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# TEACHING PROBLEM-SOLVING LAWYERING: AN EXCHANGE OF IDEAS

MARK NEAL AARONSON\* AND STEFAN H. KRIEGER\*\*

*In the last issue of the Clinical Law Review, Stefan Krieger argues that clinical law teachers who emphasize problem-solving approaches to lawyering incorrectly downplay as a necessary prerequisite to learning effective legal practice the significance of domain knowledge, which he mainly identifies as knowledge about legal doctrine.<sup>1</sup> Among the writings on clinical law teaching criticized by Krieger are those of Mark Aaronson, who has articulated as a teaching goal helping students learn how to improve their practical judgment in lawyering, which he describes as a process of deliberation whose most prominent features are a contextual tailoring of knowledge, a dialogic form of reasoning that accounts for plural perspectives, an ability to be empathetic and detached at the same time, an intertwining of intellectual and moral concerns, an instrumental and equitable interest in human affairs, and a heavy reliance on learning from cumulative experience.<sup>2</sup> Krieger stresses the foundational importance for law students of acquiring substantive legal knowledge; Aaronson focuses on developing the ability of students to think critically and appropriately in role as a lawyer. In this brief exchange of ideas, Aaronson comments on Krieger's critique of problem-solving teaching in law schools, to which Krieger then responds.*

## I. AARONSON'S COMMENTS: DESCRIBING DIFFERENT PARTS OF AN ELEPHANT

Krieger in his article on domain knowledge harkens back to the traditional emphasis in law school on extensively teaching legal doctrine first, though he continues to see himself as advancing a problem-solving approach to lawyering. His targets are skills teachers whom he asserts insufficiently appreciate how the acquisition of substantive legal knowledge affects the structure and organization of thought in

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\*\* Professor of Law, Hofstra University School of Law. I wish to thank David Kaufman, Lawrence Kessler, Ian Weinstein and my research assistants, Elizabeth Quinn and Yonatan Zamir for their assistance.

<sup>1</sup> See Stefan H. Krieger, *Domain Knowledge and the Teaching of Creative Legal Problem Solving*, 11 CLIN. L. REV. 149 (2004).

<sup>2</sup> See Mark Neal Aaronson, *We Ask You to Consider: Learning about Practical Judgment in Lawyering*, 4 CLIN. L. REV. 247 (1998); see also Mark Neal Aaronson, *Thinking Like a Fox: Four Overlapping Domains of Good Lawyering*, 9 CLIN. L. REV. 1 (2002).

analyzing problem situations. While not an endorsement of the still dominant case method of instruction, his ideas blur the boundaries between standard law classroom teaching and real-client or simulation-based clinical pedagogy.

Some may consider his revisionist views as falling outside the rubric of clinical legal education. My own view is that in offering his analysis he is not so different from many of us who conceive of a lawyer's core role to be a problem solver. Like the proverbial blind person, we touch part of the elephant and draw conclusions about the whole beast. Problem solving as an approach to lawyering is a big idea not likely to be covered comprehensively in a single book, let alone a single article. Often we are neither as conscious nor as explicit as we might be about what we are not addressing.

Krieger's perspective on developing effective problem-solving skills is for me refreshing but skewed. His clear emphasis is on a law student's development of substantive legal expertise. The refreshing aspect is his ably developed argument about the centrality of legal doctrine in shaping how lawyers spot issues, organize information, and reason. For this argument, he does not rely on classics in American jurisprudence<sup>3</sup> but rather draws on studies of other professionals conducted by cognitive psychologists and scientists. His focus is on how knowledge and experience are imprinted in the mind and then retrieved and applied in new situations. His main comparative reference is to the education and training of medical students.

It is fair to say that in writings by legal clinicians about problem-solving approaches to lawyering, there is little attention paid to teaching legal doctrine and the role played by doctrine in developing the problem-solving skills of lawyers. It is unfair to imply, however, that clinical teachers are unmindful of the importance of legal doctrine either in their writings or in their practices. Yet this implication is an aspect of Krieger's argument, and it unnecessarily skews the terms of debate.

