TWO PROBLEMS WITH TEACHER KNOWLEDGE

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Shulman's[1] notion of a knowledge base for teaching" and, specifically, his argument that teachers possess "pedagogical content knowledge," invites further analysis. Buchmann,[2] for example, describes two likely political or social forces behind the knowledge base argument. One stems from motivations to professionalize teaching. Researchers attempt to dignify the practice of teaching by showing its rich, complex nature. The tone of these discussions is often positive, perhaps inspiring, liberating or enlightening. The other stems from motivations to evaluate teaching. Researchers attempt to scrutinize the nature of teaching in order to better clarify ways in which teachers should be accountable. The tone of these discussions is often negative or critical, sometimes belittling the enterprise of teaching.

Irrespective of whether one studies teachers in order to praise them or to bury them, at least two interesting philosophical questions arise when the notion of teacher knowledge is examined in greater detail. The first, which will be called the "tacit problem," is that teacher knowledge appears to be primarily a form of knowledge how. In other words, the most credible justification for a teacher's knowing is the fact that he or she can do something in the classroom (eg., create situations that enable students to learn). The second, which will be called the "situated problem," is that teacher knowledge is deeply dependent on particular times, places, and contexts, and lacks the general character of knowledge in mathematics, physics, or even psychology. Thus, it is difficult to formulate criteria which can be used to explain how a piece or instance of teacher knowledge might be justified.

Many researchers have described the tacit and situated nature of teacher knowledge.[3] The motive for rehashing these problems is not to disprove what Shulman writes, but to speak more carefully about the connection between knowledge and teaching.

In what follows, it will be argued that the situated problem is methodological and that its resolution depends on the way meaning and generality are parceled out in discursive forms. In other words, the situated problem belongs to the same category as more general discussions within the educational research community regarding the nature of justification and truth; and, assuming a liberal eclecticism, the situated problem turns on a "matter of taste." The tacit problem, on the other hand, is more serious and challenges more directly the concept of a "knowledge base for teaching." It will be argued that a "solution" to the tacit problem would require a link between psychological causes of skill performance and conceptual reasons which evaluate performance as skillful. Exploring this problem in greater detail will resurrect some of those ghosts and goblins that Ryle[4] tried to exorcise in his discussion of "knowledge how" and "knowledge that."

THE SITUATED AND TACIT PROBLEMS

To begin the analysis, the situated and tacit problems will be framed in a way that will assist further study. The tacit problem is that teacher knowledge might be expressed only as a skill or knowledge how. Methods books and prescriptions such as "Don't smile 'till Christmas" aside, one could argue that there is little of interest about teacher knowledge that can be put into discursive form. This is not to disparage or belittle the skill of teaching. It is to suggest that trying to relate this skill to

something *that* a teacher knows is difficult or impossible. All that can be done is to describe *how* some individuals are incredibly successful at getting their students to learn.

The situated problem is that criteria for truth and justification for alleged cases of teacher knowledge are difficult to formulate. One might succeed in eliciting, describing, or fabricating a discourse, narrative, or text which somehow implies, embodies, or otherwise constitutes "teacher knowledge." But it could be argued that the criteria for evaluating this artifact are so diffuse that it is impossible to get any community agreement about them. Results of process-product research aside, one might argue that the domain of teaching is so complex that it is fruitless to come up with any generalizable laws about the phenomenon. All that one can say is that this worked for that particular teacher on that particular date and time.

The situated and tacit problems are not identical. Situated knowledge is not necessarily tacit. A student might be able to correctly state the Pythagorean Theorem and demonstrate his/her knowledge on Geometry homework exercises. Yet, the same student might have no idea as to how to find the distance of a throw from home plate to second base, even when the student also knows that the baseball "diamond" is really a square with side length of ninety feet. By the same token, tacit knowledge is not necessarily situated. A cartoonist might be able to work with issues from Republican presidential candidates, attitudes toward Hurricane Andrew, and local views on gun control. But when an expert (eg., a neurophysiologist, a social analyst, a teacher of cartooning, or even the cartoonist him/herself) tries to describe the skill used to make these diverse parodies, the humor evaporates into thin air.

Thus, it is not contradictory to claim that a given instance of knowledge is situated in a particular time, place, and context and also to claim that the knowledge can be expressed in an explicit form. For example, Tolstoy[5] was able to paint a meaningful and memorable picture of the forces that fueled the Russian War with Napoleon, using very situated, particular terms (eg., the relationships between Natasha, Pierre, Andre, etc.). It is only in an appendix to his great novel that he then goes on to write, in more general or universal terms, about the forces that move history. The fact that something is meaningful, but perhaps not statable in general terms, does not make it tacit. *War and Peace* is a text or artifact that embodies knowledge of the social and political powers *that* can be used to explain history.

