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CHAPTER ONE

Developing Practice, Developing Practitioners

Toward a Practice-Based Theory of Professional Education

Deborah Loewenberg Ball and David K. Cohen

The past decade has seen a tidal wave of proposals to reform education. Seeking to improve what students get from school, reformers advocate changes in standards and assessment, school organization and decision making, and curriculum. The vision of a better education is complex. Teachers are to help diverse learners become competent and skilled, understand what they are doing, and communicate effectively. Schools are to be connected with their communities, and all students are to succeed in ways they currently do not and never have before in the history of American public education. If such plans are to move in any significant way beyond rhetoric to permeate practice, significant professional development will be crucial, for such instruction is not commonplace. Nor could teachers change instruction in these ways simply by being told to do so. Teachers would need opportunities to reconsider their current practices and to examine others, as well as to learn more about the subjects and students they teach.

Reformers routinely invoke the need for professional development, and there is no shortage of in-service workshops for teachers. Although a good deal of money is spent on staff development in the United States, most is spent on sessions and workshops that are often intellectually superficial, disconnected from

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deep issues of curriculum and learning, fragmented, and noncumulative (Cohen and Hill, 1997; Little, 1994). Rarely do these in-services seem based on a curricular view of teachers' learning. Teachers are thought to need updating rather than opportunities for serious and sustained learning of curriculum, students, and teaching. Instead they are offered one-shot workshops with advice and tips of things to try, catalogues filled with blackline-master activities for the latest educational ideas (cooperative learning, problem solving, literary analysis, or something else), six-step plans for a host of teaching challenges, and much more. These offerings get a steady stream of subscribers. Participation in modal staff development is the professional equivalent of yo-yo dieting for many teachers. Workshop handouts, ideas, and methods provide brief sparks of novelty and imagination, most squeakily practical. But most teachers have a shelf overflowing with dusty vinyl binders, the wilted cast-offs of staff development workshops. Since professional development is rarely seen as a continuing enterprise for teachers, it is only occasionally truly developmental. One reason is that many people see teaching as mostly common sense and perceive little need for professional learning. Another is that teaching has been seen and organized as a career in which sustained learning was not required for adequate performance. Still another is that there is no coherent infrastructure for professional development. It is not the responsibility of any easily identifiable group or agency, and so it happens everywhere—and hence lacks consistency, coherence, and curriculum.

Recent reforms challenge this perspective on teaching and its improvement. A great deal of learning would be required for most teachers to be able to do the kind of teaching and produce the kind of student learning that reformers envision, for none of it is simple. This kind of teaching and learning would require that teachers become serious learners in and around their practice, rather than amassing strategies and activities.

Despite considerable expenditures on professional development, resources are severely lacking to improve available opportunities for professional learning. Although money is important, the critical missing resources are not fiscal. Missing, for instance, is the common conviction that professional learning matters to instruction. Instead, a widely held belief is that teachers' practices change as a product of changes in curriculum, standards, and assessments. Missing as well are carefully constructed and empirically validated theories of teacher learning that could inform teacher education, in roughly the same way that cognitive psychology has begun to inform the education of schoolchildren. Teacher learning instead is usually seen as either something that just happens as a matter of course from experience or as the product of training in particular methods or curricula. Yet another missing resource is coordination among various elements of professional education. American education lacks anything remotely resembling a comprehensive perspective on professional learning, across time,

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or over topics or purposes. Such coordination would be impossible without a highly educated cadre of educators whose responsibilities prominently included the education of teachers and administrators. In the absence of these key resources, the system limps along, with teachers collecting material from a wide range of sources, their teaching experience the principal site for their individual and idiosyncratic development.

Those who want teaching and learning to become much more ambitious face a significant challenge: how to construct a substantial approach to professional learning—one that takes a comprehensive perspective on the relations between professional development and the improvement of teaching and learning, in a system in which professional development, like other education, has been superficial and fragmented, the commitment to and belief in serious professional development is quite limited, and theories of professional learning have been implicit and undeveloped.

It would be easier if schools were the problem—that is, if teacher education programs did a solid job of preparing teachers for good practice, which was then corroded by the schools. Then we could focus on practicing teachers. But the stage is set years before, in teachers' initial preparation. Although some teacher educators have aimed for more ambitious teaching and learning, many have not. And even when they aim high, preservice teacher education offers a weak antidote to the powerful socialization into teaching that occurs in teachers' own prior experience as students. What Dan Lortie (1975) called the "apprenticeship of observation" is typically more potent than formal teacher education, and the lessons of that apprenticeship ordinarily are reinforced by intending teachers' experience in most university courses, student teaching, and professional work. All of these things have reinforced the conservatism of practice, with its didactic approaches to teaching and facts-and-skills conceptions of knowledge. Teachers hone their skills within that frame of reference and have few opportunities for substantial professional discourse.

Thus we confront an educational system that seems poorly equipped to produce deeper and more complex learning in students as well as teachers. Weak teacher education, inherited conservative traditions, and little professional capacity for learning and change combine to inhibit reform.

Our response is to sketch a comprehensive approach to teachers' professional development. We situate this in a theoretical sketch of teacher learning, which we believe is essential to frame any sensible approach to teacher education. We then explore what it would take to reconstruct professional education in ways that could improve teachers' capacity to encourage deeper and more complex learning in their students. Such a reconstruction would require many changes in teacher education, but two are of leading importance.

First, professional education would have to acquire a fundamentally different content and character than it now has, in which all its elements coherently

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supported acquisition of the knowledge, skills, and dispositions that would enable teachers to encourage this sort of learning. Second, teacher education also would have to become sufficiently powerful to immunize teachers against the conservative lessons that most learn from practice. Until practice has changed, most intending teachers would arrive in their professional education having learned didactic conceptions of learning and teaching as students. And once finished with their professional education, those same teachers' experience in school would reveal the difficulty of sustaining thoughtful work when surrounded with more traditional colleagues, administrators, and parents. Teacher education would have to become an agent of professional countersocialization, no easy task.

Unless initial teacher education can prepare beginning teachers to learn to do much more thoughtful and challenging work, and unless ways can be found, through professional development, to help teachers to sustain such work, traditional instruction is likely to persist in frustrating educational reform, and reformers' visions are likely to continue not to permeate practice broadly or deeply.

Although many reformers have broken their lances on that problem since Horace Mann first attempted a solution, we think it could be solved. If teachers' professional learning could be situated in the sorts of practice that reformers wish to encourage, it could become a key element in a curriculum of professional development. A practice-based curriculum could be compelling for teachers and would help them to improve students' learning. If such teaching, and learning how to do it, became the object of continuing, thoughtful inquiry, much of teachers' everyday work could become a source for constructive professional development. Hence we propose new ways to understand and use practice as a site for professional learning, as well as ways to cultivate the sorts of inquiry into practice from which many teachers could learn.

Many advocates approach the problem of poor professional development with proposals to restructure teachers' roles, time, and relationships, but we do not. Although they may ultimately be needed, changes in the organization of professional practice or schools do not by themselves lead to better instruction or learning. To affect what teachers might learn, one must consider the curriculum and pedagogy of professional development: what teachers would have opportunities to learn and how they would be taught (Elmore, Peterson, and McCarthey, 1996). Any design for improved professional learning must be grounded in the cornerstones of education: what needs to be learned (content), the nature of that content and what that implies about how it might be learned (theories of learning), curriculum and pedagogy (with what material and in what ways the learners can be helped to learn that content, given who they are, the nature of what there is to be learned, and theories of how it is best learned). This chapter offers a set of ideas for such a design for professional development.

