-assisted instruction in 1995. At the time, the authoring program CALI provided was the “CASE” programming system, which required some elementary programming ability to successfully complete a lesson. In 1995, CALI released the IOLIS authoring system, which permitted faculty to author lessons without any programming ability. Using that program, I wrote “Interpreting the Language of Conveyances,” which was awarded the Trautman Award for Lesson Authoring by CALI in 1996. I became a member of the CALI Board of Directors in 1998 and continued to author lessons using the new CALI Author program. During the 2002–03 academic year, I was one of five authors who was working in a collaborative authoring fellowship designing “Remedies” lessons. In 2002, I became the president of the CALI Board of Directors, a position I held until 2005. In June of 2004, I conducted a survey of twenty of the CALI fellows regarding the impact of authoring on their teaching overall [hereinafter *CALI Fellows Survey*]. Additionally, Deb Quentel, the CALI Director of Curriculum and Instruction, has collected observations of the CALI fellows, some of which are quoted on the webpage describing the CALI Fellowship program. Deb Quentel, *CALI Fellowships*, CALI, (May 30, 2009, 7:01 PM), <http://www.cali.org/content/cali-fellowships> [hereinafter *CALI Fellowship Program*]. Over the past ten years, I have continued to serve as a member of the CALI Editorial Review Board, reviewing other authors’ lessons. In addition, I have participated as an author in other CALI projects, such as the Crossword Puzzle Project and the Lawdible© Podcasting project, among others. A complete list of the lessons I have published through CALI is available online at *Barbara Glesner Fines*, CALI, <http://www.CALI.org/user/394> (last visited Nov. 17, 2011). In addition, I have authored other lessons for use by my students that are published through my own course webpages. For an example of the type of other lessons that I have authored, see *Active Listening Techniques*, UMKC.EDU, <http://law2.umkc.edu/faculty/profiles/glesnerfines/cali/listen/index.htm> (last

lessons. It then outlines the lessons about teaching in the classroom learned from the CALI authoring process. These lessons are:

- (1) Good Teaching Is Good Scholarship
- (2) Choosing a Destination Is Half The Battle
- (3) It's All About The Questions
- (4) The Wrong Answers Are the Most Important Questions
- (5) The Students' Viewpoint Counts

This essay explains each of these lessons with examples drawn from my own CALI lessons and those of other authors.

II. BACKGROUND ON AUTHORING COMPUTER-ASSISTED LESSONS

The Center for Computer-Assisted Legal Instruction is a non-profit consortium of law schools whose mission includes using “research, collaboration, and leadership to assist a diverse audience in the effective use of [computer] technology in legal education.”⁴ One of the longest standing projects of CALI is the creation and distribution of computer-assisted lessons in various legal subjects.⁵ At the time of this article, the CALI lesson library includes over 800 individual lessons in thirty-three law school subjects, including much of the first-year curriculum.⁶ Students at member schools run these lessons over one million times annually.⁷ Lessons are distributed to students and faculty at member law schools through the CALI website.⁸

Nearly all lessons in the library are written using CALI

visited Nov. 17, 2011).

4. *CALI's Mission Statement*, CALI, <http://www.cali.org/about/mission> (last visited Nov. 17, 2011).

5. For a history of CALI and the authoring projects it has undertaken since its founding in 1982, see John Mayer, *CALI Is a Community*, in *AAN HET WERK MET ICT IN HET ACADEMISCH ONDERWIJS: RECHTENONLINE* 51–60 (Anton Vedder ed., 2004), available at <http://www.rechtenonline.nl/upload/20096181011254207789897.pdf>.

6. See *CALI Lessons*, CALI, <http://www.cali.org/content/cali-lessons> (last visited Nov. 17, 2011).

7. *Id.* During 2010, over 60,000 students used CALI lessons. *Extreme Makeover: CALI Lessons Edition*, CALI (Aug. 10, 2011, 9:49 AM), <http://www.CALI.org/blog/2011/08/10/extreme-makeover-CALI-lessons-edition>.

8. CALI: CENTER FOR COMPUTER ASSISTED INSTRUCTION, <http://www.cali.org> (last visited Nov. 17, 2011). Faculty and students at member schools create personal accounts to access the library of lessons and other CALI tools. Each member school has a unique authorization code that permits faculty and students to create these accounts.

Author™,⁹ the authoring software developed by CALI and made available free of charge to faculty and students at member schools. With CALI Author, faculty members can write lessons for export to the faculty member's individual web pages or for publication in the CALI library. Lessons published through CALI are subject to an anonymous peer-review process through the CALI Editorial Board and through a separate editing by CALI staff.¹⁰

CALI also has commissioned lessons through its CALI Author Fellowship program and the Legal Research Community Authoring Project. The fellowship program involves four to six faculty members with extensive experience in teaching a particular subject working together as a team to develop lessons in their field. The fellowship process begins with an initial meeting to learn to use the authoring software and to consider proposed lesson topics. CALI's Director of Curriculum and Instruction prepares a topic grid based on a review of the contents of all major casebooks in the subject area, faculty syllabi from member schools, and discussions with members of the editorial board.¹¹ The faculty fellows review, reorganize, edit, and prioritize the topic grid before reserving particular topics for authoring. Each fellow is both the author of his or her own lesson and the editor of lessons by the other fellows. The fellows meet regularly to discuss issues they are facing in their lesson development. Thus far, CALI has had fellowship teams prepare lessons in Criminal Law, Property Law, Torts Law, Business Associations/Corporations, Remedies, Copyright, Trademark, Family Law, and Criminal Procedure.¹²

III. LESSONS LEARNED

The process of CALI authoring requires faculty members to author or script an entire lesson,¹³ and forces them to consider

9. CALI Author™ is protected by federal and state U.S. trademark law and is owned by the Center for Computer-Assisted Legal Instruction. CALI: CENTER FOR COMPUTER ASSISTED INSTRUCTION, <http://www.cali.org> (last visited Nov. 17, 2011).

10. Mayer, *supra* note 5, at 54–55. For a description of the peer-review process of the fellowship program, see *CALI Fellowship Program*, *supra* note 3.

11. E-mail from Deb Quentel, Dir. of Curriculum and Instruction, Ctr. for Computer-Assisted Legal Instruction, to author (Oct. 27, 2011) (on file with author).

12. *CALI Fellowship Program*, *supra* note 3.

13. Authors are encouraged to keep lessons focused on the amount of material they would ordinarily cover in a single class session. CALI coined the term "Lessonette™" to describe this discrete approach to lesson planning. Mayer,

carefully student learning more deeply than they might in preparing that same lesson to be taught in a classroom. The collaborative process of preparing or reviewing that lesson with other faculty provides feedback on teaching choices that is rare in the law school classroom. Overall, the CALI authoring process has many important lessons to offer that apply to all law school teaching.

A. *Good Teaching Is Good Scholarship*

The first way in which authoring a computer-assisted instruction lesson improves teaching is by emphasizing the hallmarks of good scholarship: thorough research and mastery of the subject and testing through collaboration and editing.

Writing a CALI lesson requires the same type of research, inquiry, and analysis as any other form of legal scholarship. One can author a CALI lesson on a subject that has been the subject of previous scholarship, but most CALI lessons, like most of the lessons we teach in a classroom, are not presentations of our latest research. However, authors of CALI lessons report that writing a CALI lesson is much like writing a law review article.¹⁴ CALI authoring requires faculty to thoroughly research their topic. Because the author is not only teaching the lesson, but also

supra note 5, at 51–52 (describing the justification for this approach to lesson authoring as a better tool for student learning based on educational research that supports “chunking” of material as a constraint of computer design in delivering text, and a strategic approach to encouraging faculty to author and use CALI lessons).

