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Legal Writing Unplugged: Evaluating the Role of Computer Technology in Legal Writing Pedagogy

*Suzanne Ehrenberg*¹

When I began teaching legal writing in 1985, computers occupied an insignificant and somewhat suspect position in the world of legal education. Few students had their own computers, let alone knew how to use word processing programs. Many of the papers I received were painstakingly produced on typewriters and were liberally splattered with “white-out.” When I faulted students for their poor citation form, some of them would blame it on their typist, who was invariably unfamiliar with the whims of the *Bluebook*. Computerized legal research played a relatively minor role in the research training program; LEXIS and Westlaw training were relegated to a couple of sessions taught by vendor representatives at the end of second semester. We had no electronic mail. I communicated with students by taping notes to their lockers or posting announcements on a bulletin board that they consulted only occasionally. Phrases like “computer-assisted instruction,” “internet,” “World Wide Web,” “notebook computer,” “electronic textbook” and “hypertext” were not a part of our vocabulary.

In the intervening ten years, a revolution has taken place and computer technology has become a fixture in virtually every aspect of legal education. All students now produce their papers on word processors. As computer-assisted legal research has become the preferred mode of accessing information by many practicing attorneys, it has also assumed greater prominence in our research training programs. We have added Internet and CD-Rom instruction. Electronic mail has provided us with an efficient way of communicating with our students and has enabled us to carry on electronic discussions. Text analysis programs are available to help students identify technical errors in their writing. More computer-assisted instruction programs are available

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to help students learn skills related to writing, research and analysis. "Infobase technology" has made it possible for students to access their course materials entirely on computer, to annotate their texts on a screen, to access an entire law library through hypertext links by touching a button, and to store and organize their research and notes. The law school certainly looks a lot different than it did ten years ago.

The question posed by this essay is whether the central functions that instructors of legal writing, research and analysis perform have actually changed in any significant respect as a result of this explosion in technology. The more troubling corollary to that question is whether legal writing instructors² are in serious danger of being replaced, in whole or in part, by some form of computer-assisted instruction.

In seeking to answer these questions, I have examined five functions that have affected the way in which legal writing, research and analysis are currently taught: 1) word processing; 2) information retrieval (LEXIS, Westlaw and the Internet); 3) infobase technology (hypertext links, electronic note-taking, course outlining, and research organization and retrieval functions); 4) text analysis (correction of errors in spelling, punctuation, grammar, style or citation form); and 5) computer-assisted instruction ("CAI"). In this essay, I assess the extent to which legal writing pedagogy has been enhanced, impeded or remained unaffected by each of these computer functions.

This assessment leads me to conclude that, while computers have had a significant impact on the way in which students produce their work in a legal writing class, computers have not truly enhanced the way in which we teach our students legal writing, research and analysis. The most notable achievement of computers is simply to make the transfer of information to students more convenient or visually appealing.

First, although word processing and information retrieval have certainly facilitated the students' production of legal writing assignments, these functions have made the teaching of legal writing and research, if anything, more difficult. Second, infobase technology has had only a minor impact on legal writing, in part, because such key features as hypertext links and textbook annotation do not have any utility in a legal writing course. Third, text analysis programs are fundamentally flawed

² I will use the term "legal writing instructor" to refer to law school faculty members whose primary function is the teaching of legal writing, research and analysis.

and are incapable of accurately identifying the most common spelling, punctuation and grammatical errors in student writing. Finally, legal writing educators have not made very effective use of currently available technology in the area of computer-assisted instruction. Thus, the more sophisticated technologies (such as CAI and infobases) have not yet fulfilled their promise of revolutionizing and improving the way that law is taught.

Lest the reader think that my skepticism of technology stems from techno-phobia, I should emphasize that I love my computer. It has liberated me from the fate of interminably scratching on a legal pad and has helped me produce attractive, readable teaching materials for my students; it has enabled me to extend classroom discussion by means of electronic mail; it has enhanced my classroom presentations by providing an "electronic chalkboard" on which my students and I can compose and edit text together; and, shortly, it will enable me to deliver teaching materials efficiently to my students on the Web. Undeniably, the computer has made valuable contributions to my teaching of legal writing.

My concern, however, is that the significance of technology to what we do has been overestimated, and that the human element indispensable to good skills instruction may be underestimated or dismissed entirely. Even the best technology currently available is incapable of executing the most essential function performed by a legal writing instructor: providing an intelligent, individualized critique of a student's writing. Until computers can respond to student writing and analysis on an individualized basis, they will never supplant human instruction in the skills of legal writing, research and analysis.

I. WORD PROCESSING

Although word processing is one of the simplest, most unsophisticated functions performed by a computer, it has probably had the greatest impact on the field of legal writing. This impact is evident, however, not so much in that way that legal writing is taught, but in the way that students exercise their writing skills and produce documents for a legal writing course.³ Because word processing makes it so easy for students make

³ For an excellent discussion of the ways in which word processing has affected students' legal writing, both positively and negatively, see Lucia Ann Silecchia, *Of Painters, Sculptors, Quill Pens & Microchips: Teaching Legal Writers in the Electronic Age*, 75 NEB. L. REV. 802 (1996).

small-scale edits in punctuation, grammar and citation form, it has plainly improved the technical quality of the papers that students submit in their legal writing courses.⁴ In addition, because students are more likely to go through multiple drafts of a paper than they did in the days of the typewriter, word processing may also, in some instances, have enhanced the quality of students' writing style and substantive analysis.