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Our proposals are ambitious, but we want an approach that will work within American education as it stands. We propose to improve teachers' knowledge and classroom practice. As Milbrey McLaughlin wrote, "Implementation is a problem of the smallest unit," and we think it makes most sense to begin there, rather than trying to turn the system upside down from the outside, based on large increases in money or potent new instruments of coordination. Hence we offer ways to challenge and change common conceptions of practice at their roots, in ways that link the development of better practice to practitioners' development, and in doses that teachers might find usable and manageable. For reasons that we will explain near the end of this chapter, this seemingly more modest strategy seems more likely than more dramatic and grandiose strategies to thrive and grow. As the changes in practice and professional learning matured, they would generate the capabilities needed to change the system dramatically, but they would have done so at its base, where the capacity for change is most critical, and which external changes in structure and operations cannot produce. The ideas sketched here are intended to help to plot a new direction for teachers' professional education that could make a difference tomorrow as well as in the long haul.

We organize the chapter around three basic questions. First, what would teachers have to know, and know how to do, in order to offer instruction that would support much deeper and more complex learning for their students? Second, what sort of professional education would be most likely to help teachers to learn those things? Third, what do these ideas imply for the content, method, and structure of professional development?

WHAT WOULD TEACHERS NEED TO KNOW?

Researchers and educators have quite dramatically changed their views of learning and knowledge in the past several decades. Those changes have led them to dramatically different views of what students should do in classrooms and how teachers should teach. We begin from these developing conceptions of knowledge, teaching, and learning, and ask: What would teachers need to know in order to teach in the ways that researchers and educators imagine they should?[1]

First, teachers would need to understand the subject matter they teach, in ways quite different from those they learned as students. For example, they need to know meanings and connections, not just procedures and information. It is not enough to know that when you multiply:

.75
x.25

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you count the number of places in the two multipliers (.75 and .25 together have "four places") and then "count over" that number of places from the right in the calculated answer (1875), resulting in .1875. Students are likely to come up with the answer 18.75. Speculating about why they may do this requires teachers to be able to see the procedure through students' eyes in the light of other things students know—for example, that when adding two decimals, one lines up the numbers and preserves the location of the decimal point:

$$\begin{array}{r} .75 \\ \underline{+.25} \\ 1.00 \end{array}$$

And explaining why the multiplication algorithm works is very different from being able to execute it correctly. Why does the answer for the product of .75 and .25 have four decimal places? What representation or models could function to endow the multiplication, or the conventional procedure, with meaning? What does .75 x .25 mean? What is a real-life situation for which .75 x .25 is a sensible calculation? Answers to such questions are essential to teaching with understanding and are founded on a deeper, more conceptual kind of knowledge than most of us have acquired from our own experiences in math classes.

Understanding the ideas is not all that teachers need. They also need to understand what reasoning in particular fields entails—such as what counts as "proving" something in mathematics as compared with proving something in history or biology, and, more broadly, what habits of mind are associated with scientific thinking versus literary interpretation or art criticism. They also need to see ways that ideas connect across fields, and to everyday life, so that they can appropriately select and use contexts, problems, and applications. In such matters it helps to know something about how particular ideas evolved in the history of a field, for students' thinking sometimes parallels historical developments. Understanding current controversies in certain fields can also help in knowing where knowledge is changing or contested rather than agreed on.

Second, in addition to knowing the material they are teaching, teachers would need to know about children—what children are like, what they are likely to find interesting and to have trouble with, in particular domains. They would need to become insightful in listening to and interpreting children's ideas about academic subjects. They would need ways to expand the interpretive frames they likely bring to their observations of students so that they could see more possibilities in what students could do. And they would need to come to see children as more capable of thinking and reasoning, and less as blank slates who lack knowledge. Some of this knowledge is general—about children of certain ages, for instance. Some of it is particular—what this child believes, how she works, what she means by what she has drawn or written or said. Learn-

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ing to attend to one's students with insight requires expertise beyond what one gathers from one's own experience. What one enjoyed, thought, or felt as a child may afford helpful speculation about one's students, but is insufficient as a professional resource for knowing learners.

Third, teachers would need to learn that knowing students is not simply a matter of knowing individual children. Because teachers often teach children who come from backgrounds different from their own, they would need to become acquainted with cultural differences, including differences in language, class, family, and community. Gender, taken for granted in everyday experience, is another critical matter for teachers to understand. Through a complex interplay of regard for individuals and groups, teachers have to understand their learners. Honoring differences in teaching is a complicated matter, for teachers need to suspend habitual notions that presume sameness and to appreciate distinction, which requires the capacity to bridge social and ethnic gulfs and sensitivity to the adjustment and adaptation needed to reach each student. Yet teachers also need to connect with their students, and for this it is important not to see students as the "other." That requires seeking common ground, expecting all students to learn, and not differentiating expectations of students. Teachers bring their own experiences based on race, class, gender, and culture, and these are both resource and liability in relating to students.

Moreover, teachers would need to develop and expand their ideas about learning, including what it means to learn, what helps children (or anyone else) learn, and how to "read" children to know more about what they are thinking and learning. Longstanding beliefs and assumptions about learning would need to be examined. For example, is it true that children learn best in bite-sized pieces, each one "learned" before another could be? Do we know that all learning proceeds from the concrete to the abstract, and what is meant by either? Is it true that learning needs to be "fun," and what does that mean anyway? What do we know about when students can best grasp certain ideas, and about the relationship between developing skills and developing understanding? How do differences among learners affect how they learn?

Teachers also would need to know pedagogy. In order to connect students with content in effective ways, teachers need a repertoire of ways to engage learners effectively and the capacity to adapt and shift modes in response to students. What is entailed in using discussion as a medium for instruction? How can student exploratory projects be appropriately framed and guided? When might a clear expository presentation or explanation be called for, and what distinguishes a skillful presentation from a less skillful one? Examining how the curriculum is constructed as teachers and students interact over the material is vital to an increasingly developed practice. Teachers also need to learn to discern the constituents of the culture of a classroom, to have ideas about the kind of classroom culture that supports learning goals and about how to construct such a culture.

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One conclusion we draw from this sketch is that little of the knowledge we have discussed is found in most teachers' experience as public school students or teachers, let alone in their social worlds. These sorts of knowledge and learning would require that teachers move far beyond their own personal and educational experience. However that might be done, it would be the antithesis of the "apprenticeship of observation" that now is such a powerful influence on most teaching.

LEARNING IN AND FROM PRACTICE

Even if teachers knew all these things, they would not know nearly enough to teach in the ways that researchers and educators think they should, for the knowledge we have sketched could be used only in complex interactions in the unpredictable situations that we call classrooms. In addition, the sorts of teaching we have discussed would render the interactions more complex, unpredictable, and difficult to monitor and manage. Teachers could not do such work unless they knew how to learn in the contexts of their work. That would require the capability to attend to and learn about individual students' knowledge, ideas, and intentions. It also would require the capability to stand back from and analyze their own teaching, to ask and answer such questions as: What is working? What is not working? For whom are certain things working or not working? To teach well, given reformers' ambitions and the situational and uncertain nature of teaching and learning, teachers would need to use what they learn to correct, refine, and improve instruction.

