Knowledge and Teaching: Foundations of the New Reform

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Lee S. Shulman builds his foundation for teaching reform on an idea of teaching that emphasizes comprehension and reasoning, transformation and reflection. "This emphasis is justified," he writes, "by the resoluteness with which research and policy have so blatantly ignored those aspects of teaching in the past." To articulate and justify this conception, Shulman responds to four questions: What are the sources of the knowledge base for teaching? In what terms can these sources be conceptualized? What are the processes of pedagogical reasoning and action? and What are the implications for teaching policy and educational reform? The answers—informed by philosophy, psychology, and a growing body of case-work based on young and experienced practitioners—go far beyond current reform assumptions and initiatives. The outcome for educational practitioners, scholars, and policymakers is a major redirection in how teaching is to be understood and teachers are to be trained and evaluated.

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Prologue: A Portrait of Expertise

Richly developed portrayals of expertise in teaching are rare. While many characterizations of effective teachers exist, most of these dwell on the teacher's management of the classroom. We find few descriptions or analyses of teachers that give careful attention not only to the management of students in classrooms, but also to the management of *ideas* within classroom discourse. Both kinds of emphasis will be needed if our portrayals of good practice are to serve as sufficient guides to the design of better education. Let us examine one brief account.

> A twenty-five-year veteran English teacher, Nancy, was the subject of a continuing study of experienced teachers that we had been conducting. The class was nearing the end of the second week of a unit on *Moby Dick*. The observer had been well impressed with the depth of Nancy's understanding of that novel and her skill as a pedagogue, as she documented how Nancy helped a group of California high school juniors grasp the many faces of that masterpiece. Nancy was a highly active teacher, whose classroom style employed substantial interaction with her students,

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both through recitations and more open-ended discussion. She was like a symphony conductor, posing questions, probing for alternative views, drawing out the shy while tempering the boisterous. Not much happened in the classroom that did not pass through Nancy, whose pacing and ordering, structuring and expanding, controlled the rhythm of classroom life.

Nancy characterized her treatment of literature in terms of a general theoretical model that she employed.

> Basically, I break reading skills into four levels:
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> *Level 1* is simply translation. . . . It is understanding the literal meaning, denotative, and frequently for students that means getting a dictionary.
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> *Level 2* is connotative meaning and again you are still looking at the words. . . . What does that mean, what does that tell us about the character? . . . We looked at *The Scarlet Letter*. Hawthorne described a rose bush in the first chapter. Literal level is: What is a rose bush? More important, what does a rose bush suggest, what is it that comes to mind, what did you picture?
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> *Level 3* is the level of interpretation . . . . It is the implication of Levels 1 and 2. If the author is using a symbol, what does that say about his view of life? In *Moby Dick*, the example I used in class was the boots. The boots would be the literal level. What does it mean when he gets under the bed? And the students would say, he is trying to hide something. Level 3 would be what does Melville say about human nature? What is the implication of this? What does this tell us about this character?
>
> *Level 4* is what I call application and evaluation and I try, as I teach literature, to get the students to Level 4, and that is where they take the literature and see how it has meaning for their own lives. Where would we see that event occur in our own society? How would people that we know be behaving if they are doing what these characters are doing? How is this piece of literature similar to our common experiences as human beings? . . . So my view of reading is basically to take them from the literal on the page to making it mean something in their lives. In teaching literature I am always working in and out of those levels. (Gudmundsdottir, in preparation)

Nancy employed this conceptual framework in her teaching, using it to guide her own sequencing of material and formulation of questions. She taught the framework explicitly to her students over the semester, helping them employ it like a scaffolding to organize their own study of the texts, to monitor their own thinking. Although as a teacher she maintained tight control of the classroom discourse, her teaching goals were to liberate her students' minds through literacy, eventually to use great works of literature to illuminate their own lives. Whichever work she was teaching, she understood how to organize it, frame it for teaching, divide it appropriately for assignments and activities. She seemed to possess a mental index for these books she had taught so often—*The Red Badge of Courage, Moby Dick, The Scarlet Letter, The Adventures of Huckleberry Finn*—with key episodes organized in her mind for different pedagogical purposes, different levels of difficulty, different kinds of pupils, different themes or emphases. Her combination of subject-matter understanding and pedagogical skill was quite dazzling.

When the observer arrived at the classroom one morning, she found Nancy sitting at her desk as usual. But her morning greeting elicited no response from Nancy other than a grimace and motion toward the pad of paper on her desktop. "I have laryngitis this morning and will not be able to speak aloud," said the note.

What's more, she appeared to be fighting the flu, for she had little energy. For a teacher who managed her classroom through the power of her voice and her manner, this was certainly a disabling condition. Or was it?

Using a combination of handwritten notes and whispers, she divided the class into small groups by rows, a tactic she had used twice before during this unit. Each group was given a different character who has a prominent role in the first chapters of the novel, and each group was expected to answer a series of questions about that character. Ample time was used at the end of the period for representatives of each group to report to the whole class. Once again the class had run smoothly, and the subject matter had been treated with care. But the style had changed radically, an utterly different teaching technology was employed, and still the students were engaged, and learning appeared to occur.

Subsequently, we were to see many more examples of Nancy's flexible style, adapted to the characteristics of learners, the complexities of subject matter, and her own physical condition. When learners experienced serious problems with a particular text, she self-consciously stayed at the lower levels of the reading ladder, helping the students with denotative and connotative meanings, while emphasizing literary interpretations somewhat less. When teaching *Huck Finn*, a novel she saw as less difficult than *Moby Dick*, her style changed once again. She gave much more autonomy to the students and did not directly run the classroom as much.

> For *Huck Finn*, she abandoned the stage early on and let the students teach each other. She had the students working independently in eight multi-ability groups, each group tracing one of eight themes: hypocrisy; luck and superstition; greed and materialism; romantic ideas and fantasy; religion and the Bible; social class and customs; family, racism, and prejudice; freedom and conscience. There were only two reading checks at the beginning and only two rounds of reporting. Once the groups were underway, Nancy took a seat at the back of the class and only interacted with students when she was called upon, and during group presentations. (Gudmundsdottir, in preparation)

> Thus Nancy's pattern of instruction, her style of teaching, is not uniform or predictable in some simple sense. She flexibly responds to the difficulty and character of the subject matter, the capacities of the students (which can change even over the span of a single course), and her educational purposes. She can not only conduct her orchestra from the podium, she can sit back and watch it play with virtuosity by itself.