Taken down a notch, his criticism of other clinicians is not about an oversight but over issues of timing and degree. These issues, in turn, raise important and fundamental concerns regarding his overconfidence about the opportunity for law students while in law school to develop substantive legal expertise and his ignoring or underweighting other factors as foundational elements in spurring a student's ability to think critically and appropriately in role as a lawyer.

Addressing Krieger's implication first and turning to my own writings, I have not dwelled on the importance of doctrinal knowledge

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<sup>3</sup> *E.g.*, Edward H. Levi, *INTRODUCTION TO LEGAL REASONING* (1948).

but have clearly acknowledged its suppositional significance. People seek out lawyers because of their substantive legal expertise for good reason. A very knowledgeable lawyer is able much more quickly to identify relevant legal issues and put to the side irrelevant or secondary concerns. I also find persuasive the findings from cognitive science indicating that with a buildup of substantive expertise one not only has greater breadth and depth of knowledge but also utilizes a different process of deliberation, as compared to novices, when gathering, organizing, retrieving, and applying information in new situations.

With respect to clinical teaching practice in the Hastings Civil Justice Clinic, I selected examples that illustrated how we deal with raising student awareness about inter-personal aspects of lawyering. In doing so, I did not mean to slight the attention paid substantive law in preparing students for our fields of practice. We have substantive law training sessions at the very beginning of the semester and continuing followup work, much of it one-on-one with the students throughout the semester as part of the supervision provided in handling individual cases. I am confident that what we do at Hastings in this regard occurs elsewhere as well.

It would seem then that Krieger's ire is actually directed not at clinicians being unmindful about the importance of doctrinal knowledge in teaching problem-solving but in their failure to appreciate the critical significance of both when such knowledge is conveyed and how much substantive knowledge needs to be considered. In other words, clinicians have not acknowledged sufficiently how the timing and the degree of doctrinal learning affect the development of good problem-solving approaches to lawyering. For Krieger, there needs to be heavy doctrinal law exposure, much more extensively than typically happens prior to or as part of most real-client clinics, before working with students to develop other lawyering skills and attributes. On these points, I take issue with him.

Krieger assumes that students while in law school have the opportunity to develop substantive legal expertise. Although they typically take a large number of doctrinal courses, I expect that few of their standard classroom teachers believe that they are providing anything other than an introduction to different areas of law, even when a course is labeled as advanced. As one of my Hastings colleagues is fond of saying, what we provide students at the end of three years is a learning permit. Their development of substantive expertise occurs over time once they are in practice and have repetitive exposure to similar problem situations.

It is rare that a student leaves law school with other than a nov-

ice's understanding of different areas of law. For most students, there is not great retention of substantive knowledge after the taking of final examinations. Even high achieving law review note writers are likely to have, at best, a beginning scholar's sense of issues, not a practicing lawyer's immediate appreciation of what matters most. In thirteen years of clinical teaching, I have only occasionally had students on their own apply anything other than rudimentary knowledge learned in other courses to their handling of client cases. Wage and hour law, one of the subject fields for the Hastings individual representation clinic, is primarily a statutorily governed practice area, but issues in contract law also arise regularly. For the most part, students have to relearn applicable rules, principles, and policies. They do not have a readily retrievable working knowledge of the field. None of this is surprising since so much of mainstream legal education is directed toward developing skills in legal research, legal reasoning, and policy criticism. It is not about developing substantive legal expertise.

In articulating his critique of clinical problem-solving teaching, Krieger proposes a limited conception of relevant domain knowledge consistent with his emphasis on substantive legal expertise. While he occasionally alludes to the value of ideas and findings from non-legal fields such as psychology, he stresses the primordial role played by doctrinal knowledge in structuring the compartments in a lawyer's problem-solving tool box. Knowledge of legal doctrine is not just one of several tools but sets the framework for how to position and use all the other tools. For Krieger, to learn how to use these other tools well, the framework – the way substantive knowledge is organized in the mind – needs to be firmly in place first.