14. For example, among the advantages of authoring CALI lessons that were reported by faculty members at the conferences are that authoring permits faculty to “grow in their knowledge of the subject area,” “keep the material fresh and interesting for the author/instructor,” and “explore a topic in depth and repurpose the material for a law review article or presentation.” Nancy P. Johnson, Law Librarian & Professor of Law, Ga. State Univ. Coll. of Law Library & Deb Quentel, Dir. of Curriculum Dev. & Gen. Counsel at the Ctr. for Computer-Assisted Legal Instruction, Presentation at the Back to the Future of Legal Research Conference at Chicago-Kent College of Law: Interactive CALI Legal Research Lessons: Alternatives to Reading About Research (May 18, 2007), available at <http://www.kentlaw.edu/academics/lrw/future/handouts/Interactive%20CALI%20Legal%20Research%20Lessons.pdf>. Other authors characterize CALI authoring as providing an opportunity to “fill-in the gaps.” C. Steven Bradford, Professor, Univ. of Neb. Coll. of Law, Mary LaFrance, Professor, William S. Boyd Sch. of Law, & Robert Lind, Professor, Sw. Law Sch., Presentation at the CALI Conference for Law School Computing: Why Every Faculty Member Should Author a CALI Lesson (June 17, 2004), available at <http://www.youtube.com/watch?v=sklw6tw-F8> [hereinafter CALI Conference Presentation].

creating the teaching materials, the process of creating a CALI lesson requires a faculty member to systematically canvass the topic in order to choose what material to teach. Research into case law and commentary is necessary to construct hypothetical situations upon which questions can be built. All professors work to stay current in their understanding of their course topics, but inevitably have gaps in their knowledge. However, when writing a lesson for students who will be learning from a variety of textbooks and in a variety of jurisdictions, the faculty is compelled to look into all the little niches to make the lesson complete.¹⁵ Faculty members must fill the gaps in their knowledge in order to meet the learning needs of this broad audience of students.

In addition, authoring CALI lessons engages faculty in discussions with other faculty about the decisions made in crafting a lesson. Since the authoring process is not driven primarily by textbook content or personal interests and enthusiasms, the collaborative process of interaction with the CALI topic grid, and with other teachers (whether in authoring projects or through the editorial board), provides systematic examination of course coverage issues from a more global perspective. Just how important is the rule against perpetuities in today's property regime? Why exactly do I choose to spend four weeks on the personal jurisdiction cases and you choose only one?

These collaborative discussions lead faculty to articulate sometimes previously unrecognized justifications for selecting certain subject matter or approaches. For example, one professor may discover that the actual justification for her extensive coverage of personal jurisdiction cases is grounded in a desire to teach not only the doctrine and rules but also a broader legal methodology. Thus, her coverage of the doctrine might include the process of constitutional development of a particular standard, the tensions of federal and state power, and the process of choosing an appropriate rule regime. Another faculty member may prefer to convey these lessons through other materials and is more interested in students learning whether an individual can be sued in a particular jurisdiction. His approach might be oriented toward problems that allow students to apply the current doctrine. Because CALI lessons go through a rigorous peer review process, faculty authors receive critical feedback from others on these

15. See sources cited *supra* note 14.

coverage decisions. This process can reveal some choices of coverage goals that are not necessarily pedagogically sound; for other coverage goals, these discussions can clarify the learning outcomes a teacher expects from his or her coverage.

While the evidence connecting productivity in published scholarship and effectiveness in teaching is sparse,¹⁶ effective teaching unquestionably requires mastery of the subject matter being taught.¹⁷ Even though CALI authors in the fellowship process are selected for their experience and expertise in teaching the subjects of their lessons, most CALI authors report that authoring a CALI lesson increased their own understanding of the topic of their lesson.¹⁸ What CALI authoring teaches is that one's classroom teaching will be dramatically improved if the preparation for that teaching uses the same methods that one uses to produce an effective law review article: thorough research, careful analysis, and testing through peer review.

B. Choosing a Destination Is Half the Battle

A fundamental aspect of good teaching is setting clear learning objectives for students.¹⁹ In any given course, faculty must decide what body of knowledge the students must cover and what level of mastery they must achieve. This is the first step in assessing student learning. CALI authoring helps faculty to see how a concrete and appropriately limited learning goal for students directly and dramatically improves instruction.

16. Benjamin Barton, *Is There a Correlation Between Law Professor Publication Counts, Law Review Citation Counts, and Teaching Evaluations? An Empirical Study*, 5 J. EMPIRICAL LEGAL STUD. 619 (2008) (finding no or only a slight positive correlation between teaching effectiveness and any of the five measures of research productivity).

17. MICHAEL HUNTER SCHWARTZ, SOPHIE SPARROW & GERALD HESS, *TEACHING LAW BY DESIGN* 12–14 (2009); ROY STUCKEY AND OTHERS, *BEST PRACTICES FOR LEGAL EDUCATION* 105 (2007); K. Patricia Cross, *On College Teaching*, UNIV. OF CAL. BERKLEY CENTER FOR HIGHER EDUC. STUD. (Dec. 1, 2005), <http://escholarship.org/uc/item/2mg0z2vnj;sessionid=53B11249D0D9D98A30B7681598834871#page-1>.

18. See *CALI Fellows Survey*, *supra* note 3. Twelve of twenty faculty fellows reported that CALI authoring increased their substantive understanding. *Id.* For example, author Scott Burnham found that CALI authoring led him to a “discovery of sources not previously used or appreciated.” *Id.* Author Beth Adelman reports that as a result of authoring lessons, “I know my CALI author topics intimately.” *Id.*; see also CALI Conference Presentation, *supra* note 14 (reporting that CALI authoring requires him to “fill in the gaps”).

19. STUCKEY AND OTHERS, *supra* note 17, at 116–17.

At the university level for some time, and more recently at law schools, scholars²⁰ and accrediting agencies²¹ have called for a more formalized assessment of student learning. In law teaching, for too long, faculty have measured their success by their inputs, especially those inputs that involve the classroom—the carefully chosen course materials, the meticulously planned learning activity, the brilliantly delivered lecture—without asking whether all this teaching is actually resulting in learning.²² When we read the exams or papers at the end of the semester, and see that some percentage of the students did not learn what we expected them to learn, we may be inclined to blame the students. But in the end, this approach to teaching and evaluation is about as successful as blaming clients or judges for an unsuccessful practice.

Writing a CALI lesson requires first a consideration of what goals a teacher has for the students at the end of the lesson. In the CALI authoring process, the author must first select a topic for the lesson. Because the lesson is standing on its own, the author is forced to think carefully and precisely about the learning objectives for that lesson, in much the same way that an author of an article must zero in on a thesis.

One of the greatest benefits of the authoring communities that CALI creates is the dialogue over this choice.²³ Why is a lesson on a particular sub-branch of doctrine worth the effort of authoring a lesson? Even after choosing a topic area, the author must decide on the level of proficiency to be expected for student learning. Will this lesson introduce the subject, build on prior learning, or enrich understanding with advanced explorations?²⁴ The choice

20. SCHWARTZ, SPARROW & HESS, *supra* note 17, at 137; STUCKEY AND OTHERS, *supra* note 17, at 243; WILLIAM M. SULLIVAN ET AL., EDUCATING LAWYERS: PREPARATION FOR THE PROFESSION OF LAW 22 (2007) [hereinafter CARNEGIE REPORT].

21. See GREGORY S. MUNRO, OUTCOMES ASSESSMENT FOR LAW SCHOOLS 21–29 (2000) (describing origins of assessment movement); Janet W. Fisher, *Putting Students at the Center of Legal Education: How an Emphasis on Outcome Measure in the ABA Standards for Approval of Law Schools Might Transform the Educational Experience of Law Students*, 35 S. ILL. U. L.J. 225, 228–29 (2011) (reviewing the assessment movement at public universities and in legal education).

22. See MUNRO, *supra* note 21, at 57–60; CARNEGIE REPORT, *supra* note 20, at 188–89.

23. See *CALI Fellows Survey*, *supra* note 3. More than half of CALI Fellows surveyed reported that the authoring process improved their “selection of subject matter learning goals for students.” *Id.*

24. See Deb Quentel, *Authoring Tips*, CALI, <http://www.docstoc.com/docs/3671763/Authoring-tips> (last visited Nov. 17, 2011).

here, of course, is that of depth versus breadth.

As a practical matter, in most of our classes, breadth tends to win out by default, bowing to the ever-present drive for “coverage” implicit in the growing size of course books and the press of the “mile-wide and inch-thick” bar examination.²⁵ The range of choice of depth versus breadth in any one class is staggering. One can conceive of a particular case, statute, doctrine, or theory that could occupy all of the students’ learning for fourteen weeks if the level of expected proficiency were set high enough. On the other hand, it is difficult to identify a course in the curriculum for which *all* the doctrine, rules, policies, and context could be covered—even in cursory fashion—in fourteen weeks.

Consider a common initial learning task in law school: distinguishing between primary and secondary authority. At the most basic level, students must be able to define primary and secondary legal authority and recognize the most common categories of each. As soon as a student declares, “But it’s a U.S. Supreme Court case, of course it’s primary authority,” we recognize that students also need to be able to recognize the interactions of jurisdictional power and primary authority. At an even more sophisticated level, we may have distinctions within primary and secondary—differentiating, for example, between a law review article on international law by a recognized scholar, a law review article on domestic law by a recognized scholar, and a law review article by a student author. Were we to aim for mastery of this basic concept, we might ask students to consider why some authorities are considered binding and others not, and the circumstances in which otherwise binding precedent is subject to change. Many of us choose a proficiency goal for student learning that allows us to land somewhere in between becoming experts on the minutiae and becoming acquainted with the field. We may choose to dig deep on one topic in the course, but provide a cursory survey of others.

Beyond this syllabus-level examination of subject matter learning goals, with CALI lessons, faculty must zoom in on coverage issues regarding one particular topic in a systematic manner that

25. The criticism that the drive for coverage has eclipsed other learning goals is not confined to legal education. See DAVID N. PERKINS, MAKING LEARNING WHOLE: HOW SEVEN PRINCIPLES OF TEACHING CAN TRANSFORM EDUCATION 5 (2009) (“[N]arrow curriculum standards, bloated textbooks, and the pressure for coverage have led to a piecemeal curriculum. Every conceivable topic gets its fifteen minutes of fame.”).

faculty do not necessarily employ in designing day-to-day classes.²⁶ One might presume that coverage and organization issues with a lesson are perhaps easier in CALI authoring than in choosing what to include in a fifty-minute classroom session. With a computer-assisted lesson, space is limited only by the time a student is willing to devote to the lesson. One can give options to students to explore topics more or less deeply as they wish.

In fact, however, coverage and organization issues are perhaps more difficult in the CALI environment. Unlike the classroom, where students generally do not simply get up and leave when they are bored or confused, they readily will do so when interacting with a computer program. Likewise, in a classroom students can stay after class for additional questions and discussion, but in a computer environment, one can only guess whether the student is sitting at the screen wanting more.²⁷ For any given day in the classroom, the teacher has a good idea of what most students already have studied and what they are likely to be studying after that class. When designing a CALI lesson, coverage within an individual lesson must take into account a much broader level of student background study and a greater variety of organizational schemes for the materials. If authors hope to have other faculty recommend or assign the lesson, they must attend to other teachers' approaches to the subject matter.

This entire process leads the author to reevaluate his or her own course coverage and approach much more globally and rigorously. Why exclude a topic? Why isn't it important enough to teach? CALI lessons provide a very rigorous evaluation of coverage because, if faculty leave something out that is necessary, it will be painfully obvious later in the lesson. Faculty obtain a better sense of how topics play off each other than they might over the course of several class discussions. For example, in my own enthusiasm for

26. Debra Quentel, CALI Director of Curriculum and Instruction, reports that this is one of the most common observations she hears from authors. E-mail from Deb Quentel, Dir. of Curriculum and Instruction, Ctr. for Computer-Assisted Legal Instruction, to author (Oct. 26, 2011) (on file with author) ("We tend to teach a class in a seamless web way. We can combine material in ways that benefit from face-to-face feedback that we're getting . . . if we start down the path to step 4 without presenting step 3, we can detour and pick up step 3. Lessons require a specific path that can't be amended if we see the glassy eyes of confused students.").

27. CALI lessons do have a function in which students can e-mail the author for questions or comments; however, this is not the immediate feedback an after-class question can provide.

a subject upon which I had previously written a law review article, I decided to write a CALI lesson that explored minutiae of the topic.²⁸ The reviewers indicated the point at which the lesson was “over the top.” This caused me to not only reconsider the depth and coverage in that particular lesson, but also in other areas of classroom course coverage that may have been motivated more by my own enthusiasm or affection for a topic rather than considerations of its importance for student learning.

This is not to say that there is not a pedagogical benefit to be gained by choosing subjects simply because the teacher is passionate about the subject. Indeed, research indicates that teacher enthusiasm is a key component for effective student learning.²⁹ Moreover, one would not wish to underestimate the value of the implicit lessons of “love of learning” conveyed in classes chosen for passion rather than priority. Especially in authoring CALI lessons, instruction must provide intrinsic motivation in order to hold the students’ attention. Studies of computer gaming and learning motivation point to three key elements of instruction that foster this intrinsic motivation: “challenge, fantasy, and curiosity.”³⁰ A faculty member’s passion for his or her subject is often grounded in the challenge of a particular problem. The CALI authoring process allows one to bring to light the challenge that makes a particular problem or subject important and requires that one examine implicit justifications for course coverage.³¹

Some examples of choices about learning objectives that authors have debated in the course of CALI authoring include:

(1) Where in the students’ learning does this lesson come? Is this lesson primarily for background instruction, enrichment, or

28. See Barbara Glesner Fines, *Election of Remedies Doctrines*, CALI, <http://www.cali.org/lesson/784> (last visited Nov. 27, 2011).

29. Edward M. Bettencourt et al., *Effects of Teacher Enthusiasm Training on Student On-Task Behavior and Achievement*, 20 AM. EDUC. RES. J. 435, 440 (1983); Patricia Sanders & Jerry Gosenpud, *Perceived Instructor Enthusiasm and Student Achievement*, 13 DEV. BUS. SIMULATION & EXPERIENTIAL EXERCISES 52 (1986), available at <http://sbaweb.wayne.edu/~absel/bkl/vol13/13al.pdf>.

30. BADRUL HUDA KHAN, WEB BASED INSTRUCTION 181–82 (1997) (citing Thomas W. Malone, *Toward a Theory of Intrinsically-Motivating Instruction*, 4 COGNITIVE SCI. 333–69 (1981)).

31. Quentel, *supra* note 11. The author refers to this as the “golden nugget” approach to topic selection. “We prefer a lesson on a topic that you’re so passionate about that you would travel the country teaching just this bit of a course.” *Id.*

review? How much background do students need and how much can one presume that they know?

(2) How deep into the doctrine should the lesson delve? How many exceptions to the general rule are necessary or helpful? How many examples?

(3) What level of proficiency does the lesson expect? Benjamin Bloom's taxonomy of educational objectives,³² which builds objectives from basic knowledge (vocabulary) through synthesis and evaluation, provides a useful tool for deciding at what level of mastery a lesson is aimed. Early computer-assisted instruction was often aimed at a basic knowledge and recall level, but with branching and multiple question formats, the CALI lesson authoring process allows a faculty member to require more complex analytical tasks from students completing the lesson.

(4) From what standpoint is the student learning? As a policymaker? A lawyer practicing in a particular setting?

(5) How much linkage to other course work should be provided?

Beyond simply selecting subject-matter learning goals, most CALI authors find authoring has helped them to focus on the organization of learning.³³ Faculty find the process to be "an excellent organization exercise"³⁴ which "allows for more efficient allocation of topics to limited time available in a semester."³⁵ Faculty likely underestimate the extent to which students desire highly structured learning environments, perhaps because faculty generally personally prefer less structured learning environments for themselves.³⁶ Thus, again, the faculty member authoring a CALI lesson must make explicit and systematic choices about

32. See BENJAMIN S. BLOOM, TAXONOMY OF EDUCATIONAL OBJECTIVES, HANDBOOK I: THE COGNITIVE DOMAIN (1956). For a more recent update of Bloom's Taxonomy, see LORIN W. ANDERSON ET AL., A TAXONOMY FOR LEARNING, TEACHING, AND ASSESSING: A REVISION OF BLOOM'S TAXONOMY OF EDUCATIONAL OBJECTIVES (2000).

33. See *CALI Fellows Survey*, *supra* note 3. More than half of CALI Fellows indicated that CALI authoring improves their teaching by improving "organization of classroom lectures and dialogues." *Id.*

34. *Id.* (comment of author Rebecca S. Trammell).

35. *Id.* (comment of author Larrie Wilkins); see also *id.* (comment of author Deb Cohen). "Writing a CALI Lesson requires me to really break down the subject matter (even more than just preparing a lecture)." *Id.*

36. Joanne Ingham & Robin A. Boyle, *Generation X in Law School: How These Law Students Are Different from Those Who Teach Them*, 56 J. LEGAL EDUC. 281, 290 (2006).

organization of subject matter. What sequence makes the most sense? What background does the student need for each topic? If related topics are not going to be integrated in this lesson, does the lesson lay the groundwork for that integration elsewhere?

What makes this consideration of coverage and organization even more of a challenge is the demand of an interactive computer environment in which the majority of each lesson consists of questions or problems for students.

C. It's About the Questions

Because computer-assisted legal instruction is, by its very nature, designed to be interactive, a substantial portion of CALI lessons consists of questions and answers. In that way, CALI lessons are like the overwhelming majority of law school classes, which are taught by a dialogue method.³⁷ Writing CALI lesson questions emphasizes some of the key components of good questioning of students. As in the classroom, hypothetical problems form the backbone for these questions. CALI authors spend substantial time and effort in crafting fact scenarios and then constructing questions about those facts.

1. Translating Socratic Dialogue to Computerized Dialogue

Writing questions in a CALI lesson demands a degree of precision that the classroom or clinic does not, since the author in a CALI lesson has no opportunity to clarify or explain if his or her question is unclear. Authors need to consider their approach to questioning. Should questions ask students to recite or apply doctrine? Are there “right” answers or are you asking for consideration of alternative viewpoints or rules? Early computer-assisted instruction often replicated programmed learning approaches to teaching.³⁸ Programmed learning breaks down domain knowledge into very small parts and delivers this material

37. The case dialogue method has been characterized as the “signature pedagogy” of law schools. CARNEGIE REPORT, *supra* note 20, at 3 (“Law schools use [the] case-dialogue instruction in the first phase of their students’ legal education.”).

38. For a description of the history of computer-assisted instruction and the relationship between programmed learning, behaviorists learning theory, and computer-assisted instruction, see L. PAUL SAETTLER, THE EVOLUTION OF AMERICAN EDUCATIONAL TECHNOLOGY 307–11 (2004).

in a linear question and response format.³⁹ The pedagogical underpinnings of this approach were found in behaviorist learning theory.⁴⁰

Computer-assisted instruction in law quickly moved beyond limited-choice questions presented in a linear format. Of course, authors certainly may create a variety of traditional true-false or multiple-choice questions.⁴¹ However, just as in a classroom, CALI authors are encouraged to structure their questioning so that students will be asked additional questions or given different feedback if they choose one response rather than another. Through this “branching” capability, lessons can mirror Socratic dialogues.⁴²

The questions asked in a lesson reveal the level of proficiency students are asked to demonstrate. Some questions might be designed to test students’ knowledge of terminology, specific facts, elements, or doctrines. CALI authors must consider the question of prior student learning in asking these questions, but they can also give the students hypertext hints or text references that students can use to answer a question successfully.

Authors sometimes use CALI lessons to help students not only to understand basic legal materials, but also to develop students’ skills in close, analytic reading. Questions may ask students to classify or paraphrase a legal doctrine, case, or statute.⁴³ In reading statutes and rules, students often neglect conditional statements at

39. For a description of early paper-based programmed instruction workbooks and their influence on computer-aided legal instruction, see Roger Park & Russell Burris, *Computer-Aided Instruction in Law: Theories, Techniques, and Trepidations*, 3 L. & SOC. INQUIRY 1, 5–7 (1978).

40. See SAETTLER, *supra* note 38, at 69–72.

41. See Park & Burris, *supra* note 39, at 12–13.

42. John Mayer et al., *How to Write a CALI Lesson Using CALI-IOLIS*, CALI (Dec. 1995), <http://web.archive.org/web/200012100207/http://www.cali.org/iolis/toc.html> (“When properly constructed, an exercise will ask questions and respond to the student’s answers in the same manner a law professor would in the classroom or in the professor’s office. The challenge in authoring effective computer-based exercises is to pre-program dialogues that anticipate these features.”).

43. See, e.g., Elaine Shoben, *Unclean Hands*, CALI, <http://www.cali.org/lessons/web/rem07/jq.php#Review-CasetoRead> (last visited Nov. 21, 2011) (providing students with an excerpt summarized and edited from a state court opinion concerning the unclean hands defense and asking students to identify where in the opinion the court laid out the elements of the unclean hands defense); see also Scott Burnham, *UCC Remedies: An Introduction*, CALI, <http://www.cali.org/lessons/web/con49/jq.php#Q11> (last visited Nov. 21, 2011) (asking students to identify the portion of the Uniform Commercial Code that solves a problem).

the beginning of the section or do not note whether terms are conjunctive or disjunctive. Questions can be used to reinforce the importance of attention to these areas of reading by directing students to consider the structure of a law or rule through flowcharts or other graphics linked to the text of the law⁴⁴ or through questions that closely examine each part of the statute and then relate those parts together.⁴⁵ In the CALI lesson drag-into-category question type, for example, students might be asked to organize elements of a statute or rule.⁴⁶

CALI lesson questions can march students step-by-step through a rule or doctrine as slowly or as quickly as the student wishes. In class, these same types of questions sound like “Did you do your homework?” questions. While these questions do assess the level of student preparation, they do not use class time well, as they tend to waste time for those students who are prepared, communicate an expectation that students may not be prepared, and require careful correction for those who are not prepared.⁴⁷ The more students are encouraged to do active, close reading in their class preparation, the better class time can be used for other, higher-level skills. Authors of CALI lessons quickly become convinced of the value of homework that includes opportunities for students to test their knowledge before they arrive at the door of the classroom.

44. William Anderson, *Basic Structure of the Federal Administrative Procedure Act*, CALI, <http://www.cali.org/lessons/web/adm06/flash.php> (last visited Nov. 21, 2011) (providing an excellent example of a lesson that “unpacks” a law, which introduces students to the federal Administrative Procedure Act with special emphasis on mapping the relationship of its parts and closely examining the text of the principal sections); see also Craig Callen & Delicia Bryant, *Federal Rule 801(d) and Multiple Hearsay*, CALI, [http://www.cali.org/lessons/web/evd15/jq.php#Reviewing801\(d\)\(2\)\(A\)/flowchart](http://www.cali.org/lessons/web/evd15/jq.php#Reviewing801(d)(2)(A)/flowchart) (last visited Nov. 21, 2011) (providing interactive flowcharts for learning the rule).

45. C. Steven Bradford, *What Is a Director’s Conflicting Interest Transaction?*, CALI, [http://www.cali.org/lessons/web/corp07/jq.php#Definition Breakdown](http://www.cali.org/lessons/web/corp07/jq.php#Definition%20Breakdown) (last visited Nov. 21, 2011) (displaying parts of the relevant statute in different colors, providing an alternate page in different fonts for those unable to distinguish colors, and listing questions that require students to apply each subsection).

46. See, e.g., Barbara Glesner Fines, *Choosing and Withdrawing from Representation*, CALI, [http://www.cali.org/lessons/web/pr12/jq.php#Question 11-2](http://www.cali.org/lessons/web/pr12/jq.php#Question%2011-2) (last visited Nov. 21, 2011) (instructing students to categorize different fact situations into different categories created by the rule).

47. Barbara Glesner Fines, *The Impact of Expectations on Teaching and Learning*, 38 GONZ. L. REV. 89, 114–16 (2002–03) (describing how expectations of preparation can be communicated).

Just as in class, immediate corrective feedback characterizing an answer as correct or incorrect can be delayed in CALI lessons as the student is directed to a series of additional lesson pages whose content varies according to his or her response.⁴⁸ This “branching” capability of lesson authoring software means that lessons can truly mimic classroom dialogue.⁴⁹ Students can be asked a series of hypotheticals in which they are placed in the role of a clerk or attorney resolving issues in an office or court.⁵⁰ Questions need not necessarily result in correct or incorrect responses, but can simply challenge students to choose positions and defend those positions, whether in legal analysis of a problem or on a policy level in choosing rules.⁵¹

However, the CALI authoring process requires faculty to think through many different branches of a dialogue and consider how to respond to each. That highly refined consideration of the components of a dialogue—both the questions and the responses—presents important lessons for faculty engaged in classroom dialogue or office conferences. A poorly constructed Socratic dialogue lacks direction and feedback, consisting of a series of questions followed by “do you agree” or “what if” with no feedback to students regarding their answers. Feedback is essential to student learning. “Opportunities for feedback should occur continuously, but not intrusively, as a part of instruction.”⁵² Because every response in a CALI lesson page requires the author

48. See, e.g., Jennifer Martin, *Bilateral & Unilateral Contracts*, CALI, <http://www.cali.org/lessons/web/con45/jq.php#Question 13> (last visited Nov. 21, 2011). The author poses a hypothetical of a conversation between two individuals and asks a simple yes/no question regarding whether there was a contract. *Id.* Depending on the answer, the student is then given additional facts or provided portions of the Restatement in order to inform their analysis so that they understand how to analyze the question step-by-step. *Id.*

49. Visual representations of “branching” in lessons can be seen using the lesson mapper feature associated with each CALI lesson. See, for example, David Welkowitz, *Registration and Section 44*, CALI, <http://www.cali.org/lessons/web/tm21/jq.php#Contents> (last visited Nov. 21, 2011), to view a graphic depiction of the lesson which shows very extensive branching.

50. For example, CALI lessons include settings in which students are asked to act as a clerk to the Chief Disciplinary Counsel in reviewing a range of referrals to the office. Barbara Glesner Fines, *Basis for Attorney Discipline*, CALI, <http://www.cali.org/lessons/web/pr11/jq.php#Your job> (last visited Nov. 21, 2011).

51. See *supra* text accompanying note 50.

52. NAT’L RESEARCH COUNCIL, COMM. ON DEVS. IN THE SCI. OF LEARNING, HOW PEOPLE LEARN: BRAIN, MIND, EXPERIENCE, AND SCHOOL 140 (John D. Bransford et al. eds., expanded ed. 2000) [hereinafter NAT’L RESEARCH COUNCIL].

to make a choice about how to respond, authors consider very carefully the form and sequence of feedback to students, providing important lessons for that same feedback process in the classroom.

If a student answers a question correctly, should they simply be told “right” or “good?” CALI lesson authors rarely provide so little feedback even to a correct answer, but rather reinforce the answer with an explanation of how or why the answer is correct, often with citations to authority. After all, just because the student provides the correct answer does not necessarily mean that they understand completely and clearly. Likewise, in the classroom, reinforcement of correct answers reinforces the understanding of the student responding and provides additional explanation for those students listening. CALI authors sometimes also challenge students to defend even a correct answer, which helps to eliminate guessing and refines a student’s judgment.⁵³

When students get answers wrong, CALI lesson authors have to decide how to tell the student they are wrong. In class, a professor can say “no” or “wrong” or “nice try” or any other brief corrective and can do so in a tone and with a facial expression that encourages the student to keep trying. Maintaining a positive, authoritative but not authoritarian tone in written feedback is important to student learning,⁵⁴ but especially so in a computer-assisted lesson, as students can simply click the X to avoid comments that cut too closely. Thus, CALI authors learn to develop “coaching” tones in their feedback to incorrect answers. While some faculty choose “no,” “wrong,” or some other direct phrase, others take a more collegial tone:

Some authors prefer a more collegial tone or a “lighter” touch and use phrases such as “I agree” or “I disagree.” The latter phrases have a number of benefits. First, phrases such as “I agree” or “I disagree” seem to make the student and the instructor partners in working through the material. Therefore, while the student is working with a computer, the student appreciates that there’s a professor behind the material. Second, many authors

53. See, e.g., David Welkowitz, *Joinder of Claims and Parties*, CALI, <http://www.cali.org/lessons/web/civ18/jq.php#Party7Y-1> (last visited Nov. 11, 2011) (asking students “Are you sure you don’t want to change your answer?” to confirm their confidence in an answer).

54. See Kirsten K. Davis, *Building Credibility in the Margins: An Ethos-Based Perspective for Commenting on Student Papers*, 12 LEGAL WRITING: J. LEGAL WRITING INST. 73, 87 (2006).

believe the latter feedback is less harsh; a concern many instructors have in an interactive faceless environment, where students have more freedom than they have in the class, and where students can walk away from the tutorial at anytime.⁵⁵

Just as in classrooms, however, an author may not want to correct a student's statement immediately. Instead the student might be told to read additional materials or check their assumptions or understandings and "try again."⁵⁶ Lessons can even branch from wrong answers to "remedial branches" to review or reinstruct the key concept being tested.

Classroom teachers must consider how to respond when students give incorrect responses, too.⁵⁷ However, faculty in the classroom do not have the opportunity to reflect on their responses as carefully as when authoring a CALI lesson. Do they tell the student, "Wrong"? Do they ask the student to reconsider? Do they ask another student to respond? In the classroom, these decisions are made on the fly. The incentive of CALI authoring to pay close attention to responses to incorrect answers can inform these classroom responses. The feedback provided to incorrect responses is perhaps some of the most important feedback given in a classroom, since it is the wrong answers that generate the greatest learning.⁵⁸

55. Samuel Goshom, *What Sort of Feedback Does the Student Get? And, What Type of Information Should I Include in a Feedback Box?*, CALI (Sept. 21, 2009, 1:24 AM), <http://www.cali.org/faq/7979>.

56. See, for example, the tone of the feedback throughout Mary LaFrance's *Joint Works* lesson on CALI. Mary LaFrance, *Joint Works*, CALI, <http://www.cali.org/lessons/web/cpy02/jq.php#Royalties> (last visited Nov. 21, 2011).

57. Daniel Keating et al., *Responding to Wrong Answers*, in *TECHNIQUES FOR TEACHING LAW II* 112–13 (Gerald F. Hess et al. eds., 2011) [hereinafter *TECHNIQUES FOR TEACHING LAW II*].

58. Mayer, *supra* note 5, at 53 (citing THE WRITINGS OF ROGER C. SCHANK, *VIRTUAL LEARNING: A REVOLUTIONARY APPROACH TO BUILDING A HIGHLY SKILLED WORKFORCE* (1997)) ("[P]eople don't learn UNLESS they make mistakes[, and] it is the instructor's duty to steer students INTO the potholes. It is only at that point that the student is motivated to learn."); see, e.g., ROGER C. SCHANK, *MAKING MINDS LESS WELL EDUCATED THAN OUR OWN* 136 (2004) ("Failure is where it all starts. We are receptive to new stories, new information of any kind, at the failure points. . . . Changing our mental structures, what we think about how things work, is what learning is all about.").

2. *The Wrong Answers are the Most Important Questions*

One of the first dilemmas in designing a CALI lesson is the question of how readily students should be able to answer correctly. Since CALI lessons are scored, some students become very distressed if questions are asked without a way for the students to ensure they are choosing the correct response. Some CALI authors provide “research” opportunities for students when answering a question, through hypertext links on a toolbar or in the text of the question to the rule, case, or doctrine being discussed.⁵⁹ Likewise, faculty in some classes provide students detailed guidance for who will be called upon to answer what questions in a classroom, lest the students feel embarrassed by not being able to answer correctly. However, is this essential to effective learning? Early computer-assisted instruction was built upon behaviorist models of learning. In these early “programmed learning” models, it was important that students would rarely fail. “[T]he avoidance of errors is important for two reasons. First, any student error should not be practiced because, in order to correct the error, unlearning and relearning are required. Second, the student’s response must be in agreement with the feedback [provided immediately after the response] to be reinforcing.”⁶⁰ This same theory of error proofing the learning environment was promoted for classroom learning as well. One classic model for designing learning activities in the classroom suggested that “at the beginning of learning, correct answers are most enabling. Therefore, it is recommended that the teacher at first call on able students to avoid incorrect answers, which can ‘pollute’ the learning”⁶¹

59. Many lessons use hypertext links to pop-up pages providing definitions, cases, and statutes. An excellent example is Scott Burnham, *A Copyright Primer*, CALI, <http://www.cali.org/lesson/554> (last visited Nov. 21, 2011), which uses hypertext links to take you to cases and statutes, and provides addresses for websites where you can obtain additional information. Some faculty capture these links into a toolbar that appears throughout the lesson, or a portion of the lesson, so students can have the rule at hand at any time. For example, Barbara Glesner Fines, *Choosing and Withdrawing from Representation*, CALI, <http://www.cali.org/lesson/658> (last visited Nov. 21, 2011), provides a toolbar link to Rule 1.16 throughout the withdrawal portion of the lesson.

60. Roger Park & Russell Burris, *Computer-Aided Instruction in Law: Theories, Techniques, and Trepidations*, in *TEACHING LAW WITH COMPUTERS: A COLLECTION OF ESSAYS* 91, 94 (Russell Burris et. al. eds., 1979).

61. Madeline Hunter & Doug Russell, *Planning for Effective Instruction: Lesson Design*, in *ENHANCING TEACHING* 87, 91 (Madeline Hunter ed., 1994).

However, recent research in learning indicates that there is value in asking students questions for which they do not know the answers. Getting answers wrong the first time improves overall learning of a subject.⁶² This suggests that an effective way to begin a lesson is to pose a question or problem that is challenging and engaging, and that highlights the outcomes sought from that lesson and the reasons those outcomes are important.

Some wrong answers are especially important to generate because they uncover fundamental misunderstandings that block learning. Students construct knowledge by building on prior understandings. If those prior understandings are incomplete or incorrect, new learning will be flawed as well. Thus, “[T]eachers need to pay attention to the incomplete understandings, the false beliefs, and the naive renditions of concepts that learners bring with them to a given subject.”⁶³

An example from the first-year Property curriculum is instructive. Students often have a very difficult time learning the concept of competing chains of title. However, for many students, the only property they have ever owned with which they associate the word “title” is their automobile, where the title to the car is represented by a piece of paper that serves as authoritative proof of ownership. They assume that if there were two separate titles to an automobile (that is, two separate documents), one of them would easily be identified as fraudulent or void. Carrying that same documentation and registration experience into the discussion of titles to land blocks their ability to appreciate the concept of title as a right of ownership independent of a document. Thus, the property professor must first “unlearn” the students’ understanding of title to effectively teach the new concept.

Authors of CALI lessons have to think about these preconceptions and misunderstandings in a very systematic way. Many of the question types, such as multiple choice or short answer, require an author to create wrong answers. For these questions to assess student learning (rather than simply the ability to choose a likely response), these wrong answers cannot be merely filler but must be wrong answers that students are likely to choose. This requires CALI authors to think carefully about how someone

62. Henry L. Roediger & Bridgid Finn, *Getting It Wrong: Surprising Tips on How to Learn*, SCI. AM. (Oct. 20, 2009), <http://www.scientificamerican.com/article.cfm?id=getting-it-wrong>.

63. NAT’L RESEARCH COUNCIL, *supra* note 52, at 10.

new to the subject is likely to misunderstand that subject.

How do authors generate these “wrong answers?” Some wrong answers are found in history as legal doctrines develop and courts acquire more sophisticated understandings. Some are found in the losing arguments reported in cases. Some of the most fundamental misunderstandings that students bring to a subject from their own experience (or from bad course outlines passed around from prior semesters) must be discovered in the classroom. Brief classroom assessment devices such as “minute papers” or statements for the students to complete can easily generate a range of incorrect or incomplete understandings for any given topic.⁶⁴ Summative assessments such as final exams or papers can identify those misconceptions that are the most stubborn.

After writing an excellent lesson replicating classroom dialogue on a particular topic, a faculty author may then ask, “Now what do I do in class?” Simply repeating the content and method of the CALI lesson in class is not desirable or effective. The faculty member who has used much of classroom instruction for basic delivery of subject matter will be challenged by CALI authoring to discover new and different uses for classroom time. Obviously there is a social element to education, and regular class meetings provide a disciplined regulation of a student’s schedule of learning. CALI lessons provide efficient, effective, and interactive delivery of the subject and some of the basic analytical skills previously delivered in the classroom, with the feedback that gives students the confidence that they have mastered these materials. Consequently, class time can be turned toward learning activities for which face-to-face meeting is more critical: simulations and practice of lawyering skills⁶⁵ or creative and exploratory dialogue

64. For a more complete description of how to use classroom assessment techniques, see Barbara Glesner Fines, *Classroom Assessment Techniques for Law School Teaching*, U. MO. KAN. CITY SCH. L., <http://law2.umkc.edu/faculty/profiles/glesnerfines/cats.htm> (last visited Nov. 21, 2011).

65. For example, rather than spend class time in Professional Responsibility on doctrinal details of admission to practice, I assign my CALI lesson on the subject. See generally Barbara Glesner Fines, *The Law Governing Admission to Practice Law*, CALI, <http://www.cali.org/lesson/656> (last visited Nov. 21, 2011). I then spend class time on an interviewing exercise in which the students conduct an interview of a law student who has been denied permission to take the bar examination. See generally Barbara Glesner Fines, *Teaching Empathy Through Simulation Exercises—A Guide and Sample Problem Set*, SOC. SCI. RES. NETWORK (Working Paper Series), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1304261. Likewise, CALI author Wilson Freyermuth reports that

and debate, for example.⁶⁶ At least one CALI author has used CALI lessons to develop an entirely online version of his class.⁶⁷

What CALI lesson authoring teaches is that some class time needs to be devoted to uncovering and addressing fundamental misconceptions. Learning is most effective if learners “work on the hard parts.”⁶⁸ To do this, students must be given opportunities for error, must receive prompt feedback on the nature of the error, and, most importantly, must be given the opportunity to try again. Classroom time spent on this cycle of problem, error, correction, and return to the problem is time much better spent than time spent on reviewing content and confirming homework. If the “wrong answers” students regularly provide are sufficiently fundamental and pervasive, they can become a core theme to a course. In *Understanding by Design*, authors Grant P. Wiggins and Jay McTighe encourage faculty to focus on “Big Ideas” of a course and suggest that becoming aware of predictable misunderstandings is foundational.⁶⁹ Thus, for example, much of the first year of law school is devoted to “unteaching” the positivist philosophy of students who believe the law is resolutely determinate.⁷⁰ By focusing on wrong answers in creating CALI lessons, authors are led to carefully uncover these misunderstandings.

D. *The Student’s Viewpoint Counts*

The final lesson taught by authoring a CALI lesson is the need to think carefully about when and how students learn. Students spend much more time learning out of the classroom than in it,

“rather than spending class discussion on the very basics of the adverse possession standard, I assign the adverse possession lessons and use the extra day to do a client interviewing and counseling exercise involving adverse possession law.” *CALI Fellows Survey*, *supra* note 3.

66. Richard Warner et al., *Teaching Law with Computers*, 24 RUTGERS COMPUTER & TECH. L.J. 107, 129 (1998) (suggesting that computer tutorials are effective mechanisms for teaching black-letter basics of law so classroom time can be spent on more advanced topics).

67. Professor Len Biernat, of Hamline Law School, reported, “The Family Law Fellowship enabled me to get an understanding of the value and importance of on-line education. With my experience using CALI-Author software, I was able to develop a Professional Responsibility course that was entirely on-line.” *CALI Fellowship Program*, *supra* note 3.

68. PERKINS, *supra* note 25, at 83–89.

69. GRANT P. WIGGINS & JAY MCTIGHE, *UNDERSTANDING BY DESIGN* 42, 143 (2005).

70. James Maule, *Crumbling Myths and Dashed Expectations*, in *TECHNIQUES FOR TEACHING LAW II*, *supra* note 57, at 90–91.

but most discussions of teaching focus on the classroom. Moreover, we know that students in our classroom have a diversity of learning styles, but we may have difficulty accessing those viewpoints without collaborating with other instructors and with our students.

CALI authoring helps faculty view their teaching through the eyes of a student in three ways: through the “team-teaching” aspect of authoring, through the translation of lessons into the computer medium, and through the feedback CALI lessons invite from students.

Faculty rarely subject their teaching or scholarship to systematic peer review. Most law review scholarship is largely reviewed and edited by law students.⁷¹ Team teaching in legal education is a rarity⁷² and teaching texts rarely address the issue.⁷³

71. Nancy McCormack, *Peer Review and Legal Publishing: What Law Librarians Need to Know About Open, Single-Blind, and Double-Blind Reviewing*, 101 LAW LIBR. J. 59, 61 (2009).

72. Barbara Glesner Fines, *Competition and the Curve*, 65 U. MO. KAN. CITY L. REV. 879, 906 (1997); see also Roger C. Cramton, *The Current State of the Law Curriculum*, 32 J. LEGAL EDUC. 321, 327–28 (1982) (“The Lone Ranger theory of legal education . . . involves an implicit compact (some would call it a conspiracy) among faculty members: ‘You do your thing in your courses as long as I am permitted to do my thing in mine.’”).

73. Neither the *Carnegie Report* nor *Best Practices* discuss team teaching. Examples of team teaching in the teaching literature are few and tend to involve clinical, skills-based, or interdisciplinary instruction. For example, in their 1999 law school teaching text, Professors Hess and Friedland make no reference to team teaching. See GERALD F. HESS & STEVEN FRIEDLAND, *TECHNIQUES FOR TEACHING LAW* (1999). In the 2004 edition of their text, with contributions from 170 different law teachers, team teaching is only mentioned twice: once in a two-hour (not two credit-hour) class on pleadings and once in an essay on “coordinated” courses. Robert P. Burns, *Evidence and Trial Advocacy Courses, Side by Side*, in *TEACHING THE LAW SCHOOL CURRICULUM 192–93* (Steven Friedland & Gerald Hess eds., 2004); John P. Lenich, *Pleading Workshop, Evidence and Trial Advocacy Courses, Side by Side*, in *TEACHING THE LAW SCHOOL CURRICULUM 42–43, 192–93* (Steven Friedland & Gerald Hess eds., 2004). In their 2011 edition of the text, the value of collaboration among teachers is a bit more evident, with a discussion of the value of watching one another teach and discussing our teaching with one another. Gerald F. Hess et al., *Collaborating with Colleagues*, in *TECHNIQUES FOR TEACHING LAW II*, *supra* note 57, at 312–13; Sophie Sparrow, *Are We the Teachers We Think We Are? Observing Others Teach—Lessons for the Teacher*, in *TECHNIQUES FOR TEACHING LAW II*, *supra* note 57, at 312–13, 316–17. Essays in the text that describe co-teaching involve the collaboration of an academic support professor (David Nadvorney) and doctrinal professor (Deborah Zalesne) in teaching students note-taking skills, and the collaboration of Professors Eve Biskind Klothen and Sarah Ricks in a writing course. Eve Biskind Klothen & Sarah Ricks, *Teaching Upper-Level Legal Research and Writing in a Hybrid Clinic/Writing Course*, in *TECHNIQUES FOR TEACHING LAW II*, *supra* note 57, at 185–86; David Nadvorney & Deborah Zalesne, *Integrating*

In contrast, CALI lessons are the product of peer collaboration,⁷⁴ anonymous peer review, professional editing,⁷⁵ and regular student feedback. The CALI authoring process engages faculty in intensive discussions of the varieties of ways to convey information and engage students in learning. How can a law school instructor replicate this collaborative process in teaching? Obviously, team teaching a course might lead to some of the same benefits, but only if the faculty members are truly a “team” in teaching the course, rather than just sharing a course. True team teaching is more akin to a three-legged race than a relay. Some of the same benefits of true team teaching can result from other collaborations with colleagues who teach the same course. For example, over the past ten years, my Family Law colleague and I have shared our class notes and lesson plans from semester to semester and collaborated on a common syllabus. This has led to some of the same discussions and peer review as provided by the CALI lesson authoring process. Designing one’s own learning materials for a class, even if not computerized, will force similar reflections if one shares those materials with others teaching the same course. Curriculum mapping⁷⁶ projects that some law schools have undertaken as part of their assessment projects can also generate these discussions.

However one finds a system for regular and rigorous review of one’s teaching choices, there is little doubt that this exchange improves teaching. As one author noted, “CALI peer reviews during the authoring process have expanded my perspective of how different students react (and respond) to different types of questions and feedback.”⁷⁷ Another CALI author summed up the

the Skill of Note-Taking into a Doctrinal Class, in *TECHNIQUES FOR TEACHING LAW II*, *supra* note 57, at 31–32.

74. Faculty do share drafts with one another, but not through a formal or anonymous process. See Arthur D. Austin, *The “Custom of Vetting” as a Substitute for Peer Review*, 32 ARIZ. L. REV. 1, 7–8 (1990) (arguing that the “vetting” process is an inadequate substitute for peer review).

75. Deb Quentel, CALI Director of Curriculum and Instruction, personally reviews and edits each CALI lesson.

76. See Debra Moss Curtis & David M. Moss, *Curriculum Mapping: Bringing Evidence-Based Frameworks to Legal Education*, 34 NOVA L. REV. 473, 474–87 (2010) (describing the process of curriculum mapping and its application to law school).

77. *CALI Fellows Survey*, *supra* note 3 (quoting Ed Martin). See also comments of author Andrea Charlow, who found that “preparing CALI exercises . . . made a difference in how I teach and think about my subject. It was very helpful to hear the views and teaching methods of the other fellows, and student comments helped me to better understand student needs.” *CALI Fellowship Program*, *supra*

collaborative process in this way: “The conversations with other fellows gave me, more than once, a new perspective that helped put everything together.”⁷⁸

A second way in which CALI authoring provides a different lens on student learning is through the feedback students provide to lessons generally and to the use of lessons in classes. Students generally appreciate CALI lessons,⁷⁹ and empirical studies of the effectiveness of computer-assisted instruction indicate that it is effective and efficient in increasing student performance.⁸⁰ Faculty can use CALI lessons to provide feedback on student learning in their classes. By using the LessonLink feature,⁸¹ faculty can track student use and performance and obtain feedback on student understanding while there is still an opportunity to improve that understanding. Students can also provide direct feedback to CALI authors through the comment button that is present in every lesson. Over the years, I have had several students argue with my conclusions, correct my citations, or thank me for the guidance I have provided in my CALI lessons. Since I do not know who the students are or even what law school they are attending, I know that the students are not trying to ingratiate themselves to me, as I may suspect from time to time from a student’s comment after one of my classroom sessions. Faculty can provide students this type of regular feedback loop on their own classroom teaching on a lesson-by-lesson basis through solicitations of anonymous suggestions or through prompted “minute papers.” For most students, an invitation for feedback about teaching comes only at the end of the semester. Whether assessing student learning or assessing one’s own teaching, the features of CALI lessons remind authors that ongoing assessment is available simply by asking.

Third, translating lessons into a computerized medium forces consideration of the variety of student learners. The standard classroom and the standard textbook have traditionally been

note 3.

78. *CALI Fellowship Program*, *supra* note 3.

79. “[I]n virtually every study of CALI [computer-assisted legal instruction] usage in law schools, students have indicated that they enjoyed learning via the computer.” Michael A. Geist, *Where Can You Go Today?: The Computerization of Legal Education from Workbooks to the Web*, 11 HARV. J.L. & TECH. 141, 152 (1997).

80. Paul F. Teich, *How Effective Is Computer-Assisted Instruction—An Evaluation for Legal Educators*, 41 J. LEGAL EDUC. 489, 492–94 (1991).

81. See generally Austin Groothuis, *What Is a LessonLink?*, CALI (Sept. 17, 2009, 10:38 AM), <http://www.cali.org/faq/7812> (providing a brief description and video of the LessonLink feature).

visually barren. CALI authors are encouraged to include graphic and visual elements in their lessons but are also called upon to justify the visual elements they do include. Is that picture simply eye candy, or does it help explain the concept being discussed? Could those concepts be conveyed in a flow chart or on a spectrum as well as in narrative? CALI authors find that CALI authoring has improved their use of graphics and visual elements in teaching.

Considering lessons from the perspective of visual learners is more important than ever. Information is increasingly depicted in visual forms as a way of organizing and conveying connections among the glut of ideas and information available today.⁸² Clear and compelling graphics and graphic representations of concepts can reveal some understandings more readily than other methods of instruction.⁸³ Just as the development of cartography revolutionized our understanding of our world, so too can graphical representations of legal knowledge help students “to challenge one’s assumptions, to recognize new patterns, to make new connections, and to visualize the unknown.”⁸⁴

Moreover, our classrooms increasingly support visual elements (e.g., PowerPoint, smartboards, etc.), which can be used badly. The introduction of PowerPoint slideshows is an excellent example of a technological tool that has decreased interaction and, at its worst, turned teaching into text-dense wall reading.⁸⁵ CALI authoring increases the visual sophistication of faculty, with the availability of an editorial board to comment on graphic elements in lessons and a professional artist to generate compelling visual representations. In the CALI Legal Educations Commons, CALI Illustrations are available under a creative commons license for use

82. DAVID HYERLE, *VISUAL TOOLS FOR CONSTRUCTING KNOWLEDGE* 9 (1996).

83. See William R. Andersen, *Computer Graphics in the Teaching of Administrative Law*, 38 *BRANDEIS L.J.* 229, 234 (2000) (“Graphics have a very explicit character. If you are ambiguous or uncertain about something, it is likely to show. . . . [Y]ou might find that a piece of analysis you thought was precise enough for a verbal medium needs to be refined to present it accurately in a graphic medium.”); Lisa T. McElroy & Christine N. Coughlin, *The Other Side of the Story: Using Graphic Organizers to Counter the Counter-Analysis Quandary*, 39 *U. BALT. L. REV.* 227, 230–32 (2010).

84. HYERLE, *supra* note 82, at 10.

85. See DONALD BLIGH, *WHAT’S THE USE OF LECTURES* 121–22 (2000) (recommending that lecturers use ten slides per hour and exercise caution with the number of visuals); Tom Creed, *PowerPoint, No! Cyberspace, Yes*, 6 *NAT’L TEACHING & LEARNING F.*, no. 4, 1997, at 1, available at <http://www.ntlf.com/html/pi/9705/v6n4.pdf>.

by faculty. The illustrations serve as a “visual mnemonic’ and . . . help students recall a lesson’s scenario, the legal concepts covered, and the analysis of the problem.”⁸⁶ In a similar fashion, classroom teachers can improve their graphic literacy by looking for opportunities to capture difficult concepts in graphic or pictorial representations that can advance learning. Engaging students in generating these graphics can tap into student expertise and learning style and create a more active learning environment.

CALI authors not only make use of static graphics in lessons but also include multimedia in effective ways to advance lesson objectives. An increasing number of CALI lessons have podcasts accompanying the lessons to provide students yet another modality for learning.⁸⁷ Some faculty authors include videos in their lessons to demonstrate concepts.⁸⁸ For example, Professor Scott Burnham, in his lesson “A Copyright Primer,” includes a video of conversations between an employer and employee for students to consider in assessing whether work is “for hire.”⁸⁹

Finally, working with interactive computer programs invites one to consider games and gaming. Recognizing the pervasiveness of gaming today⁹⁰ and that games can be powerful teaching tools,⁹¹ the CALI library includes several lessons that are in the format of a

86. *Clip Art Images Tagged as Landlord/Tenant*, CALI, <http://development.cali.org/lec/images/1081> (last visited Jan. 8, 2012).

87. See, e.g., *Lawdibles*, CALI, <http://www.cali.org/lawdibles> (last visited Nov. 11, 2011) (providing links to a lesson of “lawdibles”—ten-minute podcasts on selected legal subjects).

88. For example, Ronald Wheeler, Nancy Johnson, and Terrance Manion, in their lesson on Georgia secondary legal research, include a video made with Camtasia to demonstrate research methods. *Georgia Legal Research—Secondary Source Materials*, CALI, <http://www.cali.org/lesson/8143> (last visited Nov. 11, 2011). Norman Garland’s *An Overview of Relevance and Hearsay: A Nine Step Analytical Guide*, CALI, <http://www.cali.org/lesson/1057> (last visited Nov. 11, 2011), provides a video lecture of the analytical strategy and then engages students in applying the strategy.

89. See the page entitled “Drama” within Scott Burnham, *A Copyright Primer*, CALI, <http://www.cali.org/lesson/554> (last visited Nov. 11, 2011) (“Hypertext links take you to cases and statutes, and addresses are provided for web sites where you can obtain additional information.”).

90. See Evan R. Goldstein, *The Game of Life*, CHRON. HIGHER EDUC. (Jan. 9, 2011), <http://chronicle.com/article/The-Game-of-Life/125822/?key=SGt3IFdpayISYitqZmtBbT1ROHNuZRpyNXIZOX92bltTEw%3D%3D> (“In the United States alone, 183 million people devote an average of 13 hours a week to video games.”).

91. See Jennifer Rosato, *All I Ever Needed to Know About Law School I Learned in Kindergarten: Introducing Gaming Techniques into the Law School Classroom*, 45 J. LEGAL EDUC. 568, 580–81 (1995).

game or simulation⁹² as well as a set of crossword puzzles.⁹³ An ongoing project at CALI is to devise a method for faculty to easily build virtual worlds in which students can practice practicing law.⁹⁴ All of these variations on learning activities and modalities are instructive for faculty in the classroom. Because CALI authors consider potential student answers as carefully as teacher questions, provide opportunities for student commentary on individual lessons, and are invited to translate their classroom teaching into computerized, graphic, interactive lessons, CALI authors gain a greater appreciation of the student viewpoint.

IV. CONCLUSION

Faculty spend a great deal of time thinking about classroom teaching—how to engage, energize, entertain, and enlighten their students for the two or three hours per week they are together.⁹⁵ But most student learning does not take place in the classroom. Students spend an average of twenty-seven hours a week reading and preparing for their classes.⁹⁶ Authoring a CALI lesson requires faculty to attend to the many aspects of teaching that take place in those twenty-seven hours—the reading materials and learning

92. See, e.g., CALI Staff, *The Appeal Game*, CALI, <http://www.cali.org/lesson/546> (last visited Jan. 8, 2012) (concentration-style game testing routes for appeal); CALI Staff, *Supreme Court Justice Game*, CALI, <http://www.cali.org/lesson/1089> (last visited Jan. 8, 2012) (game matching justices with their opinions); Owen Fiss & Charles Berger, *Woburn: A Game of Discovery*, CALI, <http://www.cali.org/lesson/394> (last visited Jan. 8, 2012) (fundamentals of discovery); Barbara Glesner Fines, *Client or Not?*, CALI, <http://www.cali.org/lesson/660> (last visited Jan. 8, 2012) (game show format challenges students to identify whether an individual is their client, with bonus rounds in which the lesson challenges them to justify their answers).

93. See *CALI Crosswords*, CALI, <http://www.cali.org/content/cali-crosswords> (last visited Nov. 11, 2011).

94. Deb Quentel, Dir. of Curriculum Dev. & Gen. Counsel, Ctr. for Computer-Assisted Legal Instruction, Presentation at the Inst. for L. Teaching & Learning Summer Conference: Teaching Law Students Using SIMPLE (SIMULATED Professional Learning Environment) (June 17–18, 2010), available at <http://lawteaching.org/conferences/2010/handouts/6c-TeachingSIMPLE.pdf>.

95. Consider the topics relating to teaching at the Annual Meeting of the American Association of Law Schools—most relate to the classroom; far fewer address teaching materials or learning activities outside the classroom.

96. Law School Survey of Student Engagement Overview 6 (2011) (on file with author). Reports are available from the LSSSE website at <http://lssse.iub.edu/reports.cfm> and are distributed to all schools participating in the survey.

exercises that students are assigned or undertake on their own.⁹⁷ Giving attention to this aspect of student learning causes a reconsideration of the effective and efficient use of the class time; the discipline of preparation; the clarity of learning goals; the questions, answers, and misconceptions that class time can address; and the many ways in which students learn. CALI authoring is not the only route to this focused and collaborative attention to teaching. As more faculty have more choices regarding class materials and learning activities, and as greater attention is given to assessment of student learning for purposes of improving teaching, faculty will increasingly look for processes to improve their teaching. The lessons learned by the experience of CALI authors may provide helpful guidelines for those processes.

⁹⁷. For example, over half of all students prepare outlines for their courses. *Id.* at 7.