The Work of Teaching and the Challenge for Teacher Education

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Abstract

In this article, the authors argue for making practice the core of teachers' professional preparation. They set the argument for teaching practice against the contemporary backdrop of a teacher education curriculum that is often centered not on the tasks and activities of teaching but on beliefs and knowledge, on orientations and commitments, and a policy environment preoccupied with recruitment and retention. The authors caution that the bias against detailed professional training that often pervades common views of teaching as idiosyncratic and independently creative impedes the improvement of teachers' preparation for the work of teaching. They offer examples of what might be involved in teaching practice and conclude with a discussion of challenges of and resources for the enterprise.

Keywords

teacher education, teaching practice, teacher education curriculum, professional education

Improving educational outcomes in the United States is a challenging problem, one that preoccupies contemporary reformers and critics alike. With a system of schooling that has never delivered high quality education to all students, policy makers and educational leaders are calling for more complex and ambitious goals to prepare youth for the demands of the 21st century. Visions of better schooling include innovative uses of technology, a much greater emphasis on collaborative work, integrated and problem-based curricula, and higher expectations for students. Too often minimized is what such changes imply for the interactive work of teaching and learning. And, given that there are almost 4 million teachers in the United States, preparing teachers to meet these demands is a massive undertaking. Nonetheless, improvements in student learning depend on substantial, large-scale changes in how we prepare and support teachers.

Agreement is widespread that teachers are key to student learning, and efforts to improve teacher quality have proliferated. Most initiatives, however, have focused on teacher recruitment and retention and on developing new pathways to teaching. In this article, we argue that such initiatives are insufficient without fundamental renovations to the curriculum of professional education for teachers, wherever and through whatever pathway it occurs. We claim that practice must be at the core of teachers' preparation and that this entails close and detailed attention to the work of teaching and the development of ways to train people to do that work effectively, with direct attention to fostering equitably the educational opportunities for which schools are responsible.

By "work of teaching," we mean the core tasks that teachers must execute to help pupils learn. These include activities carried on both inside and beyond the classroom, such as leading a discussion of solutions to a mathematics problem, probing students' answers, reviewing material for a science test, listening to and assessing students' oral reading, explaining an interpretation of a poem, talking with parents, evaluating students' papers, planning, and creating and maintaining an orderly and supportive environment for learning. The work of teaching includes broad cultural competence and relational sensitivity, communication skills, and the combination of rigor and imagination fundamental to effective practice. Skillful teaching requires appropriately using and integrating specific moves and activities in particular cases and contexts, based on knowledge and understanding of one's pupils and on the application of professional judgment. This integration also depends on opportunities to practice and to measure one's performance against exemplars. Performing these activities effectively is intricate work. Professional training should be designed to help teachers learn to enact these tasks skillfully. Such training would involve seeing examples of each task, learning to dissect and analyze the work, watching demonstrations, and then practicing under

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close supervision and with detailed coaching aimed at fostering improvement.

Writing almost 30 years ago, B. Othanel Smith (1980a) urged his colleagues to embrace a similar conception of teacher education, arguing that "we prefer 'training' to 'education' for the simple reason that it designates the kind of education required for professional competence" (p. 6). Today, the word *training* is in disfavor because it seems to connote mindless and atomized repetition and, hence, to "deskill" the professional work of teaching. The low esteem in which the idea is held, however, stems from a pale underinterpretation of the term. Training refers to "discipline and instruction directed to the development of powers or formation of character; education, rearing, bringing up; systematic instruction and exercise in some art, profession, or occupation, with a view to proficiency in it" (*Oxford English Dictionary*, n.d.). No one balks at "medical training" or blinks when disciplinary scholars—from historians to mathematicians—refer to the skills, habits of mind, and ways of asking and answering questions that they developed through their "training." Far from reducing practice in these realms to mindless routines, this kind of "systematic instruction and exercise" defers to the highly skilled nature of professional practice.