What does Nancy believe, understand, and know how to do that permits her to teach as she does? Can other teachers be prepared to teach with such skill? The hope that teaching like Nancy's can become typical instead of unusual motivates much of the effort in the newly proposed reforms of teaching.

The New Reforms

During the past year the U.S. public and its professional educators have been presented with several reports on how to improve teaching as both an activity and a profession. One of the recurring themes of these reports has been the professionalization of teaching—the elevation of teaching to a more respected, more responsible, more rewarding and better rewarded occupation. The claim that teaching deserves professional status, however, is based on a more fundamental premise: that the standards by which the education and performance of teachers must be

judged can be raised and more clearly articulated. The advocates of professional reform base their arguments on the belief that there exists a "knowledge base for teaching"—a codified or codifiable aggregation of knowledge, skill, understanding, and technology, of ethics and disposition, of collective responsibility—as well as a means for representing and communicating it. The reports of the Holmes Group (1986) and the Carnegie Task Force (1986) rest on this belief and, furthermore, claim that the knowledge base is growing. They argue that it should frame teacher education and directly inform teaching practice.

The rhetoric regarding the knowledge base, however, rarely specifies the character of such knowledge. It does not say what teachers should know, do, understand, or profess that will render teaching more than a form of individual labor, let alone be considered among the learned professions.

In this paper, I present an argument regarding the content, character, and sources for a knowledge base of teaching that suggests an answer to the question of the intellectual, practical, and normative basis for the professionalization of teaching. The questions that focus the argument are: What are the sources of the knowledge base for teaching? In what terms can these sources be conceptualized? What are the implications for teaching policy and educational reform?[1]

In addressing these questions I am following in the footsteps of many eminent scholars, including Dewey (1904), Scheffler (1965), Green (1971), Fenstermacher (1978), Smith (1980), and Schwab (1983), among others. Their discussions of what qualities and understandings, skills and abilities, and what traits and sensibilities render someone a competent teacher have continued to echo in the conference rooms of educators for generations. My approach has been conditioned, as well, by two current projects: a study of how new teachers learn to teach and an attempt to develop a national board for teaching.

First, for the past three years, my colleagues and I have been watching knowledge of pedagogy and content grow in the minds of young men and women. They have generously permitted us to observe and follow their eventful journeys from being teacher education students to becoming neophyte teachers. In this research, we are taking advantage of the kinds of insights Piaget provided from his investigations of knowledge growth. He discovered that he could learn a great deal about knowledge and its development from careful observation of the very young—those who were just beginning to develop and organize their intelligence. We are following this lead by studying those just learning to teach. Their development from students to teachers, from a state of expertise as learners through a novitiate as teachers exposes and highlights the complex bodies of knowledge and skill needed to function effectively as a teacher. The result is that error, success, and refinement—in a word, teacher-knowledge growth—are seen in high profile and in slow motion. The neophyte's stumble becomes the scholar's window.

Concurrently, we have found and explored cases of veteran teachers such as Nancy (Baxter, in preparation; Gudmundsdottir, in preparation; Hashweh, 1985)

[1] Most of the empirical work on which this essay rests has been conducted with secondary-school teachers, both new and experienced. While I firmly believe that much of the emphasis to be found here on the centrality of content knowledge in pedagogy holds reasonably well for the elementary level as well, I am reluctant to make that claim too boldly. Work currently underway at the elementary level, both by Leinhardt (1983) and her colleagues (for example, Leinhardt & Greeno, 1985; Leinhardt & Smith, 1986) and by our own research group, may help clarify this matter.

to compare with those of the novices. What these studies show is that the knowledge, understanding, and skill we see displayed haltingly, and occasionally masterfully, among beginners are often demonstrated with ease by the expert. But, as we have wrestled with our cases, we have repeatedly asked what teachers knew (or failed to know) that permitted them to teach in a particular manner.

Second, for much of the past year, I have engaged in quite a different project on the role of knowledge in teaching. In conjunction with the recent Carnegie initiative for the reform of the teaching profession, my colleagues and I have been studying ways to design a national board assessment for teaching, parallel in several ways to the National Board of Medical Examiners (Shulman & Sykes, 1986; Sykes, 1986). This challenge renders the questions about the definition and operationalization of knowledge in teaching as far more than academic exercises. If teachers are to be certified on the basis of well-grounded judgments and standards, then those standards on which a national board relies must be legitimized by three factors: they must be closely tied to the findings of scholarship in the academic disciplines that form the curriculum (such as English, physics, and history) as well as those that serve as foundations for the process of education (such as psychology, sociology, or philosophy); they must possess intuitive credibility (or "face validity") in the opinions of the professional community in whose interests they have been designed; and they must relate to the appropriate normative conceptions of teaching and teacher education.

The new reform proposals carry assumptions about the knowledge base for teaching: when advocates of reform suggest that requirements for the education of teachers should be augmented and periods of training lengthened, they assume there must be something substantial to be learned. When they recommend that standards be raised and a system of examinations introduced, they assume there must exist a body of knowledge and skill to examine. Our research and that of others (for example, Berliner, 1986; Leinhardt & Greeno, 1986) have identified the sources and suggested outlines of that knowledge base. Watching veterans such as Nancy teach the same material that poses difficulties for novice teachers helped focus our attention on what kinds of knowledge and skill were needed to teach demanding materials well. By focusing on the teaching of particular topics—*Huck Finn*, quadratic equations, the Indian subcontinent, photosynthesis—we learned how particular kinds of content knowledge and pedagogical strategies necessarily interacted in the minds of teachers.

What follows is a discussion of the sources and outlines of the required knowledge base for teaching. I divide this discussion into two distinct analyses. First, after providing an overview of one framework for a knowledge base for teaching, I examine the *sources* of that knowledge base, that is, the domains of scholarship and experience from which teachers may draw their understanding. Second, I explore the processes of pedagogical reasoning and action within which such teacher knowledge is used.

The Knowledge Base

Begin a discussion on the knowledge base of teaching, and several related questions immediately arise: What knowledge base? Is enough known about teaching to support a knowledge base? Isn't teaching little more than personal style, artful

communication, knowing some subject matter, and applying the results of recent research on teaching effectiveness? Only the last of these, the findings of research on effective teaching, is typically deemed a legitimate part of a knowledge base.