If we focus on the contribution that word processing programs have made to the actual teaching of writing, however, we find that it is negligible. For most legal writing instructors, the word processor has done little more than provide a convenient method of preparing syllabi and other course materials. Some legal writing instructors have come to rely on word processing functions to expedite their critiquing of student papers and render their comments more comprehensible. For example, an instructor may use word processing "macros"⁵ to generate a set of typed comments for each student.⁶ Other instructors may actually critique student assignments "on disk," embedding their comments in the text using boldface or brackets. Those who have used such techniques believe that it not only saves time in grading but that it enhances the quality of the feedback they give to students.⁷ The computer can also be used in class to create a piece of writing collaboratively. By projecting the computer monitor on a large screen, the instructor can create and edit a text in front of the class, based on suggestions from class members.⁸

Relatively few legal writing instructors at Chicago-Kent, however, use the word processor to critique papers or to facilitate collaborative classroom drafting; I suspect the same is true at other schools. Their reluctance to embrace the few technological tools that are relevant to their work may reflect techno-

⁴ See text accompanying note 14 *infra*. However, one tends to proofread less accurately on a computer screen than on a printed page.

⁵ A "macro" is a defined piece of text, which the author labels with a short title and then stores in the computer. The macro can be retrieved at a later time by simply typing in the appropriate label.

⁶ See Coleen M. Barger, *Fast Commentary for Common Problems in Student Writing: Using Word Processing Macros* (1994 Legal Writing Institute Idea Bank submission, on file with the author at University of Arkansas/Little Rock).

⁷ Coleen Barger observes, for example, that she has done a better job of praising what is good in student writing since she began using macros. *Id.* at 2. In addition, the production of student comments on a word processor has become indispensable for some instructors whose handwriting is virtually illegible.

⁸ Silecchia, *supra* note 3, at 43-44.

phobia, or simply a belief that the word processor does not significantly enhance traditional critiquing or classroom instruction.⁹

Not only has word processing failed to significantly improve the way legal writing is taught, it has arguably made the job of teaching writing more difficult. Professor Lucia Silecchia has observed that, in some cases, word processing can detrimentally affect student writing by encouraging verbosity¹⁰ and discouraging full-scale rewrites.¹¹ Many students are reluctant to print out their work and look at their document as a whole; instead, they tend to view the document screen by screen, making only word-and-sentence-level revisions and reorganizations.¹² Reading a document solely on the computer constrains students from making large text reorganizations, that is those that involve moving several paragraphs of text or moving text to a more remote place in the document.¹³ In addition, students' ability to accurately proofread their work, both for technical proficiency and for "sense," is hampered when they read their documents on a computer screen.¹⁴

Professor Silecchia suggests that we must take account of these phenomena in the way that we teach writing.¹⁵ We must familiarize ourselves with the technology our students are using and sensitize them to the ways in which this technology affects their writing process.¹⁶ She suggests, for example, that we re-

⁹ I experimented for several years with the practice of replacing my handwritten "end comment" on student papers with a comment sheet that I typed on the computer. This typewritten comment sheet was individualized for each student and did not make use of macros. I naively believed that typing comments rather than writing them would save me time in grading papers. Alas, I found that I was spending twice as much time preparing the typed comments because I simply wrote more. The ease of typing and editing comments on the computer led me to release an unbridled flow of commentary on each paper that I seemed incapable of stemming. My students probably benefitted from the increased feedback, but I found that I could not afford to devote the additional time to grading that my use of the computer entailed. I ultimately returned to using the pen. Now my comments are limited by the constraint of writer's cramp and the confines of an 8-1/2 X 11 inch piece of paper.

¹⁰ Silecchia, *supra* note 3, at 30-31.

¹¹ *Id.* at 24.

¹² *Id.*

¹³ Christina Haas, *Seeing It on the Screen Isn't Really Seeing It: Computer Writers' Reading Problems*, in Gail E. Hawisher and Cynthia L. Selfe, *CRITICAL PERSPECTIVES ON COMPUTERS AND COMPOSITION INSTRUCTION* 16, 21 (1989) (hereafter *CRITICAL PERSPECTIVES*).

¹⁴ *Id.* at 20-21, 23-25.

¹⁵ Silecchia, *supra* note 3, at 55-56.

¹⁶ *Id.* at 57-61.

quire students for one assignment to save all their drafts in hard copy and "red-line" them in order to see how they edit on the computer.¹⁷ Such an assignment might encourage students to print out their documents more often and to do more of their editing on the hard copy rather than on the screen.¹⁸

Teaching students to be "technology-critical" is plainly necessary, but it adds yet one more dimension to the already overcrowded first-year legal writing curriculum. Thus, in the case of word processing, computer technology can complicate, as well as facilitate, the teaching of legal writing.