He draws support for this conclusion from a comparative study involving two different medical schools. One offered a conventional curriculum where students learned the basic sciences first in separate discipline-based courses and then after one-and-a-half years started clinical training. The other used a problem-based learning curriculum where students learned basic sciences at the same time that they received clinical training. The surprising result of the study was that students and residents who went through the conventional curriculum used clinical information, such as a patient's symptoms, much more readily and with greater facility than students and residents who had the problem-based curriculum. Krieger uses this finding as support for the proposition that problem-solving lawyering skills are best learned after a solid foundation in doctrinal law.

While I am not able to evaluate the validity and reliability of the comparative medical school study, I am dubious about the applicability of the study's conclusion to legal education. Except for psychia-

trists, medical doctors focus on the human physical condition. In the practice of medicine, hard scientific knowledge is overwhelmingly important across-the-board.

Lawyers, by contrast, focus on the human social condition, where knowledge from the arts, humanities, and social sciences as well as comprehensive knowledge about the law and legal institutions need to be taken into account in everyday problem-solving situations. Krieger fails to consider how such non-legal knowledge affects the frameworks used by lawyers to problem solve. Information and ideas from these non-legal fields include knowledge about methods and techniques as well as substantive content, and they help to shape how lawyers approach problems. They are not just additional tools to be used. Krieger has a too crabbed view of relevant domain knowledge.

A second important crux of my disagreements with Krieger lies in differences in understanding about certain key concepts he uses to describe how individuals develop expertise in a profession. I differ in my understanding about the relationship of "backward reasoning" to "forward reasoning," and I disagree with how Krieger distinguishes "explicit knowledge" from "tacit knowledge."

Backward reasoning describes a cognitive process where individuals are very deliberate and explicit in how they think through what is to be done. It is also a methodology for how to proceed when one is a novice, especially in ill-structured problem situations. The key features of backward reasoning are an initial identification of objectives and then a working backwards from those objectives to determine what courses of action might be followed to achieve them, whether any additional information is needed, and the relative positive and negative consequences of each course of action in light of those objectives. Some characterize this process of deliberation as formulating and testing different hypotheses. Forward reasoning involves drawing inferences from available information relatively quickly. Primarily as a result of developing expertise in a field, an individual using forward reasoning is able to separate almost instantaneously relevant from irrelevant information, diagnose a situation, and propose courses of action.

Krieger largely views backward reasoning in pejorative terms. It is for him a less efficient and less accurate process of deliberation than forward reasoning. Generally speaking, I do not disagree with his comparison. But the comparison is not especially prescient. When competence in forward reasoning is absent, backward reasoning is a very respectable alternative. Moreover, it is not just an alternative to forward reasoning, it is a potentially important step in its development. As I am about to explain, we cannot do much directly about

teaching forward reasoning, but we can help students improve their ability to engage in backward reasoning.

Krieger downplays the value of the connection between backward reasoning and forward reasoning because of how he conceives of the difference between explicit knowledge and tacit knowledge. Following certain cognitive psychologists, he starts with a fairly expansive understanding of the range of what counts as explicit knowledge, which he also refers to as domain knowledge. Such knowledge includes concepts, principles, and structures of thinking within a subject field. As he discusses problem solving in lawyering, he narrows his notion of domain knowledge, and thus explicit knowledge, to mainly legal doctrine.

Tacit knowledge, according to Krieger, involves how to do things. Within his conceptual framework, the acquisition of problem-solving skills, such as brainstorming in case planning, exemplifies the retrieving and application of tacit knowledge, the functioning of which depends on how information already is imprinted and organized in the mind. From his standpoint, learning lawyering problem-solving skills prior to obtaining a deep understanding of legal doctrine is premature and likely counter-productive. It is not a position with which I agree.

From my reading of the cognitive psychology literature, the distinction between explicit knowledge and tacit knowledge is not based on the character of the knowledge, such as whether it originates in legal doctrine or concerns some other subject or task. The distinction relates to what we learn and apply in a belabored way as compared to when what we know is deeply internalized and seemingly can be retrieved and applied effortlessly. In other words, there is a largely subconscious mental process by which explicit knowledge is transformed into tacit knowledge. A simple example is touch typing. Once we have mastered this skill, we need not remember what letters are where on the keyboard; we just do it. Developing appropriate professional expertise is, of course, a much more complicated and prolonged process.