The actions of both policymakers and teacher educators in the past have been consistent with the formulation that teaching requires basic skills, content knowledge, and general pedagogical skills. Assessments of teachers in most states consist of some combination of basic-skills tests, an examination of competence in subject matter, and observations in the classroom to ensure that certain kinds of general teaching behavior are present. In this manner, I would argue, teaching is trivialized, its complexities ignored, and its demands diminished. Teachers themselves have difficulty in articulating what they know and how they know it.

Nevertheless, the policy community at present continues to hold that the skills needed for teaching are those identified in the empirical research on teaching effectiveness. This research, summarized by Brophy and Good (1986), Gage (1986), and Rosenshine and Stevens (1986), was conducted within the psychological research tradition. It assumes that complex forms of situation-specific human performance can be understood in terms of the workings of underlying generic processes. In a study of teaching context, the research, therefore, seeks to identify those general forms of teaching behavior that correlate with student performance on standardized tests, whether in descriptive or experimental studies. The investigators who conduct the research realize that important simplifications must be made, but they believe that these are necessary steps for conducting scientific studies. Critical features of teaching, such as the subject matter being taught, the classroom context, the physical and psychological characteristics of the students, or the accomplishment of purposes not readily assessed on standardized tests, are typically ignored in the quest for general principles of effective teaching.

When policymakers have sought "research-based" definitions of good teaching to serve as the basis for teacher tests or systems of classroom observation, the lists of teacher behaviors that had been identified as effective in the empirical research were translated into the desirable competencies for classroom teachers. They became items on tests or on classroom-observation scales. They were accorded legitimacy because they had been "confirmed by research." While the researchers understood the findings to be simplified and incomplete, the policy community accepted them as sufficient for the definitions of standards.

For example, some research had indicated that students achieved more when teachers explicitly informed them of the lesson's objective. This seems like a perfectly reasonable finding. When translated into policy, however, classroom-observation competency-rating scales asked whether the teacher had written the objective on the blackboard and/or directly told the student the objectives at the beginning of class. If the teacher had not, he or she was marked off for failing to demonstrate a desired competency. No effort was made to discover whether the withholding of an objective might have been consistent with the form of the lesson being organized or delivered.

Moreover, those who hold with bifurcating content and teaching processes have once again introduced into policy what had been merely an act of scholarly convenience and simplification in the research. Teaching processes were observed and evaluated without reference to the adequacy or accuracy of the ideas transmitted.

In many cases, observers were not expected to have content expertise in the areas being observed, because it did not matter for the rating of teacher performance. Thus, what may have been an acceptable strategy for research became an unacceptable policy for teacher evaluation.

In this paper I argue that the results of research on effective teaching, while valuable, are not the sole source of evidence on which to base a definition of the knowledge base of teaching. Those sources should be understood to be far richer and more extensive. Indeed, properly understood, the actual and potential sources for a knowledge base are so plentiful that our question should not be, Is there really much one needs to know in order to teach? Rather, it should express our wonder at how the extensive knowledge of teaching can be learned at all during the brief period allotted to teacher preparation. Much of the rest of this paper provides the details of the argument that there exists an elaborate knowledge base for teaching.

A View of Teaching

I begin with the formulation that the capacity to teach centers around the following commonplaces of teaching, paraphrased from Fenstermacher (1986). A teacher knows something not understood by others, presumably the students. The teacher can transform understanding, performance skills, or desired attitudes or values into pedagogical representations and actions. These are ways of talking, showing, enacting, or otherwise representing ideas so that the unknowing can come to know, those without understanding can comprehend and discern, and the unskilled can become adept. Thus, teaching necessarily begins with a teacher's understanding of what is to be learned and how it is to be taught. It proceeds through a series of activities during which the students are provided specific instruction and opportunities for learning,[2] though the learning itself ultimately remains the responsibility of the students. Teaching ends with new comprehension by both the teacher and the student.[3] Although this is certainly a core conception of teaching, it is also an incomplete conception. Teaching must properly be understood to be more than the enhancement of understanding; but if it is not even that, then ques-

[2] There are several aspects of this formulation that are unfortunate, if only for the impression they may leave. The rhetoric of the analysis, for example, is not meant to suggest that education is reduced to knowledge transmission, the conveying of information from an active teacher to a passive learner, and that this information is viewed as product rather than process. My conception of teaching is not limited to direct instruction. Indeed, my affinity for discovery learning and inquiry teaching is both enthusiastic and ancient (for example, Shulman & Keislar, 1966). Yet even in those most student-centered forms of education, where much of the initiative is in the hands of the students, there is little room for teacher ignorance. Indeed, we have reason to believe that teacher comprehension is even more critical for the inquiry-oriented classroom than for its more didactic alternative.

Central to my concept of teaching are the objectives of students learning how to understand and solve problems, learning to think critically and creatively as well as learning facts, principles, and rules of procedure. Finally, I understand that the learning of subject matter is often not an end in itself, but rather a vehicle employed in the service of other goals. Nevertheless, at least at the secondary level, subject matter is a nearly universal vehicle for instruction, whatever the ultimate goal.

[3] This formulation is drawn from the teacher's perspective and, hence, may be viewed by some readers as overly teacher-centered. I do not mean to diminish the centrality of student learning for the process of education, nor the priority that must be given to student learning over teacher comprehension. But our analyses of effective teaching must recognize that outcomes *for teachers* as well as pupils must be considered in any adequate treatment of educational outcomes.

tions regarding performance of its other functions remain moot. The next step is to outline the categories of knowledge that underlie the teacher understanding needed to promote comprehension among students.

Categories of the Knowledge Base

If teacher knowledge were to be organized into a handbook, an encyclopedia, or some other format for arraying knowledge, what would the category headings look like?[4] At minimum, they would include:

- content knowledge;
- general pedagogical knowledge, with special reference to those broad principles and strategies of classroom management and organization that appear to transcend subject matter;
- curriculum knowledge, with particular grasp of the materials and programs that serve as "tools of the trade" for teachers;
- pedagogical content knowledge, that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding;
- knowledge of learners and their characteristics;
- knowledge of educational contexts, ranging from the workings of the group or classroom, the governance and financing of school districts, to the character of communities and cultures; and
- knowledge of educational ends, purposes, and values, and their philosophical and historical grounds.

Among those categories, pedagogical content knowledge is of special interest because it identifies the distinctive bodies of knowledge for teaching. It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction. Pedagogical content knowledge is the category most likely to distinguish the understanding of the content specialist from that of the pedagogue. While far more can be said regarding the categories of a knowledge base for teaching, elucidation of them is not a central purpose of this paper.