II. INFORMATION RETRIEVAL

Like word processing, the information retrieval function performed by computers has had a greater impact on the students' production of their legal writing assignments than on the teaching of legal writing and research. Certainly, students do more of their research on-line than ever before. Many of them come to law school already familiar with computerized information retrieval systems such as INFO-TRAK and knowledgeable in the mechanics of boolean searching. Indeed, they may be more comfortable with boolean searching than with an ordinary print index. Our librarians tell us that many of our students have never used, for example, *The Reader's Guide to Periodical Literature*.

Students' preference for on-line over print research is reinforced by the vendors, who provide unlimited free access to LEXIS and Westlaw, including free "dial-in" software. Using such software, students can now access on-line research data bases from their homes, and they are further disinclined to march down to the law school to use print materials. Thus, the impact of information retrieval on the way in which students perform research for their legal writing assignments is substantial.

But what has the computer's information retrieval capability contributed to those of us who teach legal writing? Aside from providing legal writing instructors with a marginally more efficient way to research our legal writing assignments, computerized information retrieval has contributed little to our pedagogy. And, as is true with word processing, the presence of

¹⁷ *Id.* at 63-64.

¹⁸ Professor Silecchia's other suggestions include requiring students to write a short critique of the way in which they approached the revision process and requiring students to do a small-scale project "by-hand" without the use of the word processor. *Id.* at 63-64.

the computer has complicated the task of teaching our students essential skills.

Students have always been more proficient at performing the mechanics of research, than they have been at engaging in research strategy.¹⁹ This is perhaps even more true with respect to on-line research than it is with respect to book research. Students seem quite able to master "point-and-click" techniques to access information on LEXIS and Westlaw, but they have greater difficulty determining how to search on-line efficiently or when it is more appropriate to do their research in books than on-line. Thus, we must not only teach our students the mechanics of on-line research, but we must also teach them about the limitations of computers as a research tool.

We must teach them that performing research on-line is not necessarily more efficient than performing research in print sources. Students who are accustomed to locating information on-line are frequently oblivious to the limitations of boolean searching, and to the need to develop precise search terms in performing an on-line search. We must teach them, therefore, that boolean searches can be vastly overinclusive, and therefore inefficient. Alternatively, such searches can be underinclusive and therefore miss key sources.

Students may also be unaware that reading text on a screen is inefficient. We must alert them to the fact that they are reading text on a screen 20-30% more slowly than they can read the same text on paper.²⁰ We must convince them, moreover, that by reading a text screen by screen, they are, in effect, looking through a "porthole" which deprives them of the valuable opportunity to see the text as a whole. Just as students may experience a sense of getting lost in a document they are composing on a word processor when they read it exclusively on a computer screen,²¹ they may become equally lost in attempting to decipher a complex case or statute on the screen. Those who are accustomed to "screen-reading" may be utterly unacquainted with the virtue of simply flipping through the pages of a text in print form to gauge its length and complexity, to see, for example, the

¹⁹ By research strategy, I mean the process by which one decides which search terms to use in researching a problem, which research tools to employ and in what sequence, when to stop using one tool and move to another, and when to stop researching entirely.

²⁰ Edward Tenner, *The Revenge of Paper*, N.Y. TIMES, Mar. 5, 1988, at 7; See also Haas, *supra* note 12, at 18.

²¹ Haas, *supra* note 13, at 22.

hierarchical arrangement of the sections of a statute and their inter-relation with one another. They may not realize how much more efficient it can be to browse through a case on printed pages to locate the most relevant sections, than to scroll through screen after screen on a computer. While the "KWIC" and "term mode" features of LEXIS and Westlaw do permit one to browse a document in a focused manner by highlighting search terms, these features can aggravate the "tunnel-vision" problem inherent in on-line research because they screen out portions of the document that do not contain search terms but may nevertheless be relevant.

In addition to instructing our students about the practical limitations of on-line research, we also must now teach our students to be sensitive to the relative costs of print research, traditional fee-based on-line research (LEXIS and Westlaw), and Internet research. With the advent of CD-Roms and "flat-rate" pricing by LEXIS and Westlaw, an increasing number of smaller firms and government agencies now have access to computerized research. But students must nevertheless be taught that there are some circumstances when doing an on-line search is the most cost-effective method and other circumstances where print research is more cost-effective.²² In addition, with legal research materials becoming increasingly available on the Internet, we must acquaint our students with the fundamentals of Internet research. We must help them to identify the websites on which they can readily locate legal authority so that they will be able to use the Internet as an alternative to LEXIS and Westlaw when these services are no longer free to them.

Some educators have argued that all of these lessons are best taught in the context of an integrated research training program, in which print research and on-line research are taught simultaneously.²³ Regardless of how the research training program is structured, however, the proliferation of computerized legal research in law schools has presented legal writing instructors with new challenges in teaching legal research and has done little to facilitate our teaching.

²² West's free pamphlet, *Principles of Power Research*, actually does a good job of explaining when on-line research is more efficient and when it is not. In addition, Emanuel's *LEXIS for Law Students* (1994) provides some information on pricing and tips on cost-effective research.

²³ See Marilyn Walter, *Retaking Control Over Teaching Research*, 43 J. LEGAL EDUC. 569, 583 (1993).

III. INFOBASE TECHNOLOGY

The term "infobase technology" refers to software, such as LEXIS' *Folio VIEWS* and West's *Premise*, that enables students to 1) read their textbooks on a computer screen; 2) annotate and manipulate that text; 3) access outside materials in full text form through hypertext links; and 4) store, organize and retrieve research materials through boolean searching techniques. Although these functions are closely related to the simple information retrieval function performed by computers, they operate at a higher level of sophistication.