My difference with Krieger is that the concepts, principles, and structures of thinking involved in learning substantive law and in learning, for instance, interviewing, counseling, case planning, negotiation, and trial preparation are all aspects of relevant domain knowledge for lawyers. Each subject or skill area is a source of meaningful and pertinent knowledge in terms of content, method, and technique. Moreover, Krieger's virtually exclusive emphasis on the foundational importance of legal doctrine shunts aside organizing frameworks not found in the law. They too are a valuable part of the imprinting on the mind that contributes to lawyering expertise. For example, knowl-

edge about statistical probability and familiarity with economic analyses, such as the use of expected utility formulas, are apt to be especially useful in settling cases. Krieger sets too hard a line regarding what and how much has to be learned when.

As teachers, we focus on what can be taught explicitly. Part of what we are doing is setting the stage for what we want to get imprinted in the minds of our students. For this reason, within my own teaching, I find the concept of backward reasoning very useful. It allows me to provide a framework for students to account for a range of legal and practical considerations as they deliberate about how to accomplish instrumental objectives. I usually refer to this approach to learning as following a problem-solving methodology, not as a process of backwards reasoning. My intention is to provide students with a structure for learning how to gather information and think about problems with a modicum of intellectual versatility. Backwards reasoning offers an opening for encouraging flexible and responsive thinking.

The hallmark of forward reasoning is the transformation of explicit knowledge into tacit knowledge. The effect is an enhanced ability to identify priority concerns and to distinguish relevant from non-relevant information, rapidly and immediately. The transformation itself is something that occurs in the mind at a subconscious level. It does not involve conscious human agency.

Notwithstanding Krieger's assertion to the contrary, there is no reason to assume that backward reasoning is a hindrance to the development of forward reasoning when dealing with problems concerning the human social condition. He makes too much of the comparative medical school study. There are significant differences between the comprehensive, sequential, and hard scientific bases of medical education and the relatively soft knowledge underpinnings of a legal education.

In sum, backward reasoning is a potentially rich depository for laying the foundation for imprinting helpful scripts or schemas from law and other disciplines. Unlike forward reasoning which I cannot access directly as a teacher, the development of backward reasoning is something that I can bring to the attention of students and help in its execution. Whether meaningful imprinting actually occurs depends on the particular talents and practice experiences of students after law school.

The choices we make regarding how and what to teach are critical. There are issues of trying to do too much at once, something which Krieger refers to as cognitive overload. In making my choices, I tend to emphasize what students are not likely to get in their other



courses. My objective is to further their ability to spot and weigh relevant concerns. For me the main organizing idea is helping students improve their competence in exercising practical judgment.

As I have discussed elsewhere, my understanding of practical judgment as a process of deliberation is rooted in Aristotle's concept of practical wisdom and Arendt's adaption of Kant's concept of reflective judgment. Practical judgment is how we give coherence and direction to our thinking when matters are confusing and unsettled, and there is no initially obvious course of action to take or set formula to apply. Its maturation is critical in the formulation and application of effective problem-solving approaches to lawyering.

For novices, backward reasoning provides a method for getting started on the tasks at hand and on improving their capacity for exercising practical judgment. Experienced lawyers who have good judgment are able to rely on forward reasoning. In the transformation from novice to expert, the deep-structured internalization of doctrinal legal knowledge is essential, but it is not the only area of knowledge that needs to be strongly imprinted in the minds of legal practitioners.

As we struggle to improve how we teach problem solving in lawyering, I intend to continue to grope around my part of the elephant. I look forward to Krieger's doing the same regarding his part.