Enumerating the Sources

There are at least four major sources for the teaching knowledge base: (1) scholarship in content disciplines, (2) the materials and settings of the institutionalized educational process (for example, curricula, textbooks, school organizations and finance, and the structure of the teaching profession), (3) research on schooling, social organizations, human learning, teaching and development, and the other social and cultural phenomena that affect what teachers can do, and (4) the wisdom of practice itself. Let me elaborate on each of these.

Scholarship in content disciplines. The first source of the knowledge base is content knowledge—the knowledge, understanding, skill, and disposition that are to be

[4] I have attempted this list in other publications, though, admittedly, not with great cross-article consistency (for example, Shulman, 1986b; Shulman & Sykes, 1986; Wilson, Shulman & Richert, in press).

learned by school children. This knowledge rests on two foundations: the accumulated literature and studies in the content areas, and the historical and philosophical scholarship on the nature of knowledge in those fields of study. For example, the teacher of English should know English and American prose and poetry, written and spoken language use and comprehension, and grammar. In addition, he or she should be familiar with the critical literature that applies to particular novels or epics that are under discussion in class. Moreover, the teacher should understand alternative theories of interpretation and criticism, and how these might relate to issues of curriculum and of teaching.

Teaching is, essentially, a learned profession. A teacher is a member of a scholarly community. He or she must understand the structures of subject matter, the principles of conceptual organization, and the principles of inquiry that help answer two kinds of questions in each field: What are the important ideas and skills in this domain? and How are new ideas added and deficient ones dropped by those who produce knowledge in this area? That is, what are the rules and procedures of good scholarship or inquiry? These questions parallel what Schwab (1964) has characterized as knowledge of substantive and syntactic structures, respectively. This view of the sources of content knowledge necessarily implies that the teacher must have not only depth of understanding with respect to the particular subjects taught, but also a broad liberal education that serves as a framework for old learning and as a facilitator for new understanding. The teacher has special responsibilities in relation to content knowledge, serving as the primary source of student understanding of subject matter. The manner in which that understanding is communicated conveys to students what is essential about a subject and what is peripheral. In the face of student diversity, the teacher must have a flexible and multifaceted comprehension, adequate to impart alternative explanations of the same concepts or principles. The teacher also communicates, whether consciously or not, ideas about the ways in which "truth" is determined in a field and a set of attitudes and values that markedly influence student understanding. This responsibility places special demands on the teacher's own depth of understanding of the structures of the subject matter, as well as on the teacher's attitudes toward and enthusiasms for what is being taught and learned. These many aspects of content knowledge, therefore, are properly understood as a central feature of the knowledge base of teaching.

Educational materials and structures. To advance the aims of organized schooling, materials and structures for teaching and learning are created. These include: curricula with their scopes and sequences; tests and testing materials; institutions with their hierarchies, their explicit and implicit systems of rules and roles; professional teachers' organizations with their functions of negotiation, social change, and mutual protection; government agencies from the district through the state and federal levels; and general mechanisms of governance and finance. Because teachers necessarily function within a matrix created by these elements, using and being used by them, it stands to reason that the principles, policies, and facts of their functioning comprise a major source for the knowledge base. There is no need to claim that a specific literature undergirds this source, although there is certainly abundant research literature in most of these domains. But if a teacher has to "know the territory" of teaching, then it is the landscape of such materials, institutions, organizations, and mechanisms with which he or she must be familiar.

These comprise both the tools of the trade and the contextual conditions that will either facilitate or inhibit teaching efforts.

Formal educational scholarship. A third source is the important and growing body of scholarly literature devoted to understanding the processes of schooling, teaching, and learning. This literature includes the findings and methods of empirical research in the areas of teaching, learning, and human development, as well as the normative, philosophical, and ethical foundations of education.

The normative and theoretical aspects of teaching's scholarly knowledge are perhaps most important. Unfortunately, educational policymakers and staff developers tend to treat only the findings of empirical research on teaching and learning as relevant portions of the scholarly knowledge base. But these research findings, while important and worthy of careful study, represent only one facet of the contribution of scholarship. Perhaps the most enduring and powerful scholarly influences on teachers are those that enrich their images of the possible: their visions of what constitutes good education, or what a well-educated youngster might look like if provided with appropriate opportunities and stimulation.

The writings of Plato, Dewey, Neill, and Skinner all communicate their conceptions of what a good educational system should be. In addition, many works written primarily to disseminate empirical research findings also serve as important sources of these concepts. I count among these such works as Bloom's (1976) on mastery learning and Rosenthal and Jacobson's (1968) on teacher expectations. Quite independent of whether the empirical claims of those books can be supported, their impact on teachers' conceptions of the possible and desirable ends of education is undeniable. Thus, the philosophical, critical, and empirical literature which can inform the goals, visions, and dreams of teachers is a major portion of the scholarly knowledge base of teaching.

A more frequently cited kind of scholarly knowledge grows out of the empirical study of teaching effectiveness. This research has been summarized recently by Gage (1978, 1986), Shulman (1986a), Brophy and Good (1986), and Rosenshine and Stevens (1986). The essential goal of this program of research has been to identify those teacher behaviors and strategies most likely to lead to achievement gains among students. Because the search has focused on generic relationships—teacher behaviors associated with student academic gains irrespective of subject matter or grade level—the findings have been much more closely connected with the management of classrooms than with the subtleties of content pedagogy. That is, the effective-teaching principles deal with making classrooms places where pupils can attend to instructional tasks, orient themselves toward learning with a minimum of disruption and distraction, and receive a fair and adequate opportunity to learn. Moreover, the educational purposes for which these research results are most relevant are the teaching of skills. Rosenshine (1986) has observed that effective teaching research has much less to offer to the teaching of understanding, especially of complex written material; thus, the research applies more to teaching a skill like multiplication than to teaching critical interpretations of, say, the *Federalist Papers*.

There are a growing number of such generic principles of effective teaching, and they have already found their way into examinations such as the National Teachers Examination and into state-level assessments of teaching performance during the first teaching year. Their weakness, that they essentially ignore the con-

tent-specific character of most teaching, is also their strength. Discovering, explicating, and codifying general teaching principles simplify the otherwise outrageously complex activity of teaching. The great danger occurs, however, when a general teaching principle is distorted into prescription, when maxim becomes mandate. Those states that have taken working principles of teaching, based solely on empirical studies of generic teaching effectiveness, and have rendered them as hard, independent criteria for judging a teacher's worth, are engaged in a political process likely to injure the teaching profession rather than improve it.