The purveyors of infobase software tout it as a revolutionizing force in legal education.²⁴ Those involved in a pilot program at Chicago-Kent College of Law that employed *Folio VIEWS*, however, have been more guarded in their assessment of the software's pedagogical value.²⁵

In the Electronic Learning (or "E-Learn") Project, an entire section of first-year students (approximately 100 students) was equipped with notebook computers ("notebooks") that were loaded with LEXIS' *Folio VIEWS* software and electronic versions of all the students' textbooks.²⁶ Students were taught how to use the software and were encouraged to use it in all their courses to read text, take class notes within the structure of the textbook, prepare course outlines, access outside materials through hypertext links, and to organize and store their research for legal writing assignments. The majority of students quickly found, however, that they preferred reading their course assignments in print.²⁷ Similarly, when class discussion focused on a particular passage in a statute or opinion, most notebook users nevertheless turned to the passage in print.²⁸ Although a majority of the students used their notebooks in order to take class notes, most of these students used word processing software, rather than *Folio VIEWS*, to do so.²⁹ Even those using *Folio VIEWS* to take notes generally chose to work in a separate notes infobase rather than to place their notes within the struc-

²⁴ See e.g. LEXIS-NEXIS' "Office for Legal Education" brochure (1995).

²⁵ See P.W. Martin, *The Chicago-Kent Computer Section 1995-96* (May, 1996) (unpublished manuscript, on file with Chicago-Kent Computer Center).

²⁶ For a more complete description of the E-learn project see Richard A. Matasar & Rosemary Shiels, *Electronic Law Students: Repercussions on Legal Education*, 29 VAL. U. L. REV. 909 (1995).

²⁷ Martin, *supra* note 25, at 4.

²⁸ *Id.*

²⁹ *Id.*

ture of the textbook.³⁰

And when it came time for students to create their final course outlines, a majority of that small number who had taken their class notes in *Folio VIEWS* transferred to word processing software rather than using the "automatically generated" outline available through *Folio VIEWS*. These students understood that the process of preparing the course outline was at least as important as the product.³¹

No information is available about the extent to which students used the hypertext function of *Folio VIEWS*. This function enabled them to jump immediately to the full text of cases that were cited in their textbook's notes or mentioned by their professor during class.

None of the infobase functions described so far has particular relevance to the legal writing course. Although the students had access to an electronic version of their legal writing textbook, they presumably had no need to heavily annotate the text, as one might do in order to prepare for a final exam. Similarly, there was no need for students to prepare a course outline, and little opportunity to use the software's hypertext function in their legal writing class.

The *Folio VIEWS* feature that is most uniquely suited to the legal writing class is its ability to store and organize legal research, and to retrieve material from that specific database through the use of boolean search terms. Indeed, this feature generated the greatest degree of enthusiasm from students involved in the E-learn Project.³² Brett Amdur, Director of Technology at the Center for Information Law and Policy at Villanova University Law School, also believes that *Folio VIEWS* can make a unique and valuable contribution to the legal writing course because of its capacity to integrate the functions of outlining, research and writing.³³

³⁰ *Id.*

³¹ *Id.* at 5.

³² *Id.* at 6.

³³ Telephone interview with Brett Amdur, conducted by Suzanne Ehrenberg, on November 25, 1997. Mr. Amdur developed a pilot program at Villanova in 1997 in which his 40 legal writing students were given notebook computers equipped with *Folio VIEWS* software. He also developed a template for use with *Folio VIEWS* that customizes certain aspects of the software so that it is easy to use for legal research. For example, the template allows students to easily create narrowly tailored searches of their research materials, and simplifies the process of putting the materials in a hierarchical structure.

Does the ability to store, organize and access one's legal research on a notebook computer, however, make students "better" legal writers? Professor Sarah Bensinger, who taught legal writing to E-Learn students for two years, has concluded that while use of *Folio VIEWS* may enhance the performance of strong students, it offers particular pitfalls for the weaker students. She observes that because it is so easy for infobase users to paste large sections of their research materials into their papers, the weaker students may believe that they are writing, when they really are doing nothing more than reproducing what others have written. Overall, she did not see students perform significantly better in the E-Learn classes she taught than the students she had taught previously in a traditional legal writing class.³⁴

In examining infobase technology, we see again that the effect of technology on teaching legal writing is minimal. It may facilitate the students' production of their assignments, but it does not facilitate their learning of the skills that they need in order to engage in legal research, writing and analysis. The text annotation, hypertext link, outlining and research storage features of infobase software do not help students learn how to locate relevant legal authority, how to extract legal rules from those authorities, how to apply legal rules to facts and how to express their ideas with clarity and precision.

Students who are using *Folio VIEWS* or *Premise* software may be more likely to bring their notebooks to a conference with their legal writing instructor and access their writing and research on the computer rather than in print form, but this difference in the medium through which they are working does not fundamentally alter the substance of the conference. And it is in such a conference that the real teaching of legal writing takes place.