## II. KRIEGER'S RESPONSE: DOWNSIZING THE ELEPHANT

### A. *Nature of Domain Knowledge in the Practice of Law*

Throughout Aaronson's comments, he suggests that his disagreement with my article on domain knowledge is merely about issues of timing and degree, not the critical role played by doctrinal knowledge in the practice of law. A close reading of his remarks, however, demonstrates that despite these rhetorical assertions, Aaronson's pedagogy significantly downplays the importance of such knowledge in legal problem-solving. In my opinion, this is not simply a disagreement about timing and degree but rather concerns the very nature of the domain knowledge used by lawyers in practice.

In his comments, Aaronson professes agreement with me that legal doctrine is central to the lawyering process. He cites my article approvingly for its argument about "the centrality of legal doctrine in shaping how lawyers spot issues, organize information, and reason." He acknowledges that people seek out lawyers because of their substantive legal expertise. And he adds, "A very knowledgeable lawyer is able much more quickly to identify relevant legal issues and put to the side irrelevant or secondary concerns."

Despite these assertions, Aaronson's description of the actual

process of legal problem solving fails to recognize the centrality of legal doctrine to the practice of law. Rather, he identifies legal doctrine as only one of many sources of knowledge used in lawyering. He observes, for example, that “Lawyers . . . focus on the human social condition, where knowledge from the arts, humanities, and social sciences as well as comprehensive knowledge about the law and legal institutions need to be taken into account in everyday problem-solving situations.” He continues, “[i]nformation and ideas from these non-legal fields include knowledge about methods and techniques as well as substantive content, and they help to shape how lawyers approach problems. They are not just additional tools to be used.”

While Aaronson argues that I have “too crabbed a view of relevant domain knowledge,” I believe that his view is far too expansive. Obviously, expert attorneys when analyzing a client’s problem, use substantive knowledge and techniques from nonlegal areas, but, in my experience, the central focus of their analysis in most cases is on the relevant legal doctrines. Clients do not seek assistance from lawyers primarily for advice based on social science, arts, and humanities. Rather, as Aaronson acknowledges elsewhere in his comments, most clients seek out attorneys for their expertise in substantive legal doctrine because clients want to determine if they have particular legal rights or obligations.

My disagreement with Aaronson on this point is actually one of perspective.<sup>4</sup> Most professionals who work directly with individuals or groups – from doctors to social workers to the clergy – are involved in everyday problem solving. And by its very nature, this problem-solving process sometimes requires professionals to use substantive knowledge and techniques from domains outside of their own area. But the central focus of their enterprise – the reason people seek their help – is the knowledge base of their particular professional discipline. Sometimes professionals develop the overblown perspective that theirs is the “master problem-solving” profession, uniquely suited to use frameworks from different disciplines to solve problems. From the perspective of those who seek their advice and from the standpoint of other professionals, however, such a view is a bit inflated. All professions have special areas of expertise to address particular types of problems, but it is important for each to understand its own strengths and limitations. Aaronson’s expansive view of the relevant domain knowledge for lawyers, I believe, overstates not only the role our clients want us to play for them, but also the abilities most of us have to provide such multidisciplinary service.

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<sup>4</sup> Thanks to Ian Weinstein who shared this insight with me in a private conversation.

Aaronson's bloated concept of domain knowledge for lawyering is, in large part, the basis for his dismissal of the applicability of the medical school studies to legal education. That research, which Aaronson mistakenly characterizes as a single study, compared the reasoning strategies and diagnostic accuracy of students and graduates trained in two different types of medical school curricula in solving simulated clinical problems. In the conventional curriculum, before any clinical exposure, students spent one-and-a-half years learning basic science. In the problem-based curriculum, from the beginning of medical school, students learned basic science in the context of handling clinical problems. Students and graduates trained in the conventional curriculum displayed a greater tendency to use forward-directed reasoning and to give higher quality explanations for their diagnoses than those trained in the problem-solving curriculum. The reason for these differences, the researchers hypothesize, is that the conventional curriculum, unlike the problem-solving one, gave students a well-organized knowledge base with which to structure their clinical experiences.

