1997

Education's Promise

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This is a story with at least two parts. In the first part, Sam Wineburg, a Professor of Educational Psychology at the University of Washington, tells his story, the story of instruction in the United States, beginning with one revolution, the scientific revolution, and ending with another, the cognitive revolution. In the second part, Laurel Oates, the Director of Legal Writing at Seattle University School of Law, tells our story, the story of legal education and, in particular, legal writing, and how both have been affected by these revolutions.

Sam's Story

Not too long ago, I asked eight high schools seniors and eight historians to verbalize their thoughts as they read aloud a series of historical documents, including diary entries and excerpts from an autobiography, a formal deposition, a newspaper report, a letter of protest, a selection from a historical novel, and an excerpt from a high school textbook.[1] Now the students whom I asked to do this task were not ordinary kids. They were some of the best and the brightest. All had GPAs above 3.5, and all had received high scores on the SAT. Similarly, the historians were a prestigious group. Four of the eight were Americanists, and four were "non-Americanists" who specialized in other areas.

In analyzing the students' and historians' protocols, I discovered three things. First, the students and historians rated the trustworthiness of the items very differently. While three of the eight students gave the excerpt from a high school textbook the highest rating, all of the historians gave it the lowest. Why? Because the textbook contradicted a point made in *both* British and Colonial documents and, when eyewitnesses who are adver-

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[1] Samuel S. Wineburg, *Historical Problem Solving: A Study of the Cognitive Processes Used in the Evaluation of Documentary and Pictorial Evidence,* 83 J. ED. PSYCH. 73 (1991).

saries agree, that's a pretty good indication that something did happen that way. But what about the students? Of those giving it the highest rating, one called it "straight information," and another said it was an "objective account." For these students, the textbook and not the eyewitness accounts emerged as the "primary source."

Second, even when the students and historians had the same scores on a pretest and gave documents the same ratings, they did so for very different reasons. Consider, for example, the explanations that Jan, a historian, and Darryl, a student, gave in selecting a 1859 depiction of Lexington Green as the most accurate representation of what really happened.

Jan's explanation:

> You get the idea from all of the descriptions, whether American or British, that the British soldiers . . . couldn't control themselves. It was a riot—you've heard of the Chicago police riot, well this was a redcoat riot. In all these [other paintings] the British have maintained their lines, and you get the idea that they did not maintain their lines from the accounts . . . . The thing is that none of these [paintings] tell us how the battle started . . . . It's possible that [the 1859 depiction] is the most accurate because they seem to be firing from a building and there was some indication they would be firing from buildings. However, that was only from the British side . . . . Now given the fact that there are quite a few women in this, and no women are mentioned in the document, that is something of a problem, but it also implies that it's kind of a citizenry army, and so that may be accurate.

Darryl's explanation:

> [The 1859 depiction is most accurate] because it gives sort of . . . an advantageous position, where they are sort of on a hill and I presume somewhere over here is a wall I guess . . . . The minutemen are going to be all scrambled, going to be hiding behind the poles and everything, rather than staying out here facing them . . .You know there's got to be like a hill, and they're thinking they got to hide behind something, get at a place where they can't be shot besides being on low ground, and being ready to kill. Their mentalities would be ludicrous if they were going to stand,

like, here in [the 1775 depiction], ready to be shot.[2]

While in her explanation Jan refers to the written documents five times, trying to reconcile what she has read with what she sees in the picture, Darryl makes no references to the written documents. His only reference is to another picture. In addition, while Jan was troubled by the fact that the picture contained details not mentioned in the written documents, Darryl based his decision on a detail, the presence of the hill, that had not been mentioned or alluded to in any of the written documents. Thus, while Jan's selection seems to have been based on specific details about the battle as presented in the written documents, Darryl's seems to be have based on his own 20th century notions of battlefield encounters.

Finally, the historians and students handled not knowing very differently. Thrown into unfamiliar territory, the historians could find routes and pathways because they knew how to use the disciplinary equivalent of a compass. Their expertise lay not in what they knew, but in what they were able to do when they did not know. They could cope with confusion while the students, in the absence of a clear answer, floundered.

The question, of course, is why the students did not do better than they did. Why is it that they rated secondary sources as more reliable than primary sources? That they based their decisions on their personal experiences rather than the documents before them? That they couldn't handle problems that didn't have clear answers?