Training—a term embraced with ease in other professions—is in fact fully worthy of the intricate demands of teaching. Taking it seriously suggests ideas that might help us to build the teaching force that our schools require. Our challenge is not that we need just a few competent teachers but that we must prepare a consistently skilled workforce larger than any other in this country. We need a reliable system that can begin with ordinary people willing to learn the practice of teaching and actually equip them to do the work effectively. The intricacy of this work demands a disciplined approach to preparing teachers and a determined rejection of approaches that permit a good general education, reflective field experiences, or unstructured mentoring to suffice as professional training.

Attempts to improve teacher education in this country have tended to intervene on the structure of the enterprise: lengthening teacher education or creating alternate routes, for example. We argue that the curriculum of professional training should be the first object of teacher educators' attention and that this curriculum must focus squarely on practice, with an eye to what teaching requires and how professional training can make a demonstrable difference—over sheer experience and common sense—in the quality of instructional practice. This means a comprehensive overhaul of the instructional goals that we set for those who seek to enter the teaching profession and of our approach to preparing novices. Whereas many beginners learn to teach on the job, with either minimal or misfocused and underspecified opportunities to learn practice, the task of professional education is to prepare people for the specialized work of teaching, improving significantly on what can be learned through experience alone. Doing this effectively in teaching requires dealing squarely with the both unnatural and intricate nature of instructional practice. It means unpacking and specifying practice in detail and designing professional education that will offer novices multiple opportunities to practice the work and to fine-tune their skills.

We begin with a brief analysis of the nature of teaching work and of what we argue are its unnatural and intricate qualities. We then draw on the work of several other analysts to sketch the basic components of the practice-focused curriculum for learning teaching that we argue could contribute directly to improved instructional capacity among teachers. Finally, we discuss both the challenges of centering teacher education on practice and the resources available for the work, including the history of microteaching and competency-based teacher education in the United States and the progress that researchers have made to identify content knowledge for teaching and to draw on professional education in other fields to inform teacher preparation.

The Nature of Teaching Practice and the Demands for Professional Education

Teaching as Unnatural Work

Despite the common view of good teaching as something that is mostly learned through experience, our argument rests on a conception of teaching as unnatural work (Jackson, 1986; Murray, 1989). Because it is, we argue, not natural, carefully designed learning is necessary. The notion that teaching is unnatural is difficult to grasp because of the ubiquity of teaching activity: In fact, as Cohen (in press) argues, most people teach. Parents teach children, friends and coworkers show one another how to do things, and many kinds of professionals provide information, demonstrations, and advice. Teaching, defined as helping others learn to do particular things, is an everyday activity in which many people engage regularly. Professional classroom teaching, on the other hand, is specialized work that is distinct from informal, commonplace showing, telling, or helping (Cohen, in press).

The problem of delineating the specialized, professional version of otherwise commonplace activities is not unique to teaching. In their analysis of the teaching of practice across professions, Grossman and her colleagues (2009) write,

> Learning how to build and maintain productive professional relationships with the people in one's care is no simple matter, yet many assume that this is a natural rather than learned capacity. Someone can be described as "good with people" or a "people person," but being "good with people" in purely social interactions is not the same as cultivating relationships in a professional role. The apparently natural aspects of the professional work—evident in the frequent observation that teachers are born, not made—creates [*sic*] additional challenges for professional education.

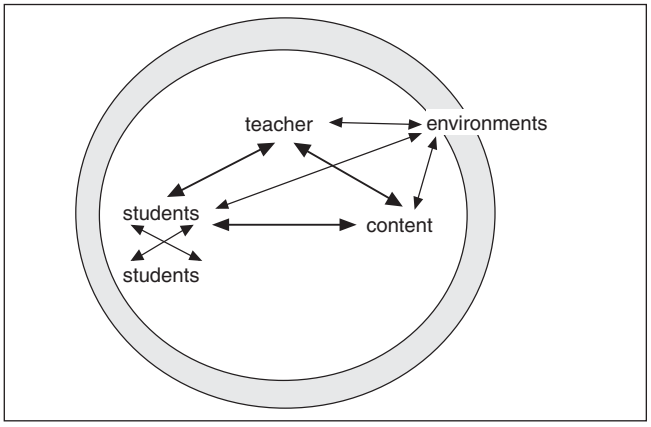


Figure 1. The instructional triangle
Source: Cohen, Raudenbush, and Ball (2003).