The results of research on learning and development also fall within the area of empirical research findings. This research differs from research on teaching by the unit of investigation. Studies of teaching typically take place in conventional classrooms. Learning and development are ordinarily studied in individuals. Hence, teaching studies give accounts of how teachers cope with the inescapable character of schools as places where groups of students work and learn in concert. By comparison, learning and development studies produce principles of individual thought or behavior that must often be generalized to groups with caution if they are to be useful for schoolteaching.

The research in these domains can be both generic and content-specific. For example, cognitive psychological research contributes to the development of understanding of how the mind works to store, process, and retrieve information. Such general understanding can certainly be a source of knowledge for teachers, just as the work of Piaget, Maslow, Erikson, or Bloom has been and continues to be. We also find work on specific subject matter and student developmental levels that is enormously useful; for example, we learn about student misconceptions in the learning of arithmetic by elementary school youngsters (Erlwanger, 1975) or difficulties in grasping principles of physics by university and secondary school students (for example, Clement, 1982). Both these sorts of research contribute to a knowledge base for teaching.

Wisdom of practice. The final source of the knowledge base is the least codified of all. It is the wisdom of practice itself, the maxims that guide (or provide reflective rationalization for) the practices of able teachers. One of the more important tasks for the research community is to work with practitioners to develop codified representations of the practical pedagogical wisdom of able teachers. As indicated above, much of the conception of teaching embodied in this paper is derived from collecting, examining, and beginning to codify the emerging wisdom of practice among both inexperienced and experienced teachers.

The portrait of Nancy with which this paper began is only one of the many descriptions and analyses of excellent teaching we have been collecting over the past few years. As we organize and interpret such data, we attempt to infer principles of good practice that can serve as useful guidelines for efforts of educational reform. We attempt to keep the accounts highly contextualized, especially with respect to the content-specificity of the pedagogical strategies employed. In this manner we contribute to the documentation of good practice as a significant source for teaching standards. We also attempt to lay a foundation for a scholarly literature that records the details and rationales for specific pedagogical practice.

One of the frustrations of teaching as an occupation and profession is its extensive individual and collective amnesia, the consistency with which the best creations of its practitioners are lost to both contemporary and future peers. Unlike

fields such as architecture (which preserves its creations in both plans and edifices), law (which builds a case literature of opinions and interpretations), medicine (with its records and case studies), and even unlike chess, bridge, or ballet (with their traditions of preserving both memorable games and choreographed performances through inventive forms of notation and recording), teaching is conducted without an audience of peers. It is devoid of a history of practice.

Without such a system of notation and memory, the next steps of analysis, interpretation, and codification of principles of practice are hard to pursue. We have concluded from our research with teachers at all levels of experience that the potentially codifiable knowledge that can be gleaned from the wisdom of practice is extensive. Practitioners simply know a great deal that they have never even tried to articulate. A major portion of the research agenda for the next decade will be to collect, collate, and interpret the practical knowledge of teachers for the purpose of establishing a case literature and codifying its principles, precedents, and parables (Shulman, 1986b). A significant portion of the research agenda associated with the Carnegie program to develop new assessments for teachers involves the conducting of "wisdom-of-practice" studies. These studies record and organize the reasoning and actions of gifted teachers into cases to establish standards of practice for particular areas of teaching.[5]

A knowledge base for teaching is not fixed and final. Although teaching is among the world's oldest professions, educational research, especially the systematic study of teaching, is a relatively new enterprise. We may be able to offer a compelling argument for the broad outlines and categories of the knowledge base for teaching. It will, however, become abundantly clear that much, if not most, of the proposed knowledge base remains to be discovered, invented, and refined. As more is learned about teaching, we will come to recognize new categories of performance and understanding that are characteristic of good teachers, and will have to reconsider and redefine other domains. Our current "blueprint" for the knowledge base of teaching has many cells or categories with only the most rudimentary place-holders, much like the chemist's periodic table of a century ago. As we proceed, we will know that something can be known in principle about a particular aspect of teaching, but we will not yet know what that principle or practice entails. At base, however, we believe that scholars and expert teachers are able to define, describe, and reproduce good teaching.

The Processes of Pedagogical Reasoning and Action

The conception of teaching I shall discuss has emerged from a number of sources, both philosophical and empirical. A key source has been the several dozen teachers whom we have been studying in our research during the past three years. Through interviews, observations, structured tasks, and examination of materials, we have attempted to understand how they commute from the status of learner to that of

[5] It might be argued that the sources of skilled performances are typically tacit, and unavailable to the practitioner. But teaching requires a special kind of expertise or artistry, for which explaining and showing are the central features. Tacit knowledge among teachers is of limited value if the teachers are held responsible for explaining what they do and why they do it, to their students, their communities, and their peers

teacher,[6] from being able to comprehend subject matter for themselves, to becoming able to elucidate subject matter in new ways, reorganize and partition it, clothe it in activities and emotions, in metaphors and exercises, and in examples and demonstrations, so that it can be grasped by students.

As we have come to view teaching, it begins with an act of reason, continues with a process of reasoning, culminates in performances of imparting, eliciting, involving, or enticing, and is then thought about some more until the process can begin again. In the discussion of teaching that follows, we will emphasize teaching as comprehension and reasoning, as transformation and reflection. This emphasis is justified by the resoluteness with which research and policy have so blatantly ignored those aspects of teaching in the past.

Fenstermacher (1978, 1986) provides a useful framework for analysis. The goal of teacher education, he argues, is not to indoctrinate or train teachers to behave in prescribed ways, but to educate teachers to reason soundly about their teaching as well as to perform skillfully. Sound reasoning requires both a process of thinking about what they are doing and an adequate base of facts, principles, and experiences from which to reason. Teachers must learn to use their knowledge base to provide the grounds for choices and actions. Therefore, teacher education must work with the beliefs that guide teacher actions, with the principles and evidence that underlie the choices teachers make. Such reasons (called "premises of the practical argument" in the analysis of Green, 1971, on which Fenstermacher bases his argument) can be predominantly arbitrary or idiosyncratic ("It sure seemed like the right idea at the time!" "I don't know much about teaching, but I know what I like."), or they can rest on ethical, empirical, theoretical, or practical principles that have substantial support among members of the professional community of teachers. Fenstermacher argues that good teaching not only is effective behaviorally, but must rest on a foundation of adequately grounded premises.