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We begin our search for answers with a brief historical excursion, going back to the early part of this century to discuss E.L. Thorndike, the father of the modern field of educational psychology and testing, continuing to his disciple, B. F. Skinner, and then talking about how the traditional views of behaviorism have been challenged by what has been called the "cognitive revolution."

Writing in 1910, Thorndike sought to establish a science of human learning that

> . . . would allow us to tell every fact about everyone's intellect and character and behavior, would tell the cause of every change in human nature, would tell the result which every educational force would have. It would aid us to use

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[2] *Id.* at 79.

> human beings for the world's welfare with the same surety of the result that we now have when we use falling bodies or chemical elements.[3]

If you wanted to study learning in 1910, you started not with students in classrooms, but with animals. Now other people had studied animal learning and had described how animals, in facing a problem, reacted in many of the same ways that humans react: they look at what confronts them, sometimes they resort to trial and error, but at other times, a bright cat or dog will sit back and — well— think!

Nonsense, said Thorndike, animals have insights as frequently as do rocks. What we call "insight" is nothing more than the outcome of a behavior that has been stamped in. To prove this, Thorndike took a group of five cats and placed them in a "problem box" where, if they happened to press on a lever, they would be released from the box and rewarded with a little piece of fish. How did learning go on? It was a slow but *predictable* process. Listen to Thorndike's description:

> When put into the box the cat shows evident signs of discomfort and of the impulse to escape from confinement. It tries to squeeze through any opening, it claws and bites at the wire; it thrusts its paws out through any opening and claws at everything it reaches. It does not pay very much attention to the food outside but seems simply to strive instinctively to escape from confinement. The cat that is clawing all over the box in her impulsive struggle will probably claw the string or loop or button so as to open the door. And gradually all the other unsuccessful impulses will be stamped out and the particular impulse leading to the successful act will be stamped in by the resulting pleasure (the piece of fish), until after many trials, the cat will when put in the box immediately claw the button or loop in a definite way.[4]

The cat would paw everything in the cage and then, by chance, hit the lever and be released to a place where the fish awaited. When placed back into the cage, some cats put two and two together. Press the lever, door opens, and voilá: smoked

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[3] E. L. Thorndike, *The Contribution of Psychology to Education*, 1 J. ED. PSCYH. 5, 5 (1910).

[4] GERALDINE JONICH, THE SANE POSITIVIST: A BIOGRAPHY OF EDWARD L. THORNDIKE (1968).

salmon. For other cats, the dumb ones, it took 10 or 12 trials before they got the trick. But regardless of how "smart" the cats were, the process was simple and wonderfully flexible: Simply create stimulus-response bonds through practice and rewards. And if the process was good enough for cats—and could produce scientifically demonstrable results—why was it not good enough for children?[5]

So this is what learning in school became. Reading was no longer a process of partially understanding difficult texts, of reading in a one-room schoolhouse with a more able peer something that one couldn't master on one's own. No, this was an age of Frederick Taylor's *scientific management* when the number of steps a custodian took in sweeping two rooms and the number of hand motions per sweep could be charted with a stopwatch, graphed, predicted, and controlled.[6] Thorndikianism and Taylorism were a stimulus-response bond made in heaven. Learning to read became a process like any other: start with letters, then progress to words, then sentences, then paragraphs, then chapters, then books. It was like building a brick wall. Each stimulus-response bond was a brick, which was fitted together with other stimulus-response bricks, layer by layer, until the wall was built.

Having as their motto, "Substitute science for the rule of thumb, substitute science for tradition, substitute science for philosophy," Thorndike's disciples sought precise measurements of every school task imaginable, from spelling to penmanship, from reading to writing, from math to science, breaking each task into its smallest constituent parts.[7] From Thorndike's office at Columbia University's Teachers College, an army of freshly minted Ph.D's bent on reforming a tradition-bound educational system established laboratories of statistics and psychological measurement in universities, "efficiency bureaus" in state departments of education, and research bureaus in city school districts. And then there were the curriculum developers and the test developers. Curricula were redesigned and textbooks rewritten to present material in carefully sequenced gradations. *The*

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[5] For a more detailed description of these experiments and Thorndike's views, see Chapter 2 in THEORIES OF LEARNING (Gordon H. Bower & Ernest R. Hilgard eds., 5th ed. 1981)

[6] *See, e.g.,* RAYMOND E. CALLAHAN, EDUCATION AND THE CULT OF EFFICIENCY (1964).