Similarly, to argue that a person's knowledge is only describable as "knowledge how" is not to argue that this knowledge is necessarily situated. Leonardo da Vinci not only left timeless artifacts such as the *Mona Lisa*, the *Last Supper*, and the *Annunciation*, he was also skillful as a military engineer, designed waterworks for the King of France, invented (or sketched) diving bells, experimented with flying machines, and developed theories of anatomy, light and shade, and the movement of water. In other words, Leonardo was the quintessential "Renaissance Person," possessing general skills that cut across a variety of situated domains. But, try as one might, it is difficult to explain his genius in terms of something *that* he knew.

In analyzing the situated problem in the next section, it will be assumed that a given instance of teacher knowledge is *not* tacit. This move will make it possible to analyze what "being situated" contributes to the problem of teacher knowledge, without becoming enmeshed in an analysis of the tacit and situated problems simultaneously. It might be objected that teacher knowledge is both situated and tacit, and thus that the move creates an artificial case. This might well true, but (as it will be argued in the second section, below), the tacit problem is sufficiently difficult to challenge the concept of teacher knowledge, *irrespective* of whether teacher knowledge is situated or not. Thus, the approach below will be to first "assume away" the tacit problem and then to examine the cost of this assumption.

TEACHER KNOWLEDGE AS SITUATED BUT NOT TACIT

The assumption that an instance of knowledge is *not* tacit implies that it can be put into some form or another that is different from the skill or "know how" that evinces it. The exact nature of this form is subject to debate. The standard answer, of course, is that this form is a true proposition, and a person "knows that" something is the case just when he/she justifiably believes the corresponding proposition. But one could argue that a piece or instance of knowledge is not tacit and yet still deny that it can be described as justified, true belief. Many credible theorists, such as Rorty,[6] argue that literature might be regarded as implying or embodying "knowledge," if one is willing to relax the idea that knowledge must somehow picture or represent reality. In a similar spirit, Bruner[7] distinguishes between "paradigmatic" (scientific) and "literary" ways of knowing and points out that certain forms of ambiguity are a virtue in narratives but a vice in expository accounts. *War and Peace* would not have the same charm if the motives of Pierre and Natasha were described in neurophysiological terms. On the other hand, mathematical set theory would still be enmeshed in the paradox described by Russell if notions of logical predication were permitted to be as ambiguous as those that drive human action.[8]

The point in raising this issue, however, is not to debate whether or not there is a literary way of knowing that is different from the scientific. Without taking sides on the issue, there would seem to be no *a priori* reason why one cannot have it both ways. In other words, there would seem to be no reason why teacher knowledge could not be displayed both in Fenstermacher's[9] logical analysis of teachers' arguments and in Buchmann's[10] literary analysis of teachers' conversations. The difference between these forms is (arguably) a matter of taste. As Shulman[11] points out, one of the qualities of education as a healthy "field of study" is that it can accommodate researchers having various tastes, methodological persuasions, and axes to grind.

One might object that this conclusion is too simplistic. It sweeps under the rug a mountain of methodological dispute about the nature of knowledge in educational settings. Fundamental differences between, say, Eisner and Phillips[12] are allowed to melt away. However, my goal right now is to *identify* the situated problem of teacher knowledge, not to *solve* it. The methodological debates carried out in the *Educational Researcher* may rest on tacit premises, but the arguments themselves, as anyone trying to keep up with the literature will find, are certainly not tacit. The intent here is not to trivialize the important debate among educational researchers regarding the status of various forms of knowledge. The intent here is to identify this more general problem of knowledge justification with the problem of analyzing non-tacit but situated teacher knowledge. If one "assumes away" the tacit problem, the residue that is left is a methodological dispute over the nature of knowledge justification.

If a given instance of teacher knowledge, though not tacit, is situated, then it can be examined for its admissibility or nonadmissibility by the community of educational researchers. The knowledge might be in the form of a video transcription, a series of field notes, a narrative, a series of scores on an observation instrument, or some other artifact. The epistemic problem, then, becomes one of describing in what sense this text might be described as an example of, as implying, or as demonstrating "teacher knowledge." For example: Why does this particular video clip of teacher X explaining the Pythagorean Theorem serve as an example of "good teaching practice"? Why does this pattern of scores on a classroom observation instrument indicate that teacher Y is conducting a discussion of *Hamlet* in a way that is "effective"? How can one substantiate a claim that teacher Z's theory about teaching the causes of the Revolutionary War is valid? Though there is no general agreement on the way that these questions should be answered, there would appear to be, at least, a sense of the issues and arguments that would arise in trying to answer them.