When we examine the quality of teaching, the idea of influencing the grounds or reasons for teachers' decisions places the emphasis precisely where it belongs: on the features of pedagogical reasoning that lead to or can be invoked to explain pedagogical actions. We must be cautious, however, lest we place undue emphasis upon the ways teachers reason to achieve particular ends, at the expense of attention to the grounds they present for selecting the ends themselves. Teaching is both effective and normative; it is concerned with both means and ends. Processes of reasoning underlie both. The knowledge base must therefore deal with the purposes of education as well as the methods and strategies of educating.

This image of teaching involves the exchange of ideas. The idea is grasped, probed, and comprehended by a teacher, who then must turn it about in his or her mind, seeing many sides of it. Then the idea is shaped or tailored until it can in turn be grasped by students. This grasping, however, is not a passive act. Just as the teacher's comprehension requires a vigorous interaction with the ideas, so students will be expected to encounter ideas actively as well. Indeed, our exemplary teachers present ideas in order to provoke the constructive processes of their

[6] The metaphor of commuting is not used idly. The journey between learner and teacher is not one-way. In the best teachers, as well as in the more marginal, new learning is constantly required for teaching.

students and not to incur student dependence on teachers or to stimulate the flatteries of imitation.[7]

Comprehension alone is not sufficient. The usefulness of such knowledge lies in its value for judgment and action. Thus, in response to my aphorism, "those who can, do; those who understand, teach" (Shulman, 1986b, p. 14), Petrie (1986) correctly observed that I had not gone far enough. Understanding, he argued, must be linked to judgment and action, to the proper uses of understanding in the forging of wise pedagogical decisions.

Aspects of Pedagogical Reasoning

I begin with the assumption that most teaching is initiated by some form of "text": a textbook, a syllabus, or an actual piece of material the teacher or student wishes to have understood. The text may be a vehicle for the accomplishment of other educational purposes, but some sort of teaching material is almost always involved. The following conception of pedagogical reasoning and action is taken from the point of view of the teacher, who is presented with the challenge of taking what he or she already understands and making it ready for effective instruction. The model of pedagogical reasoning and action is summarized in Table 1.

Given a text, educational purposes, and/or a set of ideas, pedagogical reasoning and action involve a cycle through the activities of comprehension, transformation, instruction, evaluation, and reflection.[8] The starting point and terminus for the process is an act of comprehension.

Comprehension. To teach is first to understand. We ask that the teacher comprehend critically a set of ideas to be taught.[9] We expect teachers to understand what they teach and, when possible, to understand it in several ways. They should understand how a given idea relates to other ideas within the same subject area and to ideas in other subjects as well.

Comprehension of purposes is also central here. We engage in teaching to achieve educational purposes, to accomplish ends having to do with student literacy, student freedom to use and enjoy, student responsibility to care and care for, to believe and respect, to inquire and discover, to develop understandings, skills, and values needed to function in a free and just society. As teachers, we also strive

[7] The direction and sequence of instruction can be quite different as well. Students can literally initiate the process, proceeding by discovering, inventing, or inquiring, to prepare their own representations and transformations. Then it is the role of the teacher to respond actively and creatively to those student initiatives. In each case the teacher needs to possess both the comprehension and the capacities for transformation. In the student-initiated case, the flexibility to respond, judge, nurture, and provoke student creativity will depend on the teacher's own capacities for sympathetic transformation and interpretation.

[8] Under some conditions, teaching may begin with "given a group of students." It is likely that at the early elementary grades, or in special education classes or other settings where children have been brought together for particular reasons, the starting point for reasoning about instruction may well be at the characteristics of the group itself. There are probably some days when a teacher necessarily uses the youngsters as a starting point.

[9] Other views of teaching will also begin with comprehension, but of something other than the ideas or text to be taught and learned. They may focus on comprehension of a particular set of values, of the characteristics, needs, interests, or propensities of a particular individual or group of learners. But some sort of comprehension (or self-conscious confusion, wonder, or ignorance) will always initiate teaching.

TABLE 1
A Model of Pedagogical Reasoning and Action

Comprehension

Of purposes, subject matter structures, ideas within and outside the discipline

Transformation

Preparation: critical interpretation and analysis of texts, structuring and segmenting, development of a curricular repertoire, and clarification of purposes

Representation: use of a representational repertoire which includes analogies, metaphors, examples, demonstrations, explanations, and so forth

Selection: choice from among an instructional repertoire which includes modes of teaching, organizing, managing, and arranging

Adaptation and Tailoring to Student Characteristics: consideration of conceptions, preconceptions, misconceptions, and difficulties, language, culture, and motivations, social class, gender, age, ability, aptitude, interests, self concepts, and attention

Instruction

Management, presentations, interactions, group work, discipline, humor, questioning, and other aspects of active teaching, discovery or inquiry instruction, and the observable forms of classroom teaching

Evaluation

Checking for student understanding during interactive teaching

Testing student understanding at the end of lessons or units

Evaluating one's own performance, and adjusting for experiences

Reflection

Reviewing, reconstructing, reenacting and critically analyzing one's own and the class's performance, and grounding explanations in evidence

New Comprehensions

Of purposes, subject matter, students, teaching, and self

Consolidation of new understandings, and learnings from experience

to balance our goals of fostering individual excellence with more general ends involving equality of opportunity and equity among students of different backgrounds and cultures. Although most teaching begins with some sort of text, and the learning of that text can be a worthy end in itself, we should not lose sight of the fact that the text is often a vehicle for achieving other educational purposes. The goals of education transcend the comprehension of particular texts, but may be unachievable without it.

Saying that a teacher must first comprehend both content and purposes, however, does not particularly distinguish a teacher from non-teaching peers. We expect a math major to understand mathematics or a history specialist to comprehend history. But the key to distinguishing the knowledge base of teaching lies at the intersection of content and pedagogy, in the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by the students. We now turn to a discussion of transformation and its components.