This implies that practice cannot be wholly equipped by some well-considered body of knowledge. Teaching occurs in particulars—particular students interacting with particular teachers over particular ideas in particular circumstances. Despite the significance of the knowledge that we discussed above, no amount of such knowledge can fully prescribe appropriate or wise practice. Hence an additional answer to the first question at the outset of this chapter—"What would teachers need to learn?"—is that much of what they would have to learn must be learned in and from practice rather than in preparing to practice. Or, perhaps better, they would have to learn, before they taught and while teaching, how to learn in and from practice. Teaching requires improvisation, conjecturing, experimenting, and assessing. Teachers must be able to adapt and develop practice.

It has become popular to talk about teachers as lifelong learners and about teaching as something that one learns over time, but the content of such phrases typically is less than clear. What distinguishes learning from and improving one's practice, from simply "becoming experienced"?[2] We think it wiser to ask more specifically: What might it take to learn in practice, and to learn from practice?

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First, teachers would have to learn to size up a situation from moment to moment. For example, in addition to learning formal knowledge about children's thinking, teachers would need to learn how to elicit children's ideas and how to interpret them in the context of classroom work. This is inquiry into teaching in teaching. The knowledge of subject matter, learning, learners, and pedagogy is essential territory of teachers' work if they are to work as reformers imagine, but such knowledge does not offer clear guidance, for teaching of the sort that reformers advocate requires that teachers respond to students' efforts to make sense of material.[3] To do so, teachers additionally need to learn how to investigate what students are doing and thinking, and how instruction has been understood, as classes unfold. Conducting such investigations of student learning is essential to the new pedagogies that reformers urge, as well as to effective traditional instruction.

Second, teachers would have to learn to use such knowledge to improve their practice. All teachers accumulate experience, and some inquire into children's ideas. But neither experience nor inquiry improves teaching. Teachers would need to learn how to use what they learn about students' work and ideas to inform and improve teaching. That could include using their learning about first graders' thinking about stories to broaden understanding of what helps first graders learn to write. To develop this kind of knowledge, teachers would need intellectual tools that could help them to examine their own work with care and some detachment, to challenge their own thinking, and to draw reasonable conclusions from their inquiries, including generalizations that could help them to navigate future situations.[4]

Third, in order to do these things, teachers would need to learn how to operate experimentally in response to students and situations. Some of this is evident from what we already have said. Teachers would need to know how to frame, guide, and revise tasks and to pose and reformulate questions, so as to learn more about students' ideas and understandings. Such learning is not only produced in response to what arises, but also includes a kind of predictive, imaginative anticipation. What might students say or do? How might this particular student hear or see this? What might happen if! end this discussion and try to explain it myself? Much of what teachers need to know must be known and learned in context and in the moment. Knowledgeable teachers may not know the particulars in advance, but they can anticipate many likely elements of students' response to assignments and classroom situations.

Our argument is not that teachers should become researchers or teacher researchers. Rather, it is that a stance of inquiry should be central to the role of teacher. In order to teach in the ways we have sketched, teachers must be actively learning as they teach. The best way to improve both teaching and teacher learning would be to create the capacity for much better learning about

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teaching as a part of teaching. Teachers can certainly learn subject matter, as well as knowledge of children, learning, and pedagogy, in a variety of courses and workshops. But the use of such knowledge to teach depends on knowledge that cannot be learned entirely in advance or outside practice.

Since such knowledge is situated in practice, it must be learned in practice (Feiman-Nemser and Remillard, 1995). To propose otherwise would be like expecting someone to learn to swim on a sidewalk. Reading situations, the moves, the decisions—each of these is contextualized and shaded with subtleties of time, tone, person, topic—and it is in the unique combinations of these that the professional knowledge that we have been discussing can be created. Professional development could be substantially improved if we could develop ways to learn and teach about practice in practice. But what we mean by "in practice" is not obvious.

PROFESSIONAL EDUCATION FOR PROFESSIONAL LEARNING

To understand what we mean by learning in practice, we must first consider the basic requirements of professional education. First, professional education must be education for professional practice if it is to be either professionally responsible or usable. Thus a conception of the practice itself, and what it takes to practice well, should lie at the foundation of professional education. Second, any defensible education requires a sense of its purposes, a map of the relevant terrains in which to work, and a conception of what is involved in learning to operate in that terrain—that is, ideas about appropriate curriculum and pedagogy, the materials and experiences best suited to help people learn, and how to engage them. Third, since such schemes do not apply themselves, ideas are needed about the kinds of knowledge, skill, and other qualities crucial to teaching teachers in these ways. To satisfy these three basic requirements would be to realize the key elements of professional education for the practice of teaching.

We expand on these requirements to develop our conception of learning in practice. On our first point—what is distinctive in the professional education of teachers—we believe that at the core, it is about learning professional performance. To learn anything relevant to performance, professionals need experience with the tasks and ways of thinking that are fundamental to the practice. Those experiences must be immediate enough to be compelling and vivid. To learn more than mere imitation or survival, such experiences also must be sufficiently distanced to be open to careful scrutiny, unpacking, reconstruction,
and the like.

On our second requirement, the primary purpose of teacher education is to cultivate the knowledge, skills, and values that will enable teachers to be highly effective in helping students to learn. It is also to develop the personal resources

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necessary to foster such learning. One element of such professional learning, then, is that it would be centered in the critical activities of the profession—that is, in and about the practices of teaching and learning. This does not necessarily mean that teachers should be educated in public schools, for we do not hold a narrow view of practice. As in medicine and law, to be "in" practice is not necessarily to be in an operating room or a courtroom. One is "in" a realm of legal practice when one drafts or comments on appellate briefs in a legal library, by considering a variety of briefs and other sources that bear on the matters in question. Centering professional education in practice is not a statement about either a physical locale or some stereotypical professional work. Rather it is a statement about a terrain of action and analysis that is defined first by identifying the central activities of teaching practice and, second, by selecting or creating materials that usefully depict that work and could be selected, represented, or otherwise modified to create opportunities for novice and experienced practitioners to learn.

The investigation of practice would be another key element in any professional approach to learning. In order to prepare people who were truly able to use knowledge to learn in and from practice, professional education would emphasize questions, investigations, analysis, and criticism. Crucial questions about teaching and learning would be one part of the frame of such work, and evidence of professional work—teaching and learning—would be another part. Investigating such questions and bringing salient evidence to bear would be central activities in the acquisition and improvement of professional knowledge. Thus, the pedagogy of professional education would in considerable part be a "pedagogy of investigation" (see Lampert and Ball, 1998). Such work could not be carried on without the development of suitable tools of professional analysis, and the development of such analytic tools would be another key requirement for creating a more deeply professional education.

Finally, the activities we have sketched could not be adequately cultivated without the development of more substantial professional discourse and engagement in communities of practice. Continuing thoughtful discussion among learners and teachers is an essential element of any serious education, because it is the chief vehicle for analysis, criticism, and communication of ideas, practices, and values. In the education of professionals, discourse serves additional purposes, which are related to building and sustaining a community of practitioners who collectively seek human and social improvement. The discourse of teacher education should also help to build collegiality within the profession and create a set of relations rooted in shared intentions and challenges. Such discourse should focus on deliberation about and development of standards for practice and on the improvement of teaching and learning.