Lest it appear that the author is trying to sidestep a problem that is incredibly difficult (eg., the nature of knowledge justification in educational research), the point being made here is that "trying to sidestep" is an activity that is conducted by those interested in research on teaching, and this activity assumes that there is "something to sidestep" (e.g., a solution to the tacit problem). "Sidestepping" in this context assumes that teacher knowledge can be represented in *some* form

(proposition, argument, painting, or artifact). The nature of this form, of course, is precisely the issue of debate. But what is not debatable, assuming a solution to the tacit problem, is that teacher knowledge can be represented in some form.

This "solution" to (really, identification of) the situated problem does not assume community agreement about a methodology to study teacher knowledge. But it does assume that there is something substantive to argue about. A skeptic may argue that this solution is not satisfactory. An even more extreme skeptic, however, might argue that there is nothing worth trying to be satisfied about. Perhaps researchers of teaching, irrespective of the way in which they attempt to balance the generality and the meaningfulness of their statements about teacher knowledge, can never succeed in understanding, eliciting, or characterizing what effective teachers know. Perhaps teacher knowledge is so *radically situated* that it cannot be taken away from the classroom and put into the hands of either the novelists or the psychometricians. The next section will explore the logic of this skeptical position in greater detail.

TEACHER KNOWLEDGE AS TACIT (WHETHER SITUATED OR NOT)

The situated problem stems from the fact that the criteria used to evaluate some text or artifact that embodies teacher knowledge are difficult to formulate in general terms. The proposed "solution" to the situated problem assumes a willingness to engage in a conversation about the sense in which a certain artifact evinces or otherwise demonstrates teacher knowledge. The text is assumed to be given. One seeks an interpretation.

The tacit problem, however, is more insidious. Though there may be artifacts (eg., lesson plans, video clips, even student test scores) which a knowledgeable teacher is somehow responsible for, these artifacts may say nothing about the knowledge of their creator. This is because the criteria used to evaluate an artifact associated with teacher knowledge are not the same as the criteria used to evaluate what a teacher knows.

Leonardo da Vinci, for example, left many timeless works of art that prove his skill. But these artifacts do not explain what Leonardo knew. Try as one might, it is difficult or impossible to distinguish Leonardo's "know how" (from, say, that of the average fifteenth-century Florentine duffer) on the basis of something *that* he knew. One might engage in erudite discussions about da Vinci's style, his education, his use of history, or his role in shaping the art and science of fifteenth-century Italy. But such a discussion would not provide a description of what Leonardo knew, nor would it provide a psychological characterization of the "know how" responsible for (say) the *Mona Lisa*. The proof is in the pudding, that is, in the painting.

This point, of course, was forcibly argued by Polanyi[13] more than thirty years ago, not only in the case of an artist's skill but also in the case of any skilled performance, such as the conduct of science. Many philosophers of science underscore Polanyi's argument by distinguishing between a "logic of discovery" and a "logic of testing or justification." Whereas the latter can be codified in the form of methodological texts (eg., methods of mathematical physics, statistical techniques in education), the former are (arguably) not capable of any nontacit formulation. This point, applied to the case of teacher knowledge, would place a teacher's "knowledge how" on a par with a scientist's "logic of discovery" or Leonardo's skill in painting, where formalization of this knowledge becomes difficult or impossible.

One objection to this way of framing the problem is that there must be *something* that accounts for the difference between a dullard, somewhat accidentally getting stellar results on a given instance, and a professional who has a particular disposition to consistently "get it right."[14] In other words, it seems plausible that skillful teachers know something that their less skillful colleagues do not know. Research in teaching, for example, has examined the pedagogical thoughts and decisions which lead to actions,[15] and some have argued that there are differences between the "cognitive structures" of

novice and expert teachers.[16] However, the point here is that the criteria that are used to evaluate a teacher's cognitive structure (eg., connectedness, completeness, resiliency) are not the same as the criteria that are used to determine either the validity of a teacher's beliefs or the effectiveness of a teacher's lessons.