[7] Clifford, *supra* note 4.

Adventures of Huckleberry Finn in the 6th grade? No. We know that it is an 8th grade book!

From the 1920s to the 1950s, Thorndike's behaviorism provided the lens through which we viewed education in this country. To be sure, there were dissenting voices—for example, the Gestaltists and some humanistic psychologists[8]—but the folks who made our tests and developed the scope and sequence charts for our reading programs were largely Thorndikians. But where were the shinning results? If our way of educating was so right, why were the Russians the ones launching a satellite to orbit the earth? Why did Sputnik bear a hammer and sickle and not the stars and stripes?[9]

But you see, this was the wrong way to think about it. It was not, the university psychologists told us, that our theories of learning were wrong. The problem was that we were not applying those theories correctly. If we, the *teachers in classrooms*, would only listen, we could turn schools around in an instant. If researchers, using the principles of behaviorism could teach pigeons — yes pigeons, birds whose only claim to intelligence is that they know when we have just finished washing and waxing our cars—to play Ping-Pong, then teachers should be able to use the same principles to teach children to read, to write, and to do math.

Yes, it was we, the teachers, who were lagging behind. Listen to B.F. Skinner, writing in the late 1950s. After describing his research with pigeons, Skinner says:

> From this exciting prospect of an advancing science of learning, it is a great shock to turn to that branch of technology which is most directly concerned with the learning process—education.[10]

If, by following a linear, rational process of breaking each task into its component parts, teaching each part in turn, and not progressing until the previous part had been mastered, pigeons could be taught to do things that no one would have imagined, why should it be any different, said Skinner, for "rats, dogs, monkeys, and human children and most recently human

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[8] *See, e.g.*, MAX WERTHEIMER, PRODUCTIVE THINKING (1945).

[9] ARTHUR BESTOR, EDUCATIONAL WASTELANDS (1953).

[10] B. F. Skinner, *The Science of Learning and the Art of Teaching* 24 HARVARD EDUC. R. 86 (1954).

psychotic subjects."[11]

Skinner was a practical visionary. Teaching was not the "one-on-one" shaping and reinforcing that you can do in a carefully controlled laboratory setting. The complexity of shaping 35 breathing, pulsating, perspiring children was mind boggling.

> Since the pupil is usually dependent upon the teacher for being right and since many pupils are usually dependent upon the same teacher, the total number of contingencies which may be arranged during, say the first four years of instruction, is of the order of only a few thousand. But a very rough estimate suggests that efficient mathematical behavior requires something of the order of 25,000 contingencies. In the frame of this reference, the daily assignment in mathematics seems pitifully meager.[12]

What to do? Recall that the "contingencies" Skinner speaks of, 25,000 of them, are Thorndike's pieces of fish: rewards that you need to produce an error-free performance. How were teachers to run around the room simultaneously giving out gold stars and good girl/good boy stamps to cement every single bond that needed to be cemented? There was only one answer. Replace the teacher with "teaching machines," that is,

> [d]evices that present carefully designed material in which one problem can depend upon the answer to the preceding and where the most efficient progress to an eventually complex repertoire can be made.[13]

These devices, crude hand-cranked boxes with moving paper "programs," would do the ultimate to error: they would be so exact, so precise in their apportioning of subject matter, that error would be programmed out of existence. Listen again to Skinner's words—a proclamation of an end to the reign of error:

> Additional steps can be inserted where pupils tend to have trouble, and ultimately the material will reach a point at which the answers of the average child *will almost always be right.*[14]

Almost always being right! Now this was no ordinary theory. This was an incredibly *practical* theory. Not only did it tell us

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[11] *Id.* at 89.
[12] *Id.* at 91.
[13] *Id.* at 95.
[14] *Id.* at 95. (Emphasis added)

how a child learned, but it also told us how we should teach: State clear objectives, break down complex behaviors into their constituent parts, and make guided practice a part of every lesson. In addition, with its emphasis on error reduction, Skinner's theory even told us where we should pitch our questions: make them easy, but not ludicrously easy. Strive, the researchers told us, for about an 83% success rate.[15] And, even if we didn't have teaching machines, we could still adapt. There were programmed instruction booklets: go at your own pace, do a frame, look at the answer, and move on, brick by brick, layer by layer.