This analysis leaves open many questions about what sort of study and analysis, and what the other elements would be. It remains to be shown how

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teacher education and professional development could be designed to make room for the inquiry-oriented teacher education that we propose. In fact, to say that teacher education should be centered in practice seems both reasonable and perplexing. Many tasks of teaching can be exploited as fruitful sites for inquiry and learning: selecting and developing curriculum materials, planning instruction, and assessing student work, for example. In the course of these tasks, teachers may puzzle, weigh alternatives, draw on what they know or can access as resources for judgments and decisions. But teachers also know that these things often are done on the run in the midst of busy days, and that there can be little time for puzzling or alternative weighing. How could professional education be centered in practice and still be thoughtful?

The key to our answer is that being "centered in practice" does not necessarily imply situations in school classrooms in real time. Although the bustle of immediacy lends authenticity, it also interferes with opportunities to learn. Being situated in a classroom restricts attention to the sort of teaching underway in that particular class. Further, being so situated confines learning to the rush of minute-to-minute practice. Better opportunities can be created by using strategic documentation of practice. Copies of students' work, videotapes of classroom lessons, curriculum materials, and teachers' notes all would be candidates. Using such things could locate the curriculum of teacher education "in practice," for they could focus professional learning in materials taken from real classrooms that present salient problems of practice. For instance, samples of students' work on two-digit multiplication, combined with the relevant curriculum materials and videotapes of the class in which the topic was taught, could be used to inquire into what students learned, and whether it was what the teacher intended. (See Lampert and Ball, 1998, and Cohen in Lampert and Ball, 1998.) Teachers and intending teachers could investigate what students seemed to have learned, and in the course of such analysis could probe other fundamental issues, among them these: What might it mean to know two-digit multiplication? To what big mathematical ideas is two-digit multiplication connected? Could there be more than one reasonable answer to the problem? For any answer, what sort of evidence for learning can reasonably be adduced from what is available? And if such documentation of practice included several different approaches to teaching the same topic, teachers and intending teachers would have the material with which to explore such issues in a comparative perspective, which would sharpen and deepen their examination of the issues.

Some disequilibrium is required for such learning. It would not be sufficient simply to see what one already assumes about students, learning, and content; one would also need to see others' assumptions, differences in their content and effects, or unexpected effects of one's own ideas or practices. Examples include the writing of a six-year-old boy who cannot yet read, or serious conceptual fissures in the thinking of an accomplished seventh-grade math student.[5] Such

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challenges to extant assumptions can be enormously productive exactly because seeing problems in their own, other teachers', or their students' work can spur reconsideration, more systematic inquiry, and learning about practice. For example, when teachers see the correct test of a student whose interview or openended writing reveals a profound misunderstanding of the material, they may begin to realize that the evidence that they have taken for learning is not necessarily adequate. Similarly, it is useful for teachers to notice that a student who says little in class and seems inattentive and unconnected can produce thoughtful written work.

These points are underscored in classrooms in which the tasks are less controlled and the discourse more open. One reason is that the possibilities for students' performance expand, and another is that the sensible but wrong ways students can think will also be more visible. More access to students' work can also unsettlingly reveal the complexity of the subject matter that ordinarily escapes adult notice. For example, in Ball's third-grade class, it turned out that her students did not necessarily think that 4/4 was equivalent to 5/5, even though they did think that 4/4 and 5/5 were each themselves equivalent to one whole—that is, that 4/4 = 1 and that 5/5 = 1. Some argued that 4/4 is less than 5/S because "there are fewer pieces." Some argued that 4/4 is more than 5/5 because "the pieces are bigger" (Ball and Wilson, 1996). This episode was captured on videotape, and teachers who have viewed it have been disturbed by the children's misconceptions, enchanted by their imagination, worried about the students' potential confusions, and concerned over the teacher's role.

Such videotape provides an example of what we mean by the term in practice, and they have provoked many useful discussions about mathematics, about learning and teaching, and about third graders. Situating professional development in such materials, examples, and incidents—each of which may stimulate some productive disequilibrium—would create a new terrain for learning. The sorts of materials that can be used to constitute the terrain include written cases of teaching, multimedia cases or the raw materials of such cases, observations of teaching, teachers' journals, and examples of student work that are embedded in evidence about teaching.

We are not arguing that all examples of such material would qualify; in fact, much would not. One particularly crucial entry criterion for records that might be included is that they not merely reinforce extant practices, beliefs, or ideas, for practice-centered professional learning of the kind we are describing would be contrary to teachers' conventional socialization in two respects. It would intervene in the isolation of practice, in which the only material for learning is one's own practice. By enabling encounters with very different practices, such work would broaden and diversify teachers' knowledge and create opportunities to see new versions of teaching and learning, and to understand things differently. Moreover, the use of such materials could do so in a more considered

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way than is possible in lived practice, under conditions in which teaching and learning can be held still, studied, analyzed, and contrasted. Teachers could "have" and scrutinize a variety of experiences, learning to operate as thoughtful professionals (Cohen, in Lampert and Ball, 1998).

A second crucial entry criterion for candidate records of practice is that they be used to focus teacher education on the investigation of practice—that is, to make systematic study and analysis of learning and teaching the core of professional education. To do so, teacher educators and teachers would have to cultivate the capacities to investigate teaching and learning, develop new claims on the basis of such investigation, and defend them with evidence and argument. Simply looking at students' work would not ensure that improved ways of looking at and interpreting such work will ensue. It would be crucial to develop and debate ideas about what to look at, ways to describe what is observed, and conceptions of what is sufficient evidence for any given claim. If we want to say that a given student understands even and odd numbers, what would we use to support that conclusion? If he says that 1, 3, 5, and 7 are all odd numbers, is that adequate evidence that he understands what an odd number is? What can we say with confidence about his understanding? Working with various specks of evidence—something he said in class, a homework paper, an explanation he gave to the child sitting next to him—teachers engage in real inquiries of practice. Examining student thinking is a core activity of practice, and fundamentally also a matter for investigation. The fragility of understanding—their own as well as the children's—is a phenomenon that teachers encounter uneasily. After all, they are responsible for helping children learn and for reporting on what they have learned. Teachers have to learn how to frame and explore conjectures, how to bring evidence to bear on them, how to weigh the often-conflicting information they get, to make well-supported judgments.

Careful focus on developing ways to study and analyze teaching and learning is one of the key elements of the professionalism we envision. It also could intervene in the taken-for-granted ways of seeing and interpreting teaching and learning that are developed through the apprenticeship of observation. The more teachers developed methods of professional inquiry, articulated ways of knowing, and determined standards for knowledge in practice, the more teachers would have interpretive power, which could contribute to improving both their own teaching and their own and others' learning. They should be less likely simply to see in terms of what they bring, but might be able to see new things and consider more alternatives, analyze students' learning more finely, and consider their practice more deeply and in more complex ways.

That sort of work would cut against the conventional socialization to teaching by changing what teachers talk and think about, which we term the discourses of practice (Lampert, forthcoming). Rather than centering as it does currently on a "rhetoric of conclusions," the discourse would emphasize more

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the "narrative of inquiry." Instead of a definitiveness of answers and fixes, the focus would be on possibilities, methods of reasoning, alternative conjectures, and supporting evidence and arguments. It could legitimate and invest authority in a stance of deliberative uncertainty in and about practice. With such conversations, conducted from such a stance, teachers' practice could be improved by acknowledging the limits of knowledge in practice, expanding teachers' capacity to grasp the nature of these uncertainties, and improving their capacity to manage and learn from them with thoughtful analytic—that is, not purely idiosyncratic—consideration of alternatives. Working in the company of other professionals enables them to compare their interpretations and decisions with others', to confront the inherent inconclusiveness and incompleteness of knowledge, and still to strive for reasoned and reasonable professional judgment.