The professional work entailed by the practice of teaching is different from the everyday teaching of the sort described above (Cohen, in press). Although learning can occur without teaching, such serendipitous learning is chancy. The practice of teaching comprises the intentionally designed activity of reducing that chanciness, that is, of increasing the probability that students will attain specific intended goals (for detailed perspectives on the goals and intricacy of the work, see Cohen, in press; Lampert, 2001; Lee, 2007). Feiman-Nemser and Buchmann (1986) define teaching as the work of helping people learn "worthwhile things," which, as they pointed out, adds an explicitly moral dimension. In the diagram below, sometimes called the "instructional triangle" (Cohen, Raudenbush, & Ball, 2003), teaching practice is the work—represented by the bidirectional arrows—of drawing on professional knowledge and skill to make these interactions most productive of students' learning.

Despite the familiarity of teaching, many key aspects of this deliberate practice are unnatural; making the transition to becoming a professional requires learning to do things that are not common in daily life and that most competent adults cannot do well. Consider the role of questions, for example. In everyday life, people ask one another questions to which they do not know the answers. Teachers, on the other hand, must ask questions all the time to which they *do* know the answers: What is a number that lies between 1.5 and 1.6? What does *enigma* mean? What factors led to the end of apartheid? If there is an unknown to these questions, it is what students' responses will be—the answers to these questions are already known by the teachers who ask them. Comparing common ways of being in adult life with ways of being entailed by teaching (see Table 1) reveals the fundamental differences in orientation that teaching requires.

Competent adult behavior involves doing many things that are functional for everyday life: helping others avoid embarrassment, assisting them with problems, inferring meaning when it is unclear from others' speech, and being genuine and sincere. Being oneself is a virtue, held up in contrast to someone who is "fake" or "putting on." Teaching, however, is not about being oneself. Teacher is a "role word" (Buchmann, 1993, p. 147), and the locus of the role of teacher is other people—learners. Acting in learners' interests is the core imperative of the role. Acting in their interest entails the deliberate suspension of aspects of one's self. One's personal religious convictions, for example, have no place in public school teaching. Similarly, it is inappropriate to teach only the books one enjoys, to go barefoot in class, or to decide not to interact with students or parents whom one finds annoying. In suspending some aspects of one's self, the teacher instead cultivates other aspects of that self to use as a special kind of professional tool (Lampert, 1985) to enable other people's development.

In short, teaching requires an unnatural orientation toward others and a simultaneous, unusual attention to the "what" of that which they are helping others learn. Although teachers should be people who enjoy and are skilled with ideas, texts, and learning, their primary responsibility is to see the content from others' perspectives—in Gilbert Highet's (1966) terms, to "think, not what you know, but what they know; not what you find hard, but what they will find hard" (p. 280). Teachers must enable others to learn, understand, think, and do. That teachers can themselves do all of these things is not enough to help them help others learn. Teaching involves identifying ways in which a learner is thinking about the topic or problem at hand, to structure the next steps in the learner's development, and to oversee and assess the learner's progress (see Ball & Forzani, 2007; Cohen et al., 2003). In the case of teaching in school, this work is further complicated by the reality that teachers are responsible for many individual learners' growth while working simultaneously with many learners, in batches.