At first, few seemed concerned by the cracks in the system. Those who criticized the behaviorist model were considered naysayers, "romantics" who saw teaching as an art, something ineffable, unable to be spoken about except in poetry or song.[16] But the questions these critics asked weren't being answered. For example, the behaviorists had a difficult time responding to Noam Chomsky's 1959 review of Skinner's book, *Verbal Behavior*.[17] How did we learn language according to the behaviorists? By trial and error, just like Thorndike's cat. The baby begins to make a sound, not quite knowing what that sound means: ah ahp ahp. The mother hears, "APPPPPP"? Could that be my precocious one-year-old telling me that she wants. . .yes, that's what it is, AHP, yes, an APPLE! And, before the child knows what is happening, the delicious red thing is thrust into her hand, and, lo and behold, a stimulus-response has been formed. Say AHP, and you get this juicy fruit. The bond is stamped in just as mightily as the lever/fish connection was for Thorndike's cats. But wait, Chomsky said, if this were true, if language was a *behavior* that resulted from our direct confrontation with the environment, thousands upon thousands of individual bonds built up by experience, how is that we can comprehend language we have never heard before, how can we comprehend words that are not even words?

> To prove his case, Chomsky turned to Lewis Carrol's "Jabarwacky."[18]
>
> Twas brillig and the slithy toves did gyre and gimble.

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[15] Barak Rosenshine and Robert Stevens, *Teaching Functions*, Chapter 3 in HANDBOOK OF RESEARCH ON TEACHING (Merlin C. Wittrock ed., 3d ed. 1985).

[16] GILBERT HIGHET, ART OF TEACHING (1950).

[17] B.F. SKINNER, VERBAL BEHAVIOR (1957).

[18] Norm Chomsky, *A Review of B.F. Skinner's* Verbal Behavior, in STRUCTURE OF LANGUAGE: READINGS IN THE PHILOSOPHY OF LANGUAGE (JA Fodor and JJ Katz eds 1964).

Now what does this mean? We have never heard the word "tove" before, and we can't find it in a dictionary. But one thing is certain. We would never think about kissing a tove, or even getting near one. The reason? They're "slithy," another word that appears in no dictionary.

Chomsky said we have a deep structure for learning language, that the essence of knowing is not in knowing all the parts, but in having an understanding of the whole. Think about our four-year-olds. Their vocabulary is, to say the least, limited. And yet, they can make linguistic transformations so sophisticated that we've yet been able to program a computer to make them.[19]

Moreover, think about how we learn our first language. Our parents talk to us not with single words, but in sentences. As children, our understanding is a mix of both things we know and don't know. It is anything but the careful, stepwise progression that we have in ALM Second Language. And yet, though few of us ever learn a second language, we all learn our first one.

OK, say the behaviorists, maybe there is a little problem with language. But the theory works with other types of learning. If you want children to learn to read and write, teach them the behaviors step-by-step. But then we began to notice other leaks in the dike and pretty soon there were too many to ignore. No longer was it a particular application of behaviorism that was being challenged, but its core. From Thorndike to Skinner, and from programmed instruction to the basals and workbooks that we have today, the basic premise was that any complex behavior could be broken down into a very large number of very small steps. We could then create a "learning hierarchy," help kids master each of the steps, and, when had they mastered all of them, it would all "snap together."[20] But would it? That's what the German psychologist Max Wertheimer, who came to the United States before the war but only published his findings in 1945, wanted to find out.

Take a moment and try one of Wertheimer's most famous problems, given to fifth graders in dozens of American elementary schools.[21] Wertheimer told children to do the following three

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[19] *See* MORTON M. HUNT, THE UNIVERSE WITHIN: A NEW SCIENCE EXPLORES THE HUMAN MIND (1982) OR JOHN T. BRUER, SCHOOLS FOR THOUGHT (1993).

[20] ROBERT M. GAGNE, CONDITIONS OF LEARNING (1981).

[21] WERTHEIMER, *supra* note 8 at 41.

division problems: 321 + 671 + 35 divided by 5; 540 + 689 + 390 divided by 6; and finally 213 + 213 + 213 divided by 3.