Aaronson raises doubts about the relevancy of these findings to legal education because in the practice of medicine, hard scientific knowledge is overwhelmingly important while in the practice of law relatively soft knowledge is used. Aaronson never clearly explains why this distinction has any relevancy. The medical studies compare the effects of different curricula – one requiring a solid knowledge base before clinical exposure, the other teaching the knowledge base simultaneously with clinical experience – on the development of reasoning strategies in medical students and graduates. It is far from obvious, however, why the texture of the particular body of knowledge should have any significant effect on the ability of novices to develop well-organized knowledge bases to structure their clinical experiences or the capacity of a particular curriculum to facilitate the development of such frameworks.

Although Aaronson's skepticism about the applicability of the medical school studies is stated in terms of the differences between hard and soft bodies of knowledge, his actual concern appears not to be the texture of the different knowledge bases, but rather the breadth of knowledge he believes is necessary for solving legal problems. Because lawyers focus on the human social condition, Aaronson argues, we use knowledge from nonlegal fields such as the arts, humanities, and social sciences. Legal doctrine then is not central to a lawyer's ability to organize information but is only one aspect of a liberal arts framework for legal problem solving. Apparently Aaronson believes that such a large body of knowledge is much more diffi-

cult to organize than the more discrete scientific base for medical practice and, for that reason, the medical school studies are not relevant.

Aaronson's overblown view of the relevant domain knowledge necessary for legal problem solving ignores the fact that the law, like medicine, does have a discrete knowledge base, a portion of which is applicable to most areas of practice. This base includes common law doctrines in areas such as contracts, torts, property, agency, and criminal law; evidentiary principles for fact analysis and burden allocation; constitutional law; rules for textual and statutory interpretation; professional responsibility rules; and procedural categories, such as jurisdictional, pleading, filing, service, limitations, and review requirements. Although the specific substance of some of these doctrines may vary depending upon the jurisdiction, forum, and applicable caselaw, statutes, or regulations, the general principles underlying these doctrines, like basic science principles, provide a framework necessary for organizing and analyzing information provided by clients.

Obviously, in solving legal problems, lawyers may rely on knowledge from other nonlegal disciplines. But the starting point for solving legal problems, the core of the lawyering enterprise, is a discrete knowledge base about the substance and mechanisms of basic legal doctrine. I have no disagreement, for example, with Aaronson's assertion that knowledge about statistical probability and familiarity with economic analysis can be helpful in settling cases. That does not mean, however, that such concepts are somehow an essential part of the organizing framework for lawyering. Knowledge of statistics and utility formulas will be of little help if an attorney is unable to assess effectively and efficiently the merits of the case examining traditional legal doctrines. Moreover, Aaronson ignores the fact that in medical problem solving, physicians often rely on other nonscientific knowledge bases to handle issues such as the economics of care, the impact of the environment on a patient's condition, or the ethics of using different treatment regimens. At times, then, doctors, like lawyers, must focus on the human social condition in their problem solving. Such use of nonmedical knowledge, however, does not somehow undermine the proposition that the core of the medical enterprise is basic scientific knowledge.

Likewise, Aaronson's assertion that "interviewing, counseling, case planning, negotiation, and trial preparation are all aspects of relevant domain knowledge for lawyers" misconstrues the concept of domain knowledge. As the medical school studies suggest, domain knowledge provides the organizing framework for processing informa-

tion received in practice. Similar to lawyers, doctors interview and counsel patients, plan treatment strategies, and perform various procedures to treat patients. But the medical school research suggests that the essential component for effective problem solving in practice is basic science knowledge, not the skills to problem solve in practice. No study of which I am aware indicates that the content, method, and technique of skills used in practice provide such a framework. I have no dispute that these skills are necessary for many lawyers in practice, and I certainly believe that skills should be taught in law schools; indeed, I teach them. But just because a skill is used in practice does not make it part of the relevant domain knowledge necessary for the development of problem-solving schemas.