This work is not natural. To listen to and watch others as closely as is required to probe their ideas carefully and to identify key understandings and misunderstandings, for example, requires closer attention to others than most individuals routinely accord to colleagues, friends, or even family members. To provoke discordant thinking or errors in logic and argument intentionally would seem odd if not downright irritating in many situations. And, few adults seek to learn about others' experiences and perspectives as systematically as teachers must.

More common ways of being in the world need not—in fact, cannot—rest so dependently on close attention to others' thinking. It is functional in the course of everyday interactions to be able to assume commonality with others' understanding of ideas and arguments and with others' experiences of events. In nonteaching interactions, people ask one another questions to which they do not know the answers. It is normal to help others who request it, often doing the task or answering the question for them.

Table 1. Teaching as Unnatural Work

Common Ways of Being	Ways of Being in Teaching
Asking questions to which you do not know the answers	Asking questions to which you often do know (at least part of) the answers
Telling and showing others, doing things for people	Asking questions to which you often do know (at least part of) the answers
Assuming that you know what others mean	Probing others' ideas
Correcting and smoothing over mistakes	Provoking disequilibrium and error
Assuming that others experience things as you do	Not presuming shared identity; seeking to learn others' experiences and perspectives
Liking or disliking people	Seeing people more descriptively
Being "yourself"	Being in professional role

In everyday life, one's relations with others are personal and the imperatives rest with individual preferences. It is natural to like some people and dislike others and to act "as oneself," behaving in ways that feel comfortable and uniquely expressive of one's personality. To teach, on the other hand, is to shift the locus of one's role orientation from the personal to the professional (Buchmann, 1993). In sum, although *teaching* is a universal human activity—as parents teach their children—*being a teacher* is to be a member of a practice community within which teaching does not mean the ordinary, common sense of teaching as showing or helping. The work of a teacher is instead specialized and professional in form and nature. Decisions about what to do are not appropriately rooted in personal preferences or experiences but are instead based on professionally justified knowledge and on the moral imperatives of the role. Intuition and everyday experience are poor guides for the specialized work and judgment entailed by teaching.

Teaching as Intricate Work

Most adults do not naturally develop the ability to perform the tasks required of teachers. And, the special knowledge, skills, and orientations that underlie and enable the work of teaching are not typically mere by-products of intelligence or of academic talent or success. Doing well at mathematics in school, for example, does not readily equip one to understand or be interested in others' mathematical thinking or to understand ideas or solutions in multiple ways. In studies of the mathematical work of teaching, researchers have identified forms of mathematical problem solving and ways of understanding mathematics that are special to the work of teaching and not involved in other forms of mathematical work.

Consider, for example, the task of sizing up a pupil's incorrect mathematical response—say, for example, giving .6 as the product of .2 × .3. Knowing that the answer should be .06 requires nothing more than being able to do the problem correctly oneself; figuring out what mathematical steps produced .6 requires a de-centering of one's own mathematical reasoning and the flexibility to see the content from another's perspective. What, for example, might have led a student to give the answer .6 as the product of .2 × .3? It might be easy to see that the student simply preserved the placement of the decimal point much as one does when adding .2 + .3, which equals .5. Less easy is to find out how the student is reasoning. To do that, what would be the best follow-up problem: .3 × .4, .5 × .2, or .5 × .1? On the face of it, these three problems are all single-digit decimal multiplication problems. Being able to distinguish among them requires seeing the content from a learner's perspective. A learner who thinks that .2 × .3 = .6 is likely going to make the same error with .5 × .1, producing .5, but may well solve the other two problems correctly without really understanding the idea of multiplying tenths by tenths: The student will likely produce 3 × 4 = 12 and 5 × 2 = 10 and then place the decimal point at the beginning, which gives (correctly) .12 and .10, respectively. In these two cases, the student arrives at the correct answer by using the routine steps of multiplying and then inserting a decimal point at the beginning of the answer. The student can do this even if he or she does not understand that multiplying tenths by tenths yields hundredths. Posing the problem .5 × .1 enables the teacher to test the hypothesis of what the student is doing by investigating whether or not the student makes the same sort of error again. At that point, the teacher could ask the student what .5 × .1 means and ask how much half of one tenth is. Students will not likely think that one half of one tenth is one half (i.e., .5 × .1 = .5, which would be consistent with the pattern) and may be able to reason that the answer should be one tenth; this reasoning can then be used to reconsider the meaning of .5 × .1. Next, then, what would be a step to take to generalize why the product of one *tenth* and one *tenth* is one *hundredth*? Would money be a good model? A 10 × 10 grid? Learning a rule about the placement of the decimal point? Without taking this example any further, it should be evident that being able to multiply decimals—although essential—falls far short of the mathematical understanding required to teach decimal multiplication.