Transformation. Comprehended ideas must be transformed in some manner if they are to be taught. To reason one's way through an act of teaching is to think one's way from the subject matter as understood by the teacher into the minds and motivations of learners. Transformations, therefore, require some combination or ordering of the following processes, each of which employs a kind of repertoire: (1) preparation (of the given text materials) including the process of critical interpretation, (2) representation of the ideas in the form of new analogies, metaphors, and so forth, (3) instructional selections from among an array of teaching methods and models, and (4) adaptation of these representations to the general characteristics of the children to be taught, as well as (5) tailoring the adaptations to the specific youngsters in the classroom. These forms of transformation, these aspects of the process wherein one moves from personal comprehension to preparing for the comprehension of others, are the essence of the act of pedagogical reasoning, of teaching as thinking, and of planning—whether explicitly or implicitly—the performance of teaching.

Preparation involves examining and critically interpreting the materials of instruction in terms of the teacher's own understanding of the subject matter (Ben-Peretz, 1975). That is, one scrutinizes the teaching material in light of one's own comprehension and asks whether it is "fit to be taught." This process of preparation will usually include (1) detecting and correcting errors of omission and commission in the text, and (2) the crucial processes of structuring and segmenting the material into forms better adapted to the teacher's understanding and, in prospect, more suitable for teaching. One also scrutinizes educational purposes or goals. We find examples of this preparation process in a number of our studies. Preparation certainly draws upon the availability of a curricular repertoire, a grasp of the full array of extant instructional materials, programs, and conceptions.

Representation involves thinking through the key ideas in the text or lesson and identifying the alternative ways of representing them to students. What analogies, metaphors, examples, demonstrations, simulations, and the like can help to build a bridge between the teacher's comprehension and that desired for the students? Multiple forms of representation are desirable. We speak of the importance of a representational repertoire in this activity.[10]

Instructional selections occur when the teacher must move from the reformulation of content through representations to the embodiment of representations in instructional forms or methods. Here the teacher draws upon an instructional repertoire of approaches or strategies of teaching. This repertoire can be quite rich, including not only the more conventional alternatives such as lecture, demonstration, recitation, or seatwork, but also a variety of forms of cooperative learning,

[10] The centrality of representation to our conception of pedagogical reasoning is important for relating our model of teaching to more general approaches to the study of human thinking and problem solving. Cognitive psychologists (for example, Gardner, 1986; Marton, 1986; Norman, 1980) argue that processes of internal representation are key elements in any cognitive psychology. "To my mind, the major accomplishment of cognitive science has been the clear demonstration of the validity of positing a level of mental representation: a set of constructs that can be invoked for the explanation of cognitive phenomena, ranging from visual perception to story comprehension" (Gardner, 1986, p. 383). Such a linkage between models of pedagogy and models of more general cognitive functioning can serve as an important impetus for the needed study of teacher thinking.

reciprocal teaching, Socratic dialogue, discovery learning, project methods, and learning outside the classroom setting.

Adaptation is the process of fitting the represented material to the characteristics of the students. What are the relevant aspects of student ability, gender, language, culture, motivations, or prior knowledge and skills that will affect their responses to different forms of representation and presentation? What student conceptions, misconceptions, expectations, motives, difficulties, or strategies might influence the ways in which they approach, interpret, understand, or misunderstand the material? Related to adaptation is tailoring, which refers to the fitting of the material to the specific students in one's classrooms rather than to students in general. When a teacher thinks through the teaching of something, the activity is a bit like the manufacture of a suit of clothing. Adaptation is like preparing a suit of a particular style, color, and size that can be hung on a rack. Once it is prepared for purchase by a particular customer, however, it must be tailored to fit perfectly.

Moreover, the activity of teaching is rarely engaged with a single student at a time. This is a process for which the special term "tutoring" is needed. When we speak of teaching under typical school circumstances, we describe an activity which brings instruction to groups of at least fifteen—or more typically, twenty-five to thirty-five—students. Thus, the tailoring of instruction entails fitting representations not only to particular students, but also to a group of a particular size, disposition, receptivity, and interpersonal "chemistry."

All these processes of transformation result in a plan, or set of strategies, to present a lesson, unit, or course. Up to this point, of course, it is all a rehearsal for the performances of teaching which have not yet occurred. Pedagogical reasoning is as much a part of teaching as is the actual performance itself. Reasoning does not end when instruction begins. The activities of comprehension, transformation, evaluation, and reflection continue to occur during active teaching. Teaching itself becomes a stimulus for thoughtfulness as well as for action. We therefore turn next to the performance that consummates all this reasoning in the act of instruction.

Instruction. This activity involves the observable performance of the variety of teaching acts. It includes many of the most crucial aspects of pedagogy: organizing and managing the classroom; presenting clear explanations and vivid descriptions; assigning and checking work; and interacting effectively with students through questions and probes, answers and reactions, and praise and criticism. It thus includes management, explanation, discussion, and all the observable features of effective direct and heuristic instruction already well-documented in the research literature on effective teaching.

We have compelling reasons to believe that there are powerful relationships between the comprehension of a new teacher and the styles of teaching employed. An example, based on the research of Grossman (1985), will illustrate this point.

> Colleen had completed a master's degree in English before entering a teacher education program. She expressed confidence in her command of the subject matter and began her internship with energy and enthusiasm. Her view of literature and its teaching was highly interpretive and interactive. She saw fine literature as layered communication, capable of many diverse readings and interpretations.

Moreover, she felt that these various readings should be provided by her students through their own careful reading of the texts.

Colleen was so committed to helping students learn to read texts carefully, a habit of mind not often found among the young or old, that she constructed one assignment in which each student was asked to bring to school the lyrics of a favorite rock song. (She may have realized that some of these song lyrics were of questionable taste, but preferred to maximize motivation rather than discretion in this particular unit.) She then asked them to rewrite each line of the song, using synonyms or paraphrases to replace every original word. For many, it was the first time they had looked at any piece of text with such care.

When teaching a piece of literature, Colleen performed in a highly interactive manner, drawing out student ideas about a phrase or line, accepting multiple competing interpretations as long as the student could offer a defense of the construction by reference to the text itself. Student participation was active and hearty in these sessions. Based on these observations, one would have characterized Colleen's teaching style with descriptors such as student-centered, discussion-based, occasionally Socratic, or otherwise highly interactive.

Several weeks later, however, we observed Colleen teaching a unit on grammar. Although she had completed two university degrees in English, Colleen had received almost no preparation in prescriptive grammar. However, since a typical high school English class includes some grammar in addition to the literature and writing, it was impossible to avoid teaching the subject. She expressed some anxiety about it during a pre-observational interview.