The crucial issue in this dialogue is the nature of the domain knowledge necessary for legal novices to develop organizing cognitive frameworks to eventually become experts in legal problem solving. It is not whether certain knowledge from nonlegal fields or of lawyering skills is important to problem solving or the practice of law. For Aaronson apparently, if certain knowledge is important to the practice of law, it must be "a valuable part of the imprinting on the mind that contributes to lawyering expertise." Empirical research in cognitive psychology simply does not support such an expansive view of domain knowledge. That research demonstrates that the crucial inquiry is the type of knowledge that is essential for expert lawyers to organize information in the problem-solving process. To use Aaronson's own example of touch typing, although it is important for expert typists to have some knowledge of computer hardware and software programming, it is the domain knowledge of the basic functions of the keyboard and word processing programs that helps these typists develop schemas for solving problems. Likewise for lawyers, legal doctrine provides the necessary knowledge base.

### *B. Learning Legal Problem Solving*

In his comments Aaronson overstates my position regarding the amount of legal doctrine a student must have learned before participating in a clinic. He asserts that I "assume[ ] that students while in law school have the opportunity to develop substantive legal expertise." In fact, in my article's critique of Aaronson's practical judgment course, I argue, "[A]lthough complete mastery of the knowledge base is obviously not required to learn practical judgment, sufficient command of relevant legal doctrine is essential." While, as Aaronson suggests, some may consider my "revisionist views as falling outside the rubric of clinical legal education," I am certainly not calling for a return to former times when law schools focused exclusively on issues of

legal doctrine and left skills training to practice. But I am suggesting that students should have a sufficiently solid base in relevant legal doctrine before participating in a clinical or skills program so that they can start to develop the schemas for expert reasoning.

Aaronson rejects even this modest approach because he believes that it is rare for students to leave law schools with more than a novice's understanding of different areas of the law. Most students, he asserts, retain very little after taking final examinations. And he continues, "In thirteen years of clinical teaching, I have only occasionally had students on their own apply anything other than rudimentary knowledge learned in other courses to their handling of client cases." Students, Aaronson concludes, do not have a readily retrievable knowledge of the fields handled by his individual representation clinic so they must relearn applicable rules, principles, and policies.

This assessment of the lack of knowledge base by most law students is, I believe, quite exaggerated. In my experience, most third-year law students know more than they (and we) think they know. Unlike Aaronson, I have often found that my clinical students, on their own, can access doctrine they have learned in other courses when handling cases which are not overly complex. Moreover, as recent cognitive psychology research demonstrates, experts do not solve problems deductively applying search algorithms to their knowledge base. Rather, expert reasoning involves accessing problem-solving schemas, frameworks organized using the knowledge base. The medical school studies suggest, for example, that even novice medical students with a solid scientific knowledge base use this knowledge when obtaining clinical information from simulated patients although they are not prone to use scientific explanations explicitly in their diagnoses. Similarly, I have often found that while third-year law students may not explicitly refer to doctrine learned in other courses, they often access this knowledge when identifying relevant facts and ignoring irrelevant facts in the handling of their cases.

Furthermore, even if mainstream legal education presently fails to provide law students with a solid doctrinal base, the answer suggested by cognitive psychology research is to reform legal education and not to aggravate the problem by having students participate in clinical and other skills-training programs without sufficient background training in legal doctrine. If, as Aaronson contends, mainstream legal education is directed primarily at developing skills in legal reasoning and policy criticism, law schools are not providing students with the knowledge base necessary to develop expert legal problem-solving skills. At times, students in my clinic will prepare a legal memorandum analyzing a particular statute concentrating primarily

on what they perceive to be the policy underlying the statute while ignoring the textual language and applicable caselaw. While such policy analysis may have been the focus of a particular course in which the student was enrolled, it, by itself, will do little to persuade an opposing party or a local court or agency to accept the proffered interpretation. The focus obviously needs to be on the words of the text, rules of construction, and case interpretation. Contrary to Aaronson's colleague at Hastings, I hope we can provide our students with more than a learner's permit and can at least teach them how to pass the driving test.