What Wertheimer found was that children dutifully executed the appropriate routines for multiplication and division, right down to the last problem, for which they carefully added up 213 three times (639), drew a long division bracket, divided 639 by 3, and, lo and behold, got the answer of 213. The children could multiply and add correctly. Each brick was structurally sound. The problem was that the children could not use the brick to build a wall let alone a house or a castle. What do I mean? The children saw 213 + 213 + 213 and proceeded to put it into three columns, three plus three equals six, three more is nine; one plus one is two and one more three; two four six, okay, now draw the brackets. 639 and then divide by 3, and wow, look! 213? No? Really? How did that happen? Neat! What a coincidence. The problem was that *it is no coincidence*. If you understand the core relationships between the four operations, multiplication as repeated addition, the reciprocal relationship between multiplication and division, you needed to do no computation. You *saw* it. It was there as plain as day. It was a deep understanding—not magic, not a coincidence—but the way the structure of knowledge worked. Unfortunately, it was only the odd fifth-grader, and for that matter, the odd adult, who saw this relationship. For most, the bricks of knowledge never "snapped into place."

Let's not go overboard. Behaviorism did have its successes. In teaching basic skills, for example, decoding in reading and basic computational skills in arithmetic, it achieved stunning successes, often with children for whom little success was expected. But it faltered in taking kids beyond the basics to those ways of thinking and knowing that are increasingly demanded of a work force that has virtually eliminated the assembly line in favor of the "work team." Kids could often do the basics, as the following famous, or should I say infamous, bus test question on a 1987 National Assessment of Education Project (NAEP) exam showed.[22]

> An army bus holds 36 soldiers. If 1128 soldiers are being bused to their training site, how may buses are needed?

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[22] For a different version of the same critique, see JEROME BRUNER, THE PROCESS OF EDUCATION (1962).

Seventy percent of the students who worked this problem did the long division accurately. However, the most common answer among 17-year-olds, 29% of the kids who sat for the test, was 31 remainder 12. As commanders of this unit, they would order 31 remainder 12 buses. Only 23% gave the correct answer: 32 buses. Now there are many plausible explanations to why this is so, but the larger issue is clear. Kids who can do all the parts, solve all the tiny bits, have a tough time putting it all together. Although school is supposed to "add up," it doesn't—not only for our kids but also for ourselves. How many of us are like the students math educator Marilyn Burns interviewed who, when asked about why they used a particular procedure, answered "that's how we did it last year."[23] The essence of learning was in its rules: knowing meant knowing a rule. Unfortunately, though, our knowledge wasn't flexible. If we knew the rule, we could solve the problem. However, if we didn't know the rule, we were lost. We could do the problems in our workbooks but not the ones that we confronted in our own lives.[24]

And the problem wasn't just in math, but in other subjects as well. In the video, "A Private Universe," a National Science Foundation researcher asked 21 Harvard undergraduates and professors why it is warmer in the summer than it is in the winter, a question that is discussed at at least three different points in the typical elementary and secondary curriculum and that is covered in most college physics courses. Despite this instruction, most of the undergraduates and professors answered the question incorrectly, discussing the distance between the Earth and the sun and other factors rather than discussing the way light hits the Earth.[25]

As the leaks in the system became harder and harder to ignore, people began to think about learning in very different ways. Instead of talking about learning in terms of behaviors, researchers began talking about it in terms of cognition. Gone were the references to stimulus-response bonds, learning hierarchies, and the elimination of error. Researchers were now talking about schemata, mental models, and the construction of meaning.

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[23] Marilyn Burns, Teaching "What to do in Arithmetic vs. Teaching "What to do & Why," 43 EDUC. LEADERSHIP 34 (1986).

[24] See also, Alan M. Schoenfeld, *When "Good" Teaching Leads to Bad Results*, EDUC. PSCYHOLOGIST (1985).

[25] A Private Universe (Pyramid Film and Video 1986).

It is this new way of thinking about learning that we are referring to when we talk about the cognitive revolution.[26] And it has been a revolution both in the sense that it asks us to think about things in an entirely new way and in the sense that the old structures were not dismantled in an orderly manner. In addition, the revolution is not yet complete. There are still many institutions and individuals who are fighting actively against the cognitivist approach. But the national initiatives we hear about, NCME, NBPTS, HOLMES, NEW STANDARDS, have embraced it.

So what exactly is it that these national initiatives are embracing? At one level, it is a change in what we mean by "knowing." In behaviorism, knowing meant knowing the rule. But in cognitive psychology the essence of knowing is understanding. Because it is impossible to learn a rule for every problem and situation that we will encounter, we need to develop schemata or mental models that allow us to go beyond the information given. Learning must prepare us to be flexible, teach us how to bend, prepare us to make do when we don't have all the pieces. It must prepare us to speculate, not guess; to estimate, not randomly choose.