Similarly, reading or writing well is necessary but insufficient to supply the knowledge and skill needed to help others learn to read and write. The ability to craft a coherent written argument, for example, is quite different from the

ability to help a high school student compose a cogent five-paragraph essay. Being able to recognize words does not help a teacher unlock the print code for 5-year-olds. Spelling well is inadequate to teaching spelling. Helping students learn academic skills and content requires not only strong knowledge of that content but also the capacity to make the subject accessible to diverse learners.

The work of teaching is not only unnatural but intricate. Each episode of instruction comprises many tasks and moves, many of them invisible to a casual observer (Lewis, 2007). Teachers must decide how to use time in each lesson, determine the point of the lesson (Sleep, 2009), and choose tasks, examples, models or analogies, and materials. During class, they must keep track of 25 or more learners as they move through the content, keep their eye on the learning goals, attend to the integrity of the subject matter, manage individual student behavior and maintain a productive learning environment, pose strategically targeted questions, interpret students' work, craft responses, assess, and steer all of this toward each student's growth. Teachers do all of this in environments that involve parents, administrators, state objectives and tests, policies, and community priorities. This intricate work involves high levels of coordination.

To take a closer look at the unnatural and intricate nature of classroom practice and to illustrate the unpacking of the work that is fundamental to a practice-centered curriculum of professional education, we examine a short segment of a lesson from a linguistically and ethnically diverse third-grade class.[1] The teacher and students are halfway through a 5-week unit on fractions and students are working on the problem, "Which is more, $\frac{4}{4}$ or $\frac{4}{8}$?" They have been working on fractions as parts of sets, as parts of wholes using area models, and as points on the number line, and they have been comparing and coordinating these different representational contexts. This problem demands close attention to the coordination of the denominator with the numerator in interpreting the quantity; without this, the two amounts might seem to be the same—each 4 of something, or $\frac{4}{8}$, might seem to be greater, because 8 is greater than 4.

At the beginning of the episode, the teacher asks, "Would somebody like to talk about what they think about this—which is more? Four fourths or four eighths?" A girl named Mei[2] volunteers and asks to go up to the board, where she carefully draws two rectangles, one marked off in fourths to represent $\frac{4}{4}$ and a second divided in eighths, four of them shaded, to represent $\frac{4}{8}$.

> Mei: You see, all of this is four fourths because we have four pieces and you want to take four pieces away. So it will be taking all of these—

> And this is four eighths.

Instead of confirming her answer, the teacher asks her to repeat her explanation so that others can hear her. Daniel, whose English is still slow, raises his hand and says that he agrees. The teacher asks what he agrees with and he begins a lengthy comment about how Mei drew seven lines to make the drawing:

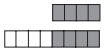
> Daniel: Because, um, ah if, if she, if she put um, I think four, four eighths, um, if you make, um, like eight lines then I disagree with her.

Speaking haltingly, Daniel elaborates. The teacher asks whether he is referring to "Sean's conjecture" ("when you make, to make some number of pieces you cut one less") and he nods. Next, another student, Betsy, says that she can show $\frac{4}{4}$ and $\frac{4}{8}$ on the number line. The teacher says that she would like to