Finally, Aaronson's clinical students may have difficulty accessing doctrine learned in other classes because of the nature of the cases handled in his clinic. As I observed in my article, his clinic represents clients in a number of subject matter areas from Social Security disability appeals to rent regulation disputes to wage and hour disputes. Aaronson acknowledged in his own article that the breadth of material was too vast, and it is unclear from his comments whether any adjustment has been made to the caseload. Even if he has pared the areas down a bit since the publication of that piece, it is little wonder that his students have to relearn basic principles and policies. Faced with technical administrative regulations from several fields, it is quite possible that students experience cognitive overload and have difficulty organizing information using legal doctrine learned in other courses. The fact that Aaronson's clinic has substantive training sessions at the very beginning of the semester with follow-up in individual supervisory sessions does little to address the problem. The cognitive science research suggests that effective and efficient problem solving requires a solid knowledge base in domain knowledge, not intensive training in particular doctrine geared to specific cases that are being handled.

Not only does Aaronson dismiss the notion that students need a solid doctrinal basis before learning skills, but he touts the teaching of backward reasoning as "a potentially rich depository for laying the foundation for imprinting helpful scripts or schemas from law and other disciplines." As described in my own article, backward reasoning is basically a deductive process in which the problem solver identifies goals and formulates different hypotheses to relate the goals to the known information. Forward reasoning is an inductive process in which the problem solver draws inferences from known data using problem-solving scripts and schemas. These structures are developed from the person's domain knowledge and past experience. Aaronson's assertion that backward reasoning somehow can imprint scripts and schemas distorts the notion of these structures. Scripts and

schemas are not particular problem-solving methods or techniques learned through a deductive process; they are not, as Aaronson suggests, problem-solving methodologies. They are problem-solving *strategies* that we develop inductively.

In this context, Aaronson again rejects the medical school studies which suggest that backward reasoning actually inhibits the development of schemas and scripts. He argues that "there is no reason to assume that backward reasoning is a hindrance to the development of forward reasoning." He points to no empirical research, however, to support this bald assertion and apparently relies solely on his own experience. While, as I discuss in my article, there are problems applying the medical school studies to the legal setting, we at least should consider those studies carefully before dismissing their findings out of hand. They raise significant concerns about over reliance on backward reasoning in our teaching.

Aaronson's further contention that we cannot access forward reasoning directly as teachers ignores one of the principal objectives of clinical teaching: training our students how to learn from experience. I disagree with Aaronson that clinical teachers should focus on what can be taught explicitly. We certainly have the ability to create environments in which students have the opportunity, apart from didactic teaching, to learn from their client representation. We can, for example, choose relatively simple subject matter areas that encourage students to use the legal doctrine they have learned in other courses; we can develop caseloads for students that give them the chance for repetitive activities; and we can attempt to provide adequate time for case preparation so students are not overwhelmed by cognitive overload. And in a more direct way, we can encourage students to organize the information they obtain in their cases using the legal doctrines they have previously learned.

Moreover, we can teach our students the strengths and weaknesses of both types of reasoning. I am not advocating a pure forward reasoning approach to all cases. As I discuss in my article, even experts use some form of backward reasoning when tackling difficult cases. We need to start to teach students how to distinguish between those cases which can be handled with routine forward reasoning and those which require a more deductive backward reasoning approach. For many years, I boasted that my students treated every case as if it was a federal action, mining every legal and factual issue possible. The cognitive psychology research raises significant questions whether such an approach actually helps students to become expert problem-solvers. Perhaps we should be teaching our students the flexibility to be able to distinguish between routine and "federal" cases.



Most clinical scholarship on the issue of legal problem solving has been based primarily on personal experiences of the author or theoretical or philosophical works unrelated to professional practice. Like Aaronson, however, these writers have not attempted to identify the core of the legal problem-solving process. As a result, this scholarship makes the task of teaching problem solving even more mammoth than may be necessary. I suggest that we try to reduce the size of the elephant by exploring whether legal problem solving has a core and, if it does, how to teach it most effectively. The empirical research on medical education, which has been conducted for over two decades by many researchers, provides a model of ways other professional educators have attempted to understand their own elephant. While the applicability of those studies to legal education can be questioned, they raise significant issues which should not be dismissed lightly. Moreover, they provide us with a more scientific model for assessing our pedagogy than most of us have used in the past. I hope that Aaronson and others will join me in such empirical projects to expand our insights into this difficult issue.