Creating and sustaining an inquiry-oriented stance such as this is a social enterprise. It can be done alone in some rare cases, but such cases require either special working conditions or almost heroic efforts on the part of the inquiring teachers, or both. Therefore a third element in our conception of professional education is to make professional learning more of a collective endeavor. The purpose here would be to create new capacity for professionals to learn from one another, capitalize on existing capability, and thus break down the traditional isolation of teachers' work and broaden their opportunities to learn.

To do such work would require the development of communities of practice designed to enable practitioners to cultivate more substantial professional discourse. That would entail the construction of more extensive common analytic and descriptive vocabularies and terms of reference, which would expand opportunities for more concrete and precise professional communication about practice (Stein, Silver, and Smith, 1994). The opportunity to engage in such conversation can provide a means for teachers to represent and clarify their understandings, using their own and others' experiences to develop ideas, learn about practices, and gain a more solid sense of themselves as contributing members of a profession, as participants in the improvement of teaching and learning and their profession, and as intellectuals (Stein, Silver, and Smith, 1994; Pfeiffer, 1998).

We emphasize the importance of situating professional discussion in concrete tasks or artifacts of practice, because they ground the conversation in ways that are virtually impossible when the referents are remote or merely rhetorical. Lacking such grounding, a common analytic vocabulary, and strong norms of analysis, professional conversation tends to become an exchange of buzzwords and slogans more than specific descriptions and analyses with concrete referents. Imagine physicians discussing the treatment of tetanus by discussing only how patients described their illness, how the physicians felt about that disorder, what patients said, how often they saw cases of tetanus, what patients looked like, and the like. Few patients would get well, and many would die, because physicians' discourse did not deal with any of the medically relevant issues. In

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fact physicians discuss specific medications and related treatments, their effects in particular sorts of cases, patients' physical symptoms and responses to treatment, and prevention. An analogous example in education would be teachers' discussion of a videotape in which a class is working with base ten blocks to learn decimals. Such an example offers a specificity that cannot be paralleled by a general conversation about the use of manipulatives in the absence of solid records of practice. Similarly, talking about "performance assessment" or standards is substantially deepened if it is centered on a set of student papers. Recall the earlier example of teachers watching a third-grade discussion about equivalent fractions. Groups of teachers who have watched this same video have disagreed, debated, raised questions, and pursued more information together. Rather than relying on vague terms and language, the communication can be grounded in real phenomena of practice. And in the context of discussing complex and not completely clear concrete elements of teaching and learning, a more useful and discriminating language of practice could develop. Such concreteness can be the beginning of serious intellectual work rather than a lowgrade alternative, focused more on personal opinion and preference without recourse to evidence and relevant analysis.

One reason that records of practice are so important to changing the discourse of practice, and hence improving teaching, is that in conversations about them, teachers could hardly avoid grappling with standards: What is good teaching? What is a good enough paper? Which response to this question shows that students understand? Where do we agree? Where do we disagree, and why? Such discussions could make much more public the bases of knowing in and about teaching and learning. That, in turn, could help to create a shared enterprise of constructing knowledge in and from practice. Developing standards in practice that reflect shared vocabularies and values could develop practice beyond the currently private enterprise that it often is. Shared standards can still produce differences of interpretation and action, but within a common framework of consideration and value. Teachers might argue over whether a given student's explanation reflected appropriate grasp of a text, but would agree on seeking to ascertain that, with common ideas about evidence. They would come into contact with the reality that different people can look at the same phenomenon and see different things and interpret them in different ways. Such encounters can expand the perspectives with which teachers can examine their own practice, as well as to stimulate discussion of the "obvious," the taken-for-granted.

By highlighting the importance of teachers' access to and participation in communities of practice, we signal the need for teachers to be linked with a wider discourse beyond their local circle of colleagues, whether through subject matter organizations, study groups, university-school partnerships, or other groups or networks. An important goal should be to expand the community of educators and education resources to which teachers turn to inform and sup-

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port their work, a shift from the pattern in which teachers focus exclusively on their own work or the work of those close by, with little external contribution, challenge, or support (Lord, 1994).

Our argument is based on the conviction that developing communities of practice with shared approaches to the study and analysis of teaching could help to build norms for knowledge and discourse within the profession. The current norms, captured concisely in the popular American maxim that "every teacher has to find his or her own style," actually work against teachers' learning. They also work against the development of collective capability as a profession, for it preserves the individualistic, polite, and standardless culture of teaching. Lacking concreteness and common ground, teachers (when they even have opportunities to talk or work collectively) often talk past and around one another. They rarely grapple with core elements of their work, seeking to discover and use their differences in assumptions, experience, and reasoning. Instead, they politely reaffirm teachers' needs to do what fits them personally. The construction of knowledge in practice is paradoxically confined to the private world of each practitioner, its status as knowledge thus peculiar (Little, 1990).

Orienting professional learning toward the joint professional study and analysis of teaching and learning would knit professional development inextricably into the practice of teaching. It would convert professional development from its traditional role of training or remediation external to the work of teaching into a core dimension of professional practice. It would simultaneously work to convert practice from a process of private trial and error and implementation to a more publicly deliberative process of inquiry and experiment. This is no small change on either front. Our proposal merges two agendas—the improvement of practice and the improvement of professional development—into a single reform aimed at both the development of practice and the development of practitioners.

TOWARD A CURRICULUM AND PEDAGOGY FOR PROFESSIONAL EDUCATION

Our proposal aims at fundamental change in teaching and teacher education, but it would not require massive or revolutionary change, with huge shifts in resource allocation or government. It would require deliberate development of the profession. We sketch some examples of what would be entailed in creating such opportunities for professional learning, to offer a sense of what the opportunities might look like and how they would draw on the elements of a theory of professional education outlined in the previous section.

Such professional education would depend partly on finding ways to use practice as a site for inquiry, in order to center professional learning in practice.

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One way to do this lies within the course of teachers' everyday work—in the regular tasks of planning, selection, enactment, reflection, and assessment. There is no shortage of material; the key lack is of ways to turn the work of teaching into material for inquiry and learning. Another way to make inquiry into practice more available to teachers is to document and collect artifacts of practice and make them available for teachers' examination and inquiry. For such opportunities for inquiry to be educative would depend on the development of a pedagogy for teacher education that would focus on new capacities for the study of practice; once begun, the work could spur the development of such a pedagogy. Questions, ways of observing, methods of annotation and comparison, access to others' perspectives—all of these would expand the opportunities for learning from practice.

The development of such a pedagogy would require significant change in the culture of professional learning, which goes beyond finding ways to use practice as a site for inquiry. Because teaching has long lacked ways for teachers to work on the improvement of practice as a group, creating such a new pedagogy and opportunities to learn thus would require creating venues, norms, and conditions for teachers to inquire collectively into problems of teaching and learning and to participate in communities of practice. Leadership would be required for such arrangements, which opens up questions about who would provide it, what such roles would entail, and what leaders would need to know. In this section, we explore further each of these elements of professional learning.

A Curriculum for Professional Learning

A central element of our argument is that professional development could be improved by seeking ways to ground its "curriculum" in the tasks, questions, and problems of practice.[6] One way to do this is to use the actual contexts of teachers' ongoing work: their efforts to design particular units of instruction, try different classroom organizations, assess students' learning. Another would be to collect concrete records and artifacts of teaching and learning that teachers could use as the curriculum for professional inquiries—for example, students' work, curriculum materials, videotapes of classroom teaching, teacher notes, and student assessments. These could be drawn from teachers' own ongoing work or be specially collected from others' practice, and catalogued and made available to be shared and accessed. These sites of practice would then be used to develop usable knowledge of content, students' learning, and teaching.