Colleen looked like a different teacher during that lesson. Her interactive style evaporated. In its place was a highly didactic, teacher-directed, swiftly paced combination of lecture and tightly-controlled recitation: Socrates replaced by DISTAR. I sometimes refer to such teaching as the Admiral Farragut style, "Damn the questions, full speed ahead." Students were not given opportunities to raise questions or offer alternative views. After the session, she confessed to the observer that she had actively avoided making eye contact with one particular student in the front row because that youngster always had good questions or ideas and in this particular lesson Colleen really didn't want to encourage either, because she wasn't sure of the answers. She was uncertain about the content and adapted her instructional style to allay her anxiety.[11]

Colleen's case illustrates the ways in which teaching behavior is bound up with comprehension and transformation of understanding. The flexible and interactive teaching techniques that she uses are simply not available to her when she does not understand the topic to be taught. Having examined the processes of pedagogical reasoning and performance that are prospective and enactive in nature, we now move to those that are retrospective.

Evaluation. This process includes the on-line checking for understanding and misunderstanding that a teacher must employ while teaching interactively, as well as the more formal testing and evaluation that teachers do to provide feedback and

[11] In no way do I wish to imply that effective lectures are out of place in a high school classroom. On the contrary, good lecturing is an indispensable teaching technique. In this case I am more interested in the relationship between knowledge and teaching. It might be suggested that this teaching style is more suited to grammar than to literature because there is little to discuss or interpret in a grammar lesson. I do not agree, but will not pursue the matter here. In Colleen's case, the rationale for a linear lecture was not grounded in such an argument, but quite clearly in her concern for limiting the range of possible deviations from the path she had designed.

grades. Clearly, checking for such understanding requires all the forms of teacher comprehension and transformation described above. To understand what a pupil understands will require a deep grasp of both the material to be taught and the processes of learning. This understanding must be specific to particular school subjects and to individual topics within the subject. This represents another way in which what we call pedagogical content knowledge is used. Evaluation is also directed at one's own teaching and at the lessons and materials employed in those activities. In that sense it leads directly to reflection.

Reflection. This is what a teacher does when he or she looks back at the teaching and learning that has occurred, and reconstructs, reenacts, and/or recaptures the events, the emotions, and the accomplishments. It is that set of processes through which a professional learns from experience. It can be done alone or in concert, with the help of recording devices or solely through memory. Here again, it is likely that reflection is not merely a disposition (as in, "she's such a reflective person!") or a set of strategies, but also the use of particular kinds of analytic knowledge brought to bear on one's work (Richert, in preparation). Central to this process will be a review of the teaching in comparison to the ends that were sought.

New comprehension. Thus we arrive at the new beginning, the expectation that through acts of teaching that are "reasoned" and "reasonable" the teacher achieves new comprehension, both of the purposes and of the subjects to be taught, and also of the students and of the processes of pedagogy themselves. There is a good deal of transient experiential learning among teachers, characterized by the "aha" of a moment that is never consolidated and made part of a new understanding or a reconstituted repertoire (Brodkey, 1986). New comprehension does not automatically occur, even after evaluation and reflection. Specific strategies for documentation, analysis, and discussion are needed.

Although the processes in this model are presented in sequence, they are not meant to represent a set of fixed stages, phases, or steps. Many of the processes can occur in different order. Some may not occur at all during some acts of teaching. Some may be truncated, others elaborated. In elementary teaching, for example, some processes may occur that are ignored or given short shrift in this model. But a teacher should demonstrate the capacity to engage in these processes when called upon, and teacher education should provide students with the understandings and performance abilities they will need to reason their ways through and to enact a complete act of pedagogy, as represented here.

Knowledge, Teaching Policy, and Educational Reform

The investigations, deliberations, and debates regarding what teachers should know and know how to do have never been more active. Reform efforts are underway: they range from raising standards for admission into teacher education programs, to establishing state and national examinations for teachers; from insisting that teacher preparation require at least five years of higher education (because there is so much to learn), to organizing elaborate programs of new-teacher induction and mentoring (because the most important learning and socialization can occur only in the workplace).

Most of the current reforms rest on the call for greater professionalization in teaching, with higher standards for entry, greater emphasis on the scholarly bases

for practice, more rigorous programs of theoretical and practical preparation, better strategies for certification and licensure, and changes in the workplace that permit greater autonomy and teacher leadership. In large measure, they call for teaching to follow the model of other professions that define their knowledge bases in systematic terms, require extended periods of preparation, socialize neophytes into practice with extended periods of internship or residency, and employ demanding national and state certification procedures.

Implicit in all these reforms are conceptions of teacher competence. Standards for teacher education and assessment are necessarily predicated on images of teaching and its demands. The conception of the knowledge base of teaching presented in this paper differs in significant ways from many of those currently existing in the policy community. The emphasis on the integral relationships between teaching and the scholarly domains of the liberal arts makes clear that teacher education is the responsibility of the entire university, not the schools or departments of education alone. Moreover, teachers cannot be adequately assessed by observing their teaching performance without reference to the content being taught.

The conception of pedagogical reasoning places emphasis upon the intellectual basis for teaching performance rather than on behavior alone. If this conception is to be taken seriously, both the organization and content of teacher education programs and the definition of the scholarly foundations of education will require revision. Teacher education programs would no longer be able to confine their activity to the content-free domains of pedagogy and supervision. An emphasis on pedagogical content knowledge would permeate the teacher preparation curriculum. A national board examination for teachers would focus upon the teacher's ability to reason about teaching and to teach specific topics, and to base his or her actions on premises that can bear the scrutiny of the professional community.

We have an obligation to raise standards in the interests of improvement and reform, but we must avoid the creation of rigid orthodoxies. We must achieve standards without standardization. We must be careful that the knowledge-base approach does not produce an overly technical image of teaching, a scientific enterprise that has lost its soul. The serious problems in medicine and other health professions arise when doctors treat the disease rather than the person, or when the professional or personal needs of the practitioner are permitted to take precedence over the responsibilities to those being served.

Needed change cannot occur without risk, however. The currently incomplete and trivial definitions of teaching held by the policy community comprise a far greater danger to good education than does a more serious attempt to formulate the knowledge base. Nancy represents a model of pedagogical excellence that should become the basis for the new reforms. A proper understanding of the knowledge base of teaching, the sources for that knowledge, and the complexities of the pedagogical process will make the emergence of such teachers more likely.

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