This could be phrased in another way. Cognitive studies of problem solving behavior aim at providing descriptions of hypothetical, intellectual processes that chess players, mathematics students, and teachers engage in. These descriptions might, as in the case of an analysis of Leonardo's hand movements, tell a lot about what the relevant thinker is doing. They might even provide a formal description of what the thinker's mind is "doing" while engaging in the particular skill. But the criteria used to evaluate a description of the thinker's cognitive processes are not the same as the criteria that are used to demonstrate the thinker's knowledge, at least as this knowledge is embodied in the relevant artifact (eg., lesson plans, excerpts of teaching, even student test scores). The former criteria are descriptive-empirical or psychological, whereas the latter criteria are normative-intellectual or logical.

Teachers, like all human beings, certainly engage in actions that are thoughtful, reflective, etc. But the bite of tacit problem is the following question: What is the force of this pedestrian, descriptive fact for a normative characterization of teacher knowledge? Both good and bad teachers think, just as both Leonardo and his not-so-successful Florentine associates presumably thought about their painting. Though in a rather trivial sense this thinking is responsible for behavior, the thinking does not enable one to elucidate criteria that will distinguish knowledgeable from non-knowledgeable behavior.[17] Again, the criteria used to assess an artifact demonstrating teacher knowledge are not the same as the criteria used to assess the teacher's cognitive structure.

The conceptual difficulty associated with the tacit problem rests on the difficulty of making a particular type of inference. It rests on the difficulty of moving (logically) *from* the fact that certain behaviors are evaluated as "knowledgeable" *to* what that person might be thinking about while exhibiting these behaviors. Teachers have minds that are different from their logical and practical behaviors, and these minds are somehow causally responsible for their behavior. But from this it does not follow that teachers' minds are a repository or source of a nontacit "teacher knowledge."

Thus framed, the tacit problem arises from the difficulty of connecting two types of inquiry. The first is a psychological investigation into the causes of skillful performance. The second is a logical investigation into the reasons why certain performances are judged as "skillful." These two types of inquiry correspond, roughly, to the distinction between the causes of belief and the reasons for knowledge, or between the "logic" of discovery and the logic of justification or testing. A solution to the tacit problem must provide a way to connect cause and reason. That is, it must provide some way to connect the psychological causes of skill performance and the conceptual grounds or reasons used to evaluate a performance as skillful. There are, to be sure, some interesting ways to connect causes of belief and justification for knowledge (eg., genetic theories of knowledge, or naturalized epistemologies[18]). But a skeptic regarding the tacit problem can always demur, insisting that psychology is different from logic.

To summarize: Just as it is difficult to say anything normative about the "context of discovery" in science, so it is difficult to formulate rules that describe the skill of teaching. Of course, one can describe the practices of effective teachers, just as one can describe the discoveries of famous scientists. But a description of the practices of effective teachers — even a description of likely cognitive processes that give rise to these practices — is not the same as a description of what these teachers know. Descartes' rules for the direction of the mind aside, one still needs to make an argument connecting the causes of a complex skill, which is a psychological or descriptive matter, and the reasons why a complex skill is judged to be effective, which is an intellectual or logical matter. Such arguments are exceedingly difficult to make, and one might suppose, in the spirit of

Ryle, that they rest on a category mistake of confusing intellectual and psychological representations of knowledge.[19]

SUMMARY AND CONCLUSION

The underlying motivations for studying teacher knowledge are complex. They might stem from myths of progress or from drives toward romanticism.[20] They might serve those who wish to emancipate teachers, or they might serve the New Right ideology of radical interventionism.[21] The point of this paper, however, is that irrespective of whatever interesting social, political, or historical forces might lie behind the notion of "teacher knowledge", there are still conceptual problems associated with the idea. This paper has focused on two such problems.

The situated problem, as framed by this paper, starts from the assumption that there exists some rough diamond (artifact), and argues that cutting this gem using scholarly or scientific technique can bring out the hues and depths of "teacher knowledge." So framed, the situated problem is one of methodology. A certain "text" is taken as somehow representative of teacher knowledge, and the problem becomes one of interpretation. Differences may persist as to how to interpret this text, and it has been suggested that these differences are related to the methodological disputes between quantitative and qualitative researchers. However, generality and meaning are both attributes of knowledge claims, and it would seem to be a problem of diplomacy as to how one parcels out the two goods.