Consider an example of what it might mean to do this within teachers' own ongoing work. In two local middle schools, the mathematics teachers have been worrying a lot about the implementation of a new state-mandated performance assessment. The test was to be given at the beginning of eighth grade. Last year, when the draft assessment was piloted at their school, test scores plummeted. Since the state assessment test has always been a worry—eighth graders have

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always done less well than fourth graders, raising concerns about the middle school program—these teachers are anxious to understand better what students need to know to do well on the new assessment. Two teachers volunteer to organize material from the pilot administration, such as students' test portfolios and the scoring sheets. Because these were their own students, the teachers also have the student records. Each teacher gets a packet of portfolios, scoring sheets, and a few other records for ten students drawn from all classes.

In preparation for the first meeting, they pore over the assessment but feel that they do not adequately understand either what the tasks are asking or the ways in which students' work was scored. They decide to begin by doing one of the tasks themselves. In three separate sessions they complete the task and analyze closely what it "covers" mathematically, and what one needs to know and be able to do to perform the task successfully. They then consider their students' performances on the same task and begin to see more about the different ways in which the students interpreted and approached the task. Over the course of several meetings, they repeated this cycle of doing one of the assessment tasks themselves, discussing and analyzing the mathematics entailed and then examining the middle schoolers' work on the same task. Doing the tasks is actually enjoyable, and they find that they are much better able to "see" the students' work and thinking after they have dug mathematically inside the tasks themselves. Later in the year the teachers develop a short list of the understandings that the assessment seems to tap and the problems they saw in students' work. This raises a host of questions about how to help students do better, and where to seek resources for their own learning. One of the teachers proposes attending the state National Council of Teachers of Mathematics affiliate conference, coming up soon in a nearby city, for she notices that a number of sessions target the new state assessment and at least a couple of them seem to address the teachers' questions about ways that might help them improve their teaching of these mathematical ideas, and hence, their students' learning.

Several elements of professional education we have already discussed are evident in this extended example. The teachers are bent on improving students' performance on the new state assessment, and they construct a way to investigate mathematics, assessment, learning, and teaching using their need to look more closely at the test to understand it. The material for their investigation is their own students' last year's tests. The immediacy and anxiety of the situation is a pressing incentive to participate—using a real task of practice as the context for their work. Their investigation of what was causing students to do so poorly on the test took them to an opportunity to deepen their own understanding of mathematics, students' thinking and interpretation, and the structure and worth of tasks. Although any one of them could have done this investigation alone, working together greatly enhanced what was possible to consider and to learn, for their ideas differed about the mathematics, the tasks,

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and particular students, and the discussions broadened what any one person could do. Finally, the teachers created for themselves an opportunity to learn mathematics: in order to understand the nature of the tasks and their students' performance, the teachers had to focus on the mathematics. Too often the "study of teaching" overlooks the central role subject matter plays in the practice of teaching. In this example, the teachers used their understanding of the mathematics and their own mathematical explorations to learn more about the assessment, students' work, and mathematics.

In this instance, teachers drew on data from their own teaching, and it seemed to work. This can be awkward if someone is particularly unreflective or defensive, and it can be hard to get enough distance on an example when it is from one's own practice. Moreover, some data are difficult to locate in one's work—videotape of very young children discussing mathematics or an entire year's worth of documentation of a single child. Another way to make practice more available to teachers is to document and collect artifacts of practice and to archive such material in ways that make them available for teachers' examination and inquiry. This would be a new kind of material, drawn directly from practice: records of teaching and learning that could be examined, discussed, and experimented with. The quality of these materials would be adequate for close examination but would not be polished or glossy. In fact, if the quality is too slick, some evidence suggests that their credibility suffers, and teachers suspect that the examples are contrived. Although such material would be outside the regular activities of teaching, its distance from teachers' own classrooms offers opportunities not proffered within the dailiness of their own work. For example, looking collectively at a videotape of a lesson from some teacher's classroom whom they do not know makes possible a kind of critical scrutiny and interpretation not likely to be possible in talking about their own or their colleagues' practice. They can explore alternative appraisals, they can disagree, and they can raise critical concerns in ways that would be much harder, at least at first, in discussing the practice of people with whom they work. Such analytic conversation about teaching and learning has not been part of either the norms of teaching or professional development. Moreover, archival records allow a special kind of access to practice not as easily done in the course of ongoing work. Teachers can look closely at multiple points back and forth across time, can look at multiple sources of evidence around a single event, can look together at the same phenomena with others. Commentaries produced by others can broaden the richness of the archive, expanding the multiplicity of perspective that teachers can learn to bring to the material and to issues of practice. The concreteness of the material can expand teachers' experience by making the experiences of a particular teacher intimately available to others (Lord, 1994).

Take now a second example in which a group of teachers works on a set of issues grounded in others' practice. A group of seven teachers from three different elementary schools in the same district decides to study two fourth

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graders' and two fifth graders' writing across an entire school year—not students from their school. They examine copies of stories, journal entries, notes, and the writing the children did in math class. They have several goals in mind. One is to develop their capacities to see things in children's writing—to increase and deepen what they can notice and describe. Another is to get better at helping children with their writing. Toward that end, two of the teachers focus particularly on the comments that the teachers have written to these students in response to these different kinds of writing, and they talk about the kinds of issues that they might raise in a writing conference with each of the students. A third goal is to develop a more shared sense of standards for evaluating students' writing. As they move increasingly in the direction of encouraging their own students to write, they feel quite uncertain about what should count as a satisfactory piece of writing. Suspecting that their standards might vary depending on the student as well as on the particular context of the writing (for example, explaining a solution to a mathematics problem versus writing a story) only makes the puzzle thornier.

As they talk together about a few pieces of children's writing, they find themselves disagreeing about the quality and key features of some of the work. At first they defer to one another, treating the conversations more as an opportunity to share their ideas. But after a few times, their meetings evolve into more of a forum for working on hard issues together, hence going away thinking a little differently or understanding something a little more. They argue, sometimes vehemently and with conviction, but they also find themselves stimulated and learning. After a year, one of the teachers who is an avid e-mail user convinces the others to get e-mail accounts too, and some of their conversations begin to take place in writing (although they also continue to meet regularly). One interesting by-product of their expansion onto the Internet is that they are writing to one another, and sometimes voluminously. They comment on this, noting that they had been doing little writing of their own for years, and that this is refreshing and even useful since they themselves are working on writing.

How are the elements of improved professional education, which we sketched earlier, evident in this example? First, the group had purposes, some shared and some individual: to learn to look more skillfully at students' writing, to get better at what they do to help children's writing improve, to develop a more shared sense of standards for what counts as good writing—for whom, in what contexts, under what conditions. Their work was grounded in a central activity of practice—examining and appraising children's writing—but the children were not their own students. The stance of the teachers was one of puzzlement and inquiry: How can we get better at looking at children's work? What makes sense to do to help any particular student with some particular text? What are the standards we hold for children's writing? What is good enough? The teachers are working as a collective, and finding that there are things they can learn to do and say with one another that improve what they could learn

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alone. The disagreements, uncomfortable at first, emerge as particularly challenging and useful for extending their capacity. Although their meeting takes time, they find it so valuable and so useful to their own learning and practice that they tend to have little difficulty finding meeting times. As in the first instance, teachers' own versatility and fluency with the content becomes a strand of their professional learning.