Thus, we are in search of a new metaphor. If learning is not as Skinner or Gagné would have it, a wall made up of millions of subskills, what is it? What if, instead of a wall built brick by brick, learning is more like a picture that comes slowly into focus? Instead of starting with the pieces, we start with the whole, seeing first its general shape, then the primary lines, and then the details.

If we use this metaphor, our notions of knowledge change dramatically. No longer are the connections linear; they are associative. The cognitive connections that we create are less like the nice, ordered connections of a scope and sequence chart and more like a Faulknerian novel, where connections are made sideways and forward, jumping ahead and circling behind, and where, to finally achieve some understanding of the whole, we must live through moments of utter confusion with only our faith that perseverance will finally pay off. Knowledge is not simple or one dimensional. It is complicated, looping and somersaulting, associating and connecting in ways that not even the most sophisticated computer program can duplicate.

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[26] For a more complete history of cognitive science, see HOWARD GARDNER, THE MIND'S NEW SCIENCE (1984).

And what if learning comes about not by doing something once, but by doing it over and over as we reflect carefully on it? If this is true, the essence of learning would not be what we can do in the single-timed essay test for 40 minutes, a cultural form still used in statewide writing assessments and college classrooms, but our ability to take that good but flawed first draft written in 40 minutes, and stick with it, through multiple drafts, stick with it, even when we hate it, and taking that first draft through a process that will make it a finished piece. If this is the case, then our response to error cannot be quick, we cannot be hasty, quick get the eraser — put an end to that sentence; no, error is the clue to success. Error, when we detect it, cannot be dismissed until it discloses its lesson to us.[27] This, I would assert, is the essence of the reforms. It is an invitation to think about what it means to err. To err and go on. To err and invite that error to stay around and be one's teacher.

If we see these reforms as just the latest brainchild of someone with a pocket panacea, if we think about the call for reform as just another set of techniques, for example, requiring the use of portfolios instead of multiple choice tests or performance assessments instead of true/false tests, we miss an opportunity to rethink what knowledge is.

If we have been brought up to think of knowledge as fixed and known, where do we learn to cope with the uncertainty that I am advocating? This whole approach, designing large, challenging tasks for youngsters and teaching them not to recoil from error and confusion but to work through it, will not be easy; this is not a "throw away your crutches in the one-day workshop" way to teach. In changing our role from an error detector to hinter, from arbiter of right and wrong to endower of skills and thoughtfulness, from a test grader to a diviner of signs, we lose our old and trusted supports. The tests that come with the multiple choice unit reviews, all of these come to look a bit less adequate than they did before.

It means that we give assignments in our English classes, our social studies classes, and our science classes that ask students to reflect on the first draft of work they handed in. What was good about it and why? And what would they want to fix? What risks did they take? What did they try that they weren't sure they could do? Students "self assessment" should not be an

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[27] Dennie P. Wolfe, *Assessment as an Episode of Learning*" (in press) and Samuel S. Wineburg, *T.S. Eliot, Collaboration and the Quandaries of Assessment* (in press).

add on or "extra credit." We should give as much weight to our students' "reflections" as we to do the math assignments, the essays, and the document evaluations. If we don't, students will simply dismiss them. We don't just "pick up" how to reflect on our work. It is a highly refined, deeply practiced skill. When we take risks, we are bound to err. That is the price we pay. But there is an alternative to denying error. Instead of blotting it out, instead of running from it, we can look at it, we can confront it, we can—strange as it may seem—celebrate it. When a risk we take ends up in a botched activity, we can say to our students, "Look, this is what I wanted to happen. This is the risk I took. And it bombed. How could I do it differently? What advice could you give to me?" In treating error this way, we model for students a lesson in intellectual courage.

Our Story:

Our students are Sam's students, only a few years older. They are, most of us would agree, the brightest of the bright. Not only do they have high high school GPAs and SAT scores, but they also have high undergraduate GPAs and LSATs. They are, however, also products of the behaviorist legacy. Whether they are in their twenties, thirties, or forties, most of them were taught not only reading and math but also English, science, and history one brick, one layer, one wall at a time. Knowledge, even in college, was knowing the rule, coming up with the correct answer.