The tacit problem, as framed by this paper, starts from the assumption that good teachers have a skill or disposition to be effective (eg., get students to learn), but argues that the "thing in itself" beyond or behind this phenomenon of successful practice cannot be put into discursive form. As Rorty[22] has argued, little has come from three hundred years of effort, "poking around" in the brain's internal representations in an attempt to connect causes of belief and reasons for knowledge. Framed in these terms, the tacit problem challenges the idea of a "knowledge base for teaching." Of course, one might maintain that the knowledge base of teaching is tacit. But this would appear to border on contradiction — an attempt to say what cannot be said. Or, as Wittgenstein put it when he was still captivated by the picture theory of meaning: "That about which one cannot speak, one must remain silent."[23]

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[1] Lee S. Shulman, "Knowledge and Teaching: Foundations of the New Reform," in *Teachers, Teaching, and Teacher Education*, ed. M. Okazawa-Rey, J. Anderson and R. Traver (Cambridge: Harvard Educational Review, 1987), 313-34; "Those Who Understand: Knowledge Growth in Teaching," *Educational Researcher* (February, 1986): 4-14.

[2] Margret Buchmann, "Teacher Thinking, Teacher Change, and the 'Capricious Seamstress' — Memory," *Philosophy of Education 1992*, ed. H. A. Alexander (Urbana, Illinois: Philosophy of Education Society, 1993), 290-99.

[3] Arthur S. Bolster, Jr., "Toward a More Effective Model of Research on Teaching," in *Teachers, Teaching, and Teacher Education*, ed. Okazawa-Rey, Anderson and Traver, 335-349; Freema Elbaz, *Teacher Thinking: A Study of Practical Knowledge* (New York: Nichols, 1983); Magdalene Lampert, "How Do Teachers Manage to Teach? Perspectives on Problems in Practice," in *Teachers, Teaching, and Teacher Education*. ed. Okazawa-Rey, Anderson, & Traver, 106-23.

[4] Gilbert Ryle, *The Concept of Mind* (New York: Barnes & Noble Books, 1949), 25-61.

[5] Leo Tolstoy, *War and Peace*, trans. L. Maude and A. Maude (Oxford: Oxford University Press, 1869).

[6] Richard Rorty, *Consequences of Pragmatism* (Minneapolis: University of Minnesota Press, 1982), 90-138.

[7] Jerome Bruner, *Actual Minds, Possible Worlds* (Cambridge: Harvard University Press, 1986), 3-43.

[8] Cf., Philip J. Davis and Reuben Hersh, *The Mathematical Experience* (Boston: Houghton Mifflin, 1981), 318-59.

[9] Gary D. Fenstermacher, "Philosophy of Research on Teaching: Three Aspects," in *Handbook of Research on Teaching* 3rd ed., ed. M. Wittrock (New York: Macmillan, 1986), 37-49; "Prolog To My Critics," "Reply To My Critics," *Educational Theory* 37 (1987): 357-60, 413-22.

[10] Margret Buchmann, "Argument and Contemplation in Teaching," *The Oxford Review of Education* 14, no. 2 (1985): 201-21.

[11] Lee S. Shulman, "Disciplines of Inquiry in Education: An Overview," in *Complementary Methods for Research in Education*, ed. R. M. Jaeger (Washington, DC: AERA, 1988), 3-17.

[12] Cf. D. C. Phillips, *Philosophy, Science, and Social Inquiry* (Oxford: Pergamon Press, 1987), 80-101.

[13] Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (New York: Harper and Row, 1958).

[14] Ryle, 25-61.

[15] Richard J. Shavelson and P. Stern, "Research on Teachers' Pedagogical Thoughts, Judgments, Decisions, and Behavior," *Review of Educational Research* 51 (1981): 455-98; Christopher Clark and Penelope Peterson, "Teachers' Thought Processes," in *Handbook of Research on Teaching* 3rd ed., ed. Wittrock, 255-96.

[16] Gaea Leinhardt and James G. Greeno, "The Cognitive Skill of Teaching," *Journal of Educational Psychology* 78, no. 2 (1986): 75-95.

[17] Leinhardt and Greeno seemingly challenge this point on empirical grounds by showing differences between expert and novice teachers' knowledge structures. However, it is not clear how one would make the inference from these structural differences to differences between what expert and novice teachers "know," in a nontacit sense.

[18] Cf. *Naturalizing Epistemology*, ed. Hilary Kornblith (Cambridge: MIT Press, 1985).

[19] Ryle.

[20] Buchmann.

[21] John Smythe, "Teachers' Work and the Politics of Reflection," *American Educational Research Journal* 29, no. 2 (1992): 267-302.

[22] Richard Rorty, *Philosophy and the Mirror of Nature* (Princeton: Princeton University Press, 1979).

[23] Ludwig Wittgenstein, *Tractatus Logico-Philosophicus* (London, 1922).