Each of these approaches offers possibilities. Using artifacts and records of practice, teachers have opportunities to pursue questions and puzzles that are deeply rooted in practice, but are not of their own classrooms. In the context of their own students, concerns, and responsibilities, teachers have depth, care, and interest that creates an immediacy for work and could mobilize incentives for learning. Studying both other teachers' practice and one's own offers opportunities to exploit the regular professional tasks of teaching. Yet the pull of the personal and the immediate in the case of one's own classroom can mitigate against reflection, analysis, and investigation of alternative perspectives and courses of action. Moreover, the current norms of teacher interaction and discourse do not readily support the kinds of joint consideration of one another's practice that would be useful. Creating common ground on which individual teachers and groups might work, compare thinking, explore alternatives, and play imaginatively would offer a meeting place for a new kind of professional work, although one still familiarly connected to practice. Paradoxically distant from the intensely personal and private world of the individual teacher's classroom, this new work would be designed to be no less deeply rooted in the intellectual, emotional, and moral realities of practice.

Three features stand out about such a curriculum for professional education. One is that it centers professional inquiry in practice. Using real artifacts, records, moments, events, and tasks permits a kind of study and analysis that is impossible in the abstract. Second, it opens up comparative perspectives on practice. In the traditionally individualistic structure of teaching, teachers rarely see teaching other than their own. Looking closely at student work produced in a different classroom offers teachers a chance to learn from others' practice. Third, it contributes to collective professional inquiry. Typically when U.S. teachers talk, they do not share commonly accessible referents. They mention students, topics, assignments, and lessons, but rarely are they able to examine such examples jointly. When they do, one teacher shares an anecdote from his or her own classroom. The example often is not in a concrete form to which others can have equal access, examining it unrestricted by the sharing teacher's interpretation. The approach that we propose would enable teachers to approach concrete phenomena of practice on equal footing, with room for each person's reactions, interpretations, conjectures, and analyses.

Doing such work would not require turning teaching inside out, changing its structure, or massive funding. Work of the sort that we describe could be woven

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into and around work in schools, professional development, and schools of education. To make this happen would still be no simple matter. One large reason is that selecting, collecting, and organizing the records of practice that would provide the material for such professional development would be a major undertaking. Merely collecting, organizing, and reproducing (with adequate technical fidelity) examples of instruction on videotape would be difficult. Constructing a rich and various multimedia database from those materials would be time-consuming. Creating such databases in ways that are both easily accessible to novices and deeply educative is no mean feat. Users would need access to both the multimedia environments and to guidance knowledgeable enough to help them use the materials.

Even if such materials could be collected, catalogued, and made accessible, another challenge would be to design ways of working with such materials. Just as providing innovative materials, media, and tools does not in itself reform and reformulate children's learning, neither will even the most clever construction and infusion of new materials change the focus and means of teachers' learning.

A Pedagogy of Professional Development

Although using the regular tasks of teaching, or materials such as those we have described, could help to create a new class of opportunities for teachers' learning, even such compelling occasions and materials themselves would not be enough. Used alone, they would most often be used in the conventional teachers' discourse in which personal style and individualism are primary and in which there is little analysis. The subtle and complex challenges of teaching and learning thus would remain invisible, much as conventional mathematics instruction leaves third graders' naive view of fractions unseen and untouched, even when new materials are used. Many schools have added colorful concrete models of fractions, but that does not ensure different engagement of the content, for students and teachers can continue to use conventional rules about fractions and fraction operations and use the models to substantiate those rules.

The same is true for the study of teaching. The kind of professional curriculum that we have sketched would be unlikely to support professional inquiry unless it was embedded in particular ways to engage and pursue issues. We refer to this as pedagogy of professional development. The key components of such a pedagogy are the sorts of tasks in which teachers would engage around materials of practice, the nature of the discourse that would be needed to support learning with and from these tasks and materials, and the roles and capabilities of teacher educators and leaders who would provide guidance for this work.

In order for materials of practice to serve as a medium for productive professional learning, teachers would need to engage in tasks grounded in the activities of practice. Using records of practice affords opportunities to investigate and construct knowledge central to teaching, so fruitful tasks for teachers'

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learning are those on which teaching itself depends. For example, one task central to teachers' work is figuring out whether and what students are learning. Teachers select materials and design lessons with the goal of affecting what students know and can do, but to figure out whether these designs are working depends on examining their effect for students, and assessing students' performance is no easy matter. Using suitable records of practice, teachers could study and discuss students' work, comparing what they notice, how they interpret it, and how they evaluate the quality of the work. Discussing such questions with other professionals would create opportunities to encounter differences in attention, interpretation, and judgment—crucial matters that are most often engaged alone and with little or no external referent. Teachers would learn from one another's views and interpretations, thus extending and enhancing their own capabilities. And teachers could develop shared standards for good work, progress, and learning.

Another potentially generative task would be analysis of students' assignments. Teachers could take a mathematics problem, a writing assignment, or a science experiment, and analyze the territory it makes possible. They could analytically probe what domains of the subject work on the assignment would entail. Teachers could explore the thinking that the assignment called for by doing it themselves and then comparing their work. Both would create opportunities for teachers to discern the content entailments of assignments and to learn some of the content. They could learn how unpacking a student task can help teachers delve into the associated or underlying ideas. Discussing the assignment with one another would enable them to see others' paths and connections and others' ways of working and solutions. Such discussion would both expand teachers' own understanding and extend their view of the terrain.

Many other sorts of tasks would similarly follow the contours of practice: planning lessons, selecting materials, listening to students, asking questions, figuring out what to do next. For example, teachers could design next steps for a class after watching and discussing a videotape of a lesson; they could frame and word specific questions to navigate student thinking as observed in videotape or children's work; they could weigh and compare alternative representations or tasks, courses of action, and materials.

We have added to the ideas we sketched earlier, about using records and materials of practice to build a curriculum of professional development, by proposing ways to set professional learning tasks that would use such records and materials. As with curriculum designed for students, even the best materials are not self-enacting. Learners will be more likely to thrive if materials are framed by appropriate and artfully designed tasks, and such task design and use is a central element in any plausible pedagogy.

Further, a pedagogy of professional development depends not only on the tasks created for profitable work, but the ways in which those tasks are engaged

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and discussed. Because few tasks are self-enacting, much learning requires teaching that helps learners to perform tasks in which they learn the vocabulary and syntax of the domain in question, and learn how to use them. One example is developing tools for the study and analysis of teaching and learning. Some such tools are skills of observation—ways of seeing, hearing, and noticing the many details of classrooms. Others concern the methods of interpretation, analysis, weighing competing views, and framing fruitful conjectures in particular subjects.

A second large element in learning how to engage a set of professional learning tasks would be the development of a disposition of inquiry. One way to put the aim here is to help teachers learn the intellectual and professional stance of inquiry—the situation of oneself that would support their generation of multiple conjectures about an issue in practice, their production of alternative explanations, and their efforts to weigh them rationally. In order to inquire, especially into one's own practice, professionals must cultivate dispositions as well as technical and intellectual knowledge and skills. These would include learning to avoid leaping to definitive conclusions, cultivating the disposition to frame interpretations as conjectures, and thus how to identify and use appropriate evidence. Learning the technical and intellectual skills and knowledge would be impossible without learning the disposition, and vice versa.

Thus the pedagogy of teacher education would be one in which critique would be valued and in which the learning teachers would be expected to argue with others and with themselves and to explore arguments among plausible explanations or approaches. Learning such dispositions would depend also on learning new norms of interaction. This would create disequilibrium at times, for teachers would encounter ideas and perspectives, evidence and possibilities, quite different from what they assumed. They would have to unlearn the politeness norm that dominates most current teacher discourse. They would have to learn to be tenacious, to probe their own and others' ideas and interpretations, to doubt and be skeptical. And they would have to learn to combine intellectual aggressiveness and a willingness to take risks with a humility about the incompleteness and uncertainty of their own ideas.

All this would require a substantial revision in the norms of professional relations and discourse. It would require learning to have respect for others and their views, but also being able to hold ideas and interpretations out for scrutiny, discussion, and debate in ways that were not seen as personal challenges to individuals. The sort of learning we propose would require that teachers see disagreement as productive, not as something to cover up.

The pedagogy of professional development we have been sketching would require something of a revolution—not in political or social structures but in professional knowledge and culture. It could not arise through spontaneous generation, but would require the participation of teacher educators. Everything we

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have been discussing in this section would depend for its existence on professionals who planned, developed, and led opportunities for teachers' learning—teacher educators, staff developers, and teacher leaders, as well as principals and other leaders. Like other teachers in any context, these teacher developers would need to understand the content terrain itself—in this case, the practice of teaching, including the subjects taught and the learners of those subjects. For teacher educators to use records of practice in fruitful ways, they would need well-cultivated knowledge, skills, sensibilities, and insight about key issues of teaching and learning. They would need to be themselves skilled observers of teaching, to be curious about practice, and to have multiple ways of thinking about student work, classroom discussions, and content representations.

In addition to being insightful students of practice themselves, these teacher developers would need to understand teachers as learners and have a repertoire of ways to engage different teachers in fruitful professional learning. They would need to be good listeners, so they could hear and respond to the wide range of reactions and stances that teachers might bring to a professional development setting. They would need to be able to establish rapport and trust with a variety of learning professionals, and be able to help them form relationships, even a sense of community, with one another. All of this would depend on extensive knowledge of teaching and learning—of both school students and professionals—and considerable interpersonal skill.

Ironically, while the role of the teacher educator is critical to any effort to change the landscape of professional development, it is a role for which few people have any preparation and in which there are few opportunities for continued learning: there is little professional development for professional developers. Yet the changes we sketch are so extensive that, like the teachers with whom they work, teacher developers would need to seek and create opportunities for learning grounded in the practice of professional development. Hence the scheme we have been sketching would require the creation of more formal opportunities for people who do this work to talk with one another, and to do many of the same things we have proposed for teachers: to watch videotapes of professional development sessions, examine materials created for teachers' learning, analyze teachers' projects, listen to teachers' discussions and interpret what they are thinking and learning. Doing such work would be a major change in how teacher developers learn and do their work, but it would be crucial to the improvement of professional development.

CAN THESE PROPOSALS WORK IN THE UNITED STATES?

Our ideas envision a kind of professional education that is rooted in both study of teaching practice and knowledge of teacher learning. Such professional education would be unlike most of the current opportunities teachers have, which

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usually are brief workshops or in-service programs. Although our emphasis on learning in and from practice superficially resembles the surface features of teachers' professional education, of which the overwhelming proportion is "from experience," uncharted experience alone is an unreliable and often unhelpful guide. We have proposed a set of ways to turn teachers' experience to educative rather than reproductive ends.

Any sensible reader would now ask how such approaches might be arranged so they could spread widely and deeply within the profession. Then they would ask whether, if the ideas did spread, how they might avoid simply reproducing the kind of fragmented, unfocused, and superficial work that already characterizes professional development. Without ways to seek and create much greater coherence in teachers' professional learning, this strategy could be just another name for the existing haphazard collage of experience and workshops, pasted together with little connection. The payoffs for practice and students' learning could be just as fragmented and ephemeral.

We do not have a six-point program and can only begin to answer the questions. Figuring out how to maintain quality in any enterprise as far-flung as American education is a terrific challenge, and working out a detailed plan would take time and extensive consultation. But we can identify three components that seem essential.

First, more people in professional development and the improvement of teaching would need to address systematically what it might mean to center teachers' opportunities for learning in practice and contrast that with conventional wisdom about teachers' learning on their own, from their own experience. The ideas we have sketched in this chapter themselves need development. Discussing them and engaging in some preliminary experiences of this kind could help to begin to develop the capabilities needed to redesign teachers' opportunities to learn.

Second, a small number of such learning opportunities should be designed and used as examples of practice-based professional development. Records of their use should be created—in effect, written and video cases of how such things work and do not work. Having such instances would make it possible to engage the ideas in ways that are grounded in practice of professional development, concretizing the discussion. Those cases should be studied and distributed widely. Companion materials should also be designed that describe ways to organize and carry on such activities. The materials should be vivid enough to be compelling, concrete enough to provide resources for others' efforts, and open enough to avoid being converted into lists of abstract principles and "shoulds."

Third, alternative curricula for grounding professional development in practice should be explored. For example, it would be fruitful to develop alternatives for embedding teachers' opportunities to learn subject matter in materials of practice—in student work, curriculum materials, or classroom videotapes.

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Similarly, how might opportunities to learn about students—their development, language, and culture, learning—be designed around opportunities to look closely at students in action? What sorts of materials would support such opportunities? What considerations might there be in designing opportunities to learn? What might be some of the most productive tasks that engage teachers and support serious and sustained learning?

One idea that underlies these proposals is that the problem is not a lack of investment in teacher development, or that "professional development" is not on anyone's mind. The problem lies more subtly in common thinking about what teachers need to learn and how they can best do it. As the analysis thus far suggests, we think that the ordinary culture, knowledge, and professional norms of teaching and teacher education are at the core of the problem. If reform does not address those, nothing will work. But if steps were taken to begin to develop the sort of attack on those problems we have proposed—through discussion, the construction of some examples, and focused curricular thinking—capacity for a different sort of professional development would grow.

Put a little differently, we have proposed to turn professional development into a professional activity centered on the development of practice and practitioners. That would be critical if the knowledge that teachers acquire were to fit with the nature of the work—its challenges, uncertainties, and complexity. Like complex learning anywhere else, learning to teach merits greater and more serious attention than it has too long had. If reformers want learning to improve, then continued careful development of professional development itself will be essential. Joining the development of practice to the development of practitioners is an avenue for that agenda.

Notes

1. We are not arguing that these developing conceptions are either complete or correct, but they seem both more adequate and more promising than many earlier ideas.
2. To highlight the complexity of "learning from experience," Philip Jackson points to the difference between two twenty-year teaching veterans, commenting that one had twenty years of experience while the other had one year of experience twenty times.
3. This is related to, but not the same as Schön's (1983) "reflection-in-action."
4. See DeweyÆs (1933) distinction between empirical and scientific thinking.
5. See Erlwanger's famous case of Benny, a student whose teacher thought he was advanced, but who had privately constructed idiosyncratic understandings of fractions and of mathematics. But the curricular approach in Benny's classroom made it possible for him to continue to progress officially, his personal constructions unrecognized.

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6. See Beasley, Corbin, Feiman-Nemser, and Shank (1997) for an extended example of what is possible and what it takes to establish a curriculum and culture of profession.

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