So what happens when these students come to law school? Are they simply asked to do more of the same? To learn, rule by rule, the rules of law? Or, are we asking them to do something different? Do we mean it when we tell them that law school will teach them not the law but how to think like a lawyer?

Like behaviorism, the case method of legal education has its roots in the "scientific revolution" of the late 1800s. Dissatisfied with the lecture method and eager to bring more prestige to the study of law, Christopher Columbus Langdell believed that lawyers should be trained in the same way as biologists, chemists, and physicists. Instead of reading textbooks or sitting through lectures, they should study the discipline's "corpus." Thus, while biology students studied plants and animals, identifying, analyzing, and classifying them, law students studied judicial

opinions.[28]

Unlike behaviorism, though, the case method did not, at least on the surface, have as its focus the development of bonds between stimuli and responses or an obsession with the elimination of error. While practices varied from classroom to classroom, most law professors were not so concerned with teaching rules as they were with teaching students to read carefully, to extract the rules and key facts, and to make arguments. As Steven Friedland found in his recent study, most professors have as their goal improving their students' thinking.[29] Professors want their students, when confronted with a new case, to be able to make sense of it, when confronted with a new fact situation, to be able to make each side's arguments. To use Sam's language, they want to give their students a disciplinary compass.

"Ah ha," you say, "so law schools have been using the 'new' cognitivist model all along." Like every thing else in law, the answer is yes and no. Yes, law schools do view knowledge as more than just knowing the rule and, yes, they do try to help students develop new schemata. How do you identify the legally significant facts? How might you frame the question before the court and its holding? What are the policies underlying the court's decision? The schemata that law schools help their students develop are, however, extremely limited. Although students learn schemata for reading cases for class, they do not, for the most part, learn schemata for reading cases as advocates. Although they develop schemata for answering exam questions, they do not develop schemata for answering questions posed by clients or courts. We give our students compasses, but these compasses work in only limited types of terrain.

In addition, at least in some courses, the approach is more like that of the behaviorists than the cognitivists. For example, in some civil procedure and evidence courses, students learn the rules but not how and when to apply them. Similarly, in some upper division courses, students learn doctrines but not how to manipulate them. And then there is the way in which some professors manage their classrooms. While they may be on the right track in seeking to bring their students, through classroom

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[28] Harvard University, THE HARVARD LAW SCHOOL: ITS HISTORY, ITS DEVELOPMENT, ITS NEEDS (1925).

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

questioning, into the "discourse community," the community that they present is often an extremely hostile one.

So what about the teaching of legal writing? Have those of us who teach legal writing adopted the behaviorist model or have we, like the other law school professors, leaned more towards the cognitivist model? The answer is that, at least in the seventies, we tended to favor the behaviorist approach. In most of the early research and writing courses, research and writing was broken down into its component parts and each part was taught separately. Thus, legal research was taught separately from legal analysis, and legal analysis was taught separately from "legal writing." In addition, in teaching each of these parts, our emphasis was on the decontextualized transmittal of information. For example, in teaching legal research, we emphasized the names of sources, what type of information was contained in each, and how one used and updated each source and not how a lawyer researches a familiar or unfamiliar area of law or questions and evaluates the sources that he or she locates. Similarly, in teaching legal writing, we emphasized the format of various types of legal writing, for instance, objective memoranda and appellate briefs, and the "rules of good writing" rather than the processes used by expert attorneys in thinking and writing about a legal issue. Our teaching methods also mirrored those being used by the behaviorists. We tended to favor well-organized lectures over more free flowing discussions, exercises that had "right answers" over more realistic, and more complex, problems.

It wasn't long, however, before those of us who were teaching legal writing realized that there were serious problems with our approach. Like the math students who could do the math problems in their math books but who could not figure our how many buses were needed, our legal writing students could tell us what type of information was contained in a particular book, the format for a question presented, and how to fix a comma splice, but they couldn't write a good memorandum or brief.

In an attempt to stop these "cracks," in the eighties most of us adopted the "process model" for teaching writing. At a minimum, we described the four steps in the writing process—prewriting, drafting, revising, and editing—and encouraged our students, instead of writing their papers the night before, to go through each of these steps in sequence. In addition, many of us began to get actively involved in the process. Instead of simply assigning a project and then grading the final product, we began

adding prewriting exercises and requiring first and sometimes even second and third drafts, which we critiqued and then returned to our students for revision.

At this point, it is important to point out that our extra efforts helped. The final drafts of the memoranda and briefs were better than they were before. They were better researched, better organized, and better written. In addition, our more able students were able to take what they had learned in our classes and use it to write high quality memoranda and briefs for their employers.

The problem was, however, that not all of our students were so "able." Even some of the students who had done well in our legal writing classes seemed to have difficulty "transferring"[30] what we had taught them to the world of practice. We began to hear complaints from librarians that students lacked basic research skills, from clinicians that students couldn't develop a theory of the case, and from judges that students couldn't write tight, well-structured arguments."

The question, of course, is why. One possible answer is that they simply forgot what we had taught them. Although they may have known how to write a good memorandum or brief during their first year, they forgot how to do so by their third year. Another possible answer is that they simply did not get enough practice applying what we taught them. In a typical first-year legal writing program, students research and write only two or three memoranda and one brief, hardly enough practice to master a difficult task. Another answer is, however, that we are still not teaching our students everything that they need to know. Although we need to transmit information to our students and we need to teach them writing processes, we also need to carry through on the promise that we make to them on the first day of school: we need to teach them how to think like lawyers. For, until they know how to think like a lawyer, they can't write like one.

But how do we teach our students to think and write as lawyers? The bad news is that, at this point, no one knows for sure. Just as law schools are struggling to find ways to better teach their students, so are medical schools, business schools,

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[30] For a general discussion of transfer, that is, the ability to apply knowledge and strategies to new situations, see R.J. Spiro et al, *Knowledge Acquisition for Application: Cognitive Flexibility and Transfer in Complex Domains*, in EXECUTIVE CONTROL PROCESSES (B.C. Britton ed. 1987)

and graduate programs in history, psychology, and engineering. First, we need to rethink our notions of knowledge, learning, and error. We need to abandon the brick and wall metaphor of knowledge with its linear connections and replace it with a picture that, with repeated and varied exposures and the help of teachers and peers, slowly comes into focus. In addition, we need to abandon the view of learning that values the product but not one's reflections on the process that created the product. Finally, we need to abandon view that error is bad, adopting instead a view that allows us to use error as an opportunity for teaching.

Second, we need to study how expert lawyers think and write, using protocol analyses to look at, among other things, the types of information that these experts have, how they organize that information, how they acquire new information and incorporate it into their existing knowledge structures, how they evaluate authority, and how they make decisions.[31]

Third, we need to look at the ways in which expert lawyers became experts. What types of instruction and experiences did they have? What type of mentoring or scaffolding seemed most effective? How long did the process take? Finally, we need to think about the ways in which we might structure our curricula to help our students develop such expertise. Do we simply need to tinker with our curricula or is a wholesale revision necessary?

The bottom line is that we, as some of the most interested members of the profession, need to advocate for, support, and participate in an open debate on the nature learning and conduct research designed to study how law students become expert lawyers. We then need to revise our curricula and teaching accordingly, looking for ways not only to transmit information to our students but also to help them develop ways of thinking and writing as lawyers.

A Final Note

In closing, we would like to turn to our title. What is education's promise? Is it simply to transmit information, without error, from one generation of privileged students to the next? Or is it much more? Can we as educators—as teachers and mentors—help our students develop the connections and strategies that will allow them to use that information in the real world?

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[31] For a discussion of using protocols, *see* Michael Pressley and Peter Afflerbach, Verbal Protocols of Reading (1995).

For example, can we help elementary school students learn how to use addition, subtraction, multiplication, and division to solve everyday problems, high school students how to evaluate historical documents as historians evaluate them, and law school students how to write effective memoranda and briefs not just for us but for real clients with real questions and problems?

In addition, can we as educators keep our promise to more students than just those who would "get it" with or without us? Can we develop curricula and teaching methods that educate those who are less able and those, who although very able, come from less privileged backgrounds?

We can, we believe, keep these promises. However, if we are going to do so, we must take chances. We need to learn how to reflect on what has and has not worked and then take the time to engage in such reflection. In addition, we must be willing to discard some of our own rules—the rules of teaching that don't seem to be working with the students in our classes. We must be willing to throw away our crutches, the syllabi and teaching methods that we have used for years, and construct new models, new approaches to teaching. In short, instead of running from our own errors in curriculum design and teaching, we need to see those errors as opportunities for learning.