IV. TEXT ANALYSIS

To the extent that a primary function performed by legal writing instructors is critiquing student writing, our jobs should arguably be made easier by computer programs that identify er-

³⁴ Interview with Professor Sarah Bensinger, conducted by Suzanne Ehrenberg, September 26, 1996. Mr. Amdur was similarly unable to definitively conclude that use of *Folio VIEWS* results in better legal writing papers. He observed, however, that good students find it a valuable tool in producing their papers because it encourages organized and hierarchical thinking.

rors in a written text. Many programs are available that analyze text for errors in spelling, grammar, punctuation, citation form and even writing style.³⁵ If our students used these programs regularly, then arguably their papers would be relatively free of technical errors and we would have far less to criticize in their work. Alternatively, it would seem to make sense for legal writing instructors to use text analysis programs, in conjunction with their own critique, to expedite the grading process.

Why, then, do text analysis programs actually play such a minor role in either the students' production or the legal writing instructor's grading of a legal writing assignment? The simple answer is that these programs don't work particularly well.³⁶ Spell-check programs, for example, will identify only words that are misspelled in such a way that they do not constitute a word in the English language. Many misspellings, however, are homophones like "sense" and "cents." A computerized text analysis program will not catch such errors.

Text analysis programs are similarly unreliable in catching punctuation, grammar and stylistic errors because they are simply incapable of engaging in the kind of sophisticated analysis required to consistently identify such errors.³⁷ Such software is designed to examine writing for "certain easily identifiable and quantifiable aspects of the discourse."³⁸ It can identify some common errors in grammar, punctuation and style such as passive constructions, nominalizations, and excessively long sentences. In doing so, however, it must rely on a limited number of extremely rigid rules that cannot encompass the full range and subtlety of errors one finds in a typical student paper.³⁹ As Professor James Collins has concluded:

Text analysis software concentrates on surface aspects of writing, on matters of linguistic etiquette and style, and often does not help with the errors student writers make. Since the computer must treat words as strings of characters, it has no access to contexts of meaning, to symbol-

³⁵ Most word processing programs come with "built-in" grammar and spelling checkers. For example, *Word Perfect* comes with the *Grammatik* program. *Cite-Rite* is a fairly common citation checking program. In addition, LEXIS and Westlaw each provide legal citation checkers.

³⁶ See James Collins, "Computerized Text Analysis and the Teaching of Writing" in *Critical Perspectives*, *supra* note 13, at 10.

³⁷ *Id.* at 31.

³⁸ *Id.* at 30.

³⁹ *Id.* at 30-32.

referent relations, to the content and logic of the writing.⁴⁰

In one study, a researcher examined three text analysis programs for accuracy by comparing their diagnosis of errors in student essays with the error analyses performed by two experienced writing teachers.⁴¹ All three programs revealed a high degree of inaccuracy, in that they overlooked errors the teachers had found and flagged non-errors. The accuracy rates ranged from a high of 42% to a low of less than 1%.⁴²

Several new text analysis programs, developed in educational rather than commercial settings, show somewhat more promise. One program, called "MINA," focuses on *patterns* of errors in students' writing and can search for 60 different error patterns. The software works on only one type of error at a time. It identifies all the sentences in which errors of that type appear, but does not identify the specific place in the sentence where the error is. The student must then find and correct all errors of that type.⁴³

Another program, called *Writing Teacher's Toolbox* and developed at SUNY-Buffalo, is designed to be used by writing instructors and students working together. The designers of the software realized that "most of what's wrong with student writing is wrong because something's missing from the writing."⁴⁴ Professor Collins observes that "[c]omputerized text analysis by itself must be limited to what appears in the text, but teachers conferring with writers have access to the writer's intended meanings."⁴⁵ The program is able to search and highlight certain features of the text that the teacher or writer asks for, such as repeated words or phrases; verbs ending in "-ed"; low-meaning words such as "things" or "nice" etc. The teacher can then work with the student to help her understand how the use of such words or phrases results in incomplete meaning. In addition, the program enables teachers to build in interactive tutorials to supplement conferences. Thus, for example, if the teacher and student had worked on a passive voice problem in conference, the teacher could use the program to mark several additional exam-

⁴⁰ *Id.* at 31.

⁴¹ *Id.* The programs used in the study were *Milliken Writing Workshop*, *Writer's Helper*, *Sensible Speller* and *Sensible Grammar*.

⁴² *Id.* at 33-34.

⁴³ *Id.* at 35-36.

⁴⁴ *Id.* at 38.

⁴⁵ *Id.*

ples of passive voice and have the program present these examples to the student in the form of a tutorial. The computer would ask the student whether a particular passive construction was appropriate and then ask the student to revise the sentence.⁴⁶ In addition, the program can combine text with graphics to analyze the content and logic of a piece of writing. Using blocks, arrows and lines of various lengths, the teacher can use the software to diagram sections of a piece of writing to show the student how the different parts relate to one another.⁴⁷

What makes this software so promising is that it recognizes the primacy of the *teacher*, the human being, in diagnosing and remediating writing problems. Only a "human text analyst — a teacher or peer in the various roles of reader, listener, respondent, editor, and collaborator" can provide a critique that is sensitive to the "content and logic" of writing.⁴⁸ And thus, only text analysis software that relies heavily on the input of a human text analyzer can ever perform a useful function in the teaching of writing.

V. COMPUTER-ASSISTED INSTRUCTION

Computer-assisted instruction ("CAI") programs, like text analysis programs, perform a function traditionally performed by human teachers. They purport to teach students a particular body of information or skill — whether it is bibliographic information about legal research tools or the mechanics of organizing a piece of writing according to the "IRAC" scheme. To date, however, CAI programs have played an insignificant role in the pedagogy of legal writing.

Although there are well over 100 CAI programs designed for law students, only a handful provide instruction in skills relevant to legal writing. The Center for Computer-Assisted Legal Instruction ("CALI"), the primary purveyor of CAI programs in law schools, lists only five programs in its directory that are of possible relevance to the legal writing course. These programs (the last three of which were acquired by CALI just this year) purport to teach the following skills: 1) citation form; 2) IRAC; 3) use of "may," "must" and "shall"; 4) general legal research; and 5) administrative regulation research. The ALT Corporation

⁴⁶ *Id.* at 39.

⁴⁷ *Id.* at 39-43.

⁴⁸ *Id.* at 31.

markets a program that teaches students to distinguish between holding and dictum, as well as a citation form program.

In addition to the CALI programs listed above, there are currently two computer-assisted programs available for teaching legal research: Clark Kelso's *Studying Law: An Introduction to Legal Research* (Matthew Bender 1991), and Steven Epstein's *Legal Research is Interactive* (LEXIS 1996). Epstein's work is actually an electronic textbook, but it includes interactive exercises designed to reinforce the bibliographic information in the text. West has also developed a research training program in CD format (which it demonstrated at the Legal Writing Directors' Conference in 1995), but the program has not yet been released to the public. The only CAI program of which I am aware that teaches law students grammar, punctuation and writing style is a program authored by the late Professor Marc Grinker of Chicago-Kent, called *The Legal Writing Teaching Assistant*.⁴⁹

With such a dearth of programs in the area of legal writing, it is not surprising that CAI has failed to take root as a significant form of legal writing instruction. Perhaps the failure of software developers to provide us with more programs is evidence that CAI is not well-suited to teach the skills of legal writing, research and analysis. Indeed, this conclusion becomes quite clear if we examine the nature of CAI programs and their technological limitations. The CAI programs used in law schools fall into three general categories. In ascending order of complexity, they are 1) drill and practice exercises; 2) tutorials; and 3) simulations.⁵⁰

Drill and practice programs generally take the form of a quiz in a multiple choice or yes/no format. The computer presents the student with a series of questions, each of which is followed by a set of possible answers. For example, a citation form CAI program might provide the student with all the information needed to produce a correct citation and then ask the student to choose the correct citation from among several alternatives. A correct response will elicit words of congratulation from the computer. An incorrect response will provide the student with the correct answer and a brief explanation of why the

⁴⁹ The program is currently available only to Chicago-Kent students through our computer network, but may be purchased for use at other law schools by arrangement with the Chicago-Kent Center for Law and Computers.

⁵⁰ See generally Margaret M. Hazen and Thomas Lee Hazen, *Simulation of Legal Analysis and Instruction on the Computer*, 59 Ind. L.J. 195 (1984).

citation form she chose was incorrect. Drill and practice programs are well suited to teaching the kind of information and skills that are acquired by rote,⁵¹ citation form being a prime example. They are not particularly useful, however, for teaching the analysis and reasoning that are central to the law school curriculum.⁵²

Tutorial CAI programs have a somewhat greater capacity than drill and practice programs to respond to individual student performance. Such programs generally use a multiple choice format similar to that in drill and practice programs, but they also provide weak students with remedial instruction or enable strong students to bypass certain questions. The more complex versions of these programs use a "branching" system — a system of remedial loops, fast and slow tracks, and other paths of interaction that depend on the behavior of the individual student.⁵³ Most tutorial programs, however, (including those related to legal writing) do nothing more than pair multiple choice question and answer drills with explanatory text. According to one pair of authorities, even the most sophisticated tutorial programs "do not present any significantly different type of learning from what is already provided by the classroom setting and assigned reading. While drill and practice and tutorial CAI increase knowledge and recall, they are not generally the best techniques for optimal development of intellectual and inquiry skills."⁵⁴

Simulation programs provide the greatest potential for developing these essential lawyering skills, but such programs are relatively rare in the panoply of CAI offerings. Making use of CD-ROMs or laser disks, simulation programs teach students legal skills in an environment that replicates the real world. The environment might be that of a criminal trial or corporate takeover. The computer can introduce the student to the simulated situation, assign a "role" to the student, ask the student to make decisions based on information provided and then continue the simulation based on the student's decision.⁵⁵ For example, one simulation program designed to teach the rules of evi-

⁵¹ *Id.* at 200.

⁵² *Id.* at 201.

⁵³ *Id.* at 200. See also, Robert Charles Clark, *The Rationale for Computer-Aided Instruction*, 33 J. LEGAL EDUC. 459, 463-64 (1983).

⁵⁴ Hazen & Hazen, *supra* note 50, at 201.

⁵⁵ *Id.* at 203.

dence visually simulates a trial on laser disk or CD-rom.⁵⁶ An attorney appears on the screen examining a witness and the student plays the role of opposing counsel. The attorney's direct examination of the witness includes objectionable questions and the witness includes inadmissible material in his answers. The student is able to object at any time by pushing a button. After each objection, the student is asked to supply either a reason for the objection or the direct examiner's argument for admissibility. After the student has completed the argument, the judge states the ruling and the trial resumes. The inadmissible evidence is introduced into the trial if the student does not object or cannot argue correctly in support of an objection.

Simulations provide "a sense of immediacy and involvement" that is lacking in drill and practice or tutorial CAI.⁵⁷ They are also capable of responding to free-form (or "natural language") responses by students, rather than requiring students to select a response from a limited set of alternatives. Nevertheless, simulations are still relatively unsophisticated in that they rely on prestored answers and remedial comments, and their ability to understand natural language is limited.

Accepting that CAI programs are only capable of performing a limited function in the teaching of law, how successful are they in performing that function? Do students actually use these programs in significant numbers and is their performance in law school enhanced by such use? No comprehensive studies have yet been conducted in the law school setting to evaluate the effect of CAI on student performance. In 78% of the studies conducted at the elementary, secondary and college level, however, students receiving CAI did not perform significantly higher on exams than did students receiving conventional instruction.⁵⁸

To the extent that researchers have tracked CAI use by law students,⁵⁹ they have found that law students do not use CAI

⁵⁶ The program is called "The Interactive Courtroom" and was developed by the Stanford Interactive Video Project.

⁵⁷ *Id.*

⁵⁸ Paul F. Teich, *How Effective is Computer-Assisted Instruction? An Evaluation for Legal Educators*, 41 J. LEGAL EDUC. 489, 492 (1991). Some researchers, however, examined the same group of studies using a different statistical technique called "meta-analysis," and concluded that examination scores of CAI students were significantly higher than the scores of students in conventional classes. They suggested that, on average, the use of CAI boosted a student from the 50th percentile to about the 60th percentile on examination scores. *Id.* at 493.

⁵⁹ Few comprehensive studies of CAI use by law students have been conducted and those that exist are seriously outdated. See Gary Clifford Korn, *Computer-Assisted Legal*

programs with any regularity, despite the increasing availability of CAI in law schools.⁶⁰ According to CALI, its program on citation form was used about 3,200 times in the 1994-95 school year. Five hundred of these uses, however, involved copying the lesson to a disk, and it was not clear whether students actually used the program after copying it. Its "IRAC" program was used a mere 1,200 times during the same school year. Keeping in mind that there are currently over 150,000 persons enrolled in law school, these figures are insignificant.

My own experience suggests that unless students are forced to complete CAI exercises, few will avail themselves of this technology. This is true, in part, because the CAI programs related to legal writing, research and analysis do not make optimal use of the available technology. Without exception, these programs are of the drill and practice or simple tutorial variety. In essence, these programs perform the same function as a set of multiple-choice questions and answers in a textbook. None of them permits even the simplest natural language response. None of them employs the more sophisticated "branching" techniques that are possible in a tutorial-type program. To date, no one has used a simulation program to teach library research skills — a perfect candidate, I believe, for the simulation format.

If we look at the more recent entrants into the field of computerized research training, such as LEXIS' *Legal Research is Interactive* or West's CD-rom program, we see that they are nothing more than drill and practice programs wrapped in a fancier package. They may look and sound a lot better than a typical drill and practice program, but they perform essentially the same function. The LEXIS program provides multiple-choice exercises as part of an electronic textbook on legal research. After reading the text, students are quizzed on the bibliographic information. An incorrect response to a question leads the student immediately to the portion of the text that provides the correct answer to the question. While this is a marginal improvement over a program that tells the student the correct answer, it is not fundamentally different from any other multiple-choice CAI program.

The West CD program is similarly disappointing in that it fails to use the CD medium to provide students with a truly enhanced learning experience. The CD format initially draws the

Instruction: Some Reservations, 33 J. LEGAL EDUC. 473, 475-76 (1983).

⁶⁰ *Id.*

user in with sophisticated graphics simulating a law library, and an entertaining audio track. The user is able to learn about different research tools by "visiting" different floors of the library. Once one strips away the bells and whistles, however, what remains is a superficial textual explanation of the research tools followed by a set of drill and practice exercises.⁶¹

So far, however, no one has come up with a computer program that really attempts to teach research strategy rather than simple bibliography. The program that I dream of would use simulation techniques to place students in a virtual library, give them a research problem and ask them to select the tools with which to address the problem. The program would enable students to actually see the research tools they have chosen in facsimile form, and would force them to deal with the consequences of their research choices. It would provide individualized feedback to students and would reinforce the use of efficient research strategies.

Apparently, I am not the only one who has had such a dream. A group of legal writing faculty members from Hofstra Law School⁶² is well on the way to designing just such a simulation program that focuses on research process.⁶³ If the program comes to fruition, CAI finally will have made a significant, positive contribution to the teaching of legal writing and research.

Even if CAI programs were developed to take full advantage of currently available technology, however, they could never do more than supplement traditional instruction in legal writing, research and analysis. Even the best CAI programs are "pedagogically deficient" in that they provide only a one-track system of feedback — from instructor to student.⁶⁴ They do not permit feedback from student to instructor in which the student "verbalizes" what the instructor has taught.⁶⁵ Such verbalization is necessary for students to organize, refine and solidify concepts in their minds.⁶⁶ The computer supplies information to the student, but cannot prevent the student from misinterpreting what

⁶¹ A typical question asks the student to indicate which set of reporters contains decisions of the federal district courts.

⁶² The program is being developed by Donna Hill, together with Richard Neumann, Kathleen Beckett, and Gary Moore, and is supported by a grant from CALI.

⁶³ Unfortunately, the program may not be widely available until Fall, 1999.

⁶⁴ Korn, *supra* note 59, at 482.

⁶⁵ *Id.*

⁶⁶ *Id.*

is transmitted.⁶⁷

The only type of CAI program that potentially could perform the functions performed by a human legal writing instructor is an "intelligent tutoring system" ("ITS"). The ITS attempts "to automate the human tutor's role, which is to prod, hint, ask leading questions or ask for justifications, and guide the problem solving with just the right amount of intervention and feedback to keep the learner on track."⁶⁸ Although researchers have been working on ITS's for more than a decade, their efforts are still generally confined to the laboratory and are not yet available widely for use in the classroom. Experts in the field of artificial intelligence are aware of the limitations of traditional CAI, and are strongly motivated to develop an alternative, but the costs of doing so have thus far been prohibitive.⁶⁹

Nevertheless, some highly respected educators still promote the notion that CAI can effectively supplant human instruction in some areas of legal education. As early as 1982, a Harvard Law School report on educational planning and development recommended that CAI should "supplement or replace, in limited part, traditional modes of instruction."⁷⁰ In the intervening 14 years, Harvard has developed a set of electronic teaching materials for first-year students as part of the "Harvard Bridge Program."

The Bridge Program, which is the first commissioned work for the LEXIS-NEXIS Electronic Authors Press ("LEAP"), includes "lectures, resources, and interactive exercises."⁷¹ The materials were supposed to have been "available for use in all interested law schools in the Fall 1996 semester."⁷² According to Fran Warren, Electronic Products Development Manager at LEXIS-NEXIS, however, the Program is still being tested at Harvard and may not be available to other law schools until

⁶⁷ *Id.*

⁶⁸ Randy Kaplan and Denny Rock, *New Directions for Intelligent Tutoring*, 10 *AI EXPERT* 30 (February, 1995).

⁶⁹ *Id.* For example, a recent effort by the Pittsburgh public schools to revise its mathematics curriculum using ITS's involved at least 100 hours of development time for each hour of ITS instruction and a 50-person-year effort to codify the math curriculum material in an ITS. Although schools are the most likely consumers of ITS technology, they generally cannot bear the cost of funding its development. So ITS developers are looking for other sponsors such as corporations and the military.

⁷⁰ Tentative Final Draft of the Harvard Law School Faculty Committee Report on Educational Planning and Development, ch. 3, at 1 (April 23, 1982).

⁷¹ LEXIS-NEXIS, "Office for Legal Education" brochure (1995).

⁷² *Id.*

Fall, 1999.⁷³ LEXIS-NEXIS has been rather tight-lipped about the precise nature of the Bridge Program materials and has declined to provide me with an examination copy of them.

Although Ms. Warren represented that Harvard plans to add more materials over time to eventually "substitute" for its legal skills course,⁷⁴ Harvard professor Peter Murray, who teaches that course, dismissed the notion that the Bridge Program materials would ever entirely replace traditional classroom instruction and individualized critique of writing.⁷⁵ According to Professor Murray, the Program focuses on legal analysis skills and includes interactive exercises on such topics as case analogy and fact analysis.⁷⁶ Professor Murray envisions an increasing role for the computer in Harvard's "Legal Reasoning and Argument" course, but he does not contemplate that classes or tutorials will be supplanted entirely.⁷⁷

At present, therefore, CAI is making only a minimal contribution to legal writing pedagogy by augmenting classroom instruction in subjects such as citation form, grammar, case analogy and legal bibliography. Given the current state of CAI technology, we cannot expect the computer to do much more.

CONCLUSION

In our effort to embrace computer technology and benefit from what is good in it, we must not lose sight of the fact that the computer is simply unable to perform the most essential functions involved in teaching legal writing, research and analysis. Cost-conscious deans and law school administrators, however, may be lulled by the purveyors of info-base technology and computer-assisted instruction into believing that the computer is an economical alternative to human instruction in skills training. Thus, the final burden imposed on us by the technology ex-

⁷³ Telephone interview with Fran Warren, conducted by Suzanne Ehrenberg, October 3, 1997.

⁷⁴ *Id.*

⁷⁵ Telephone interview with Professor Peter Murray, conducted by Suzanne Ehrenberg on October 6, 1997. Professor Murray teaches Harvard's one-semester required course for first-year students called "Legal Reasoning and Argument." The course covers legal analysis and legal research, as well as memo and brief-writing. It is taught by four full-time Harvard professors (who conduct large-group lectures on legal reasoning and argument and research strategy), in conjunction with librarians and student teaching assistants or practitioners. The student teaching assistants and practitioners critique the students' written work.

⁷⁶ *Id.*

⁷⁷ *Id.*

plosion in law schools is the burden of educating our colleagues and our deans about the true limits of technology in the pedagogy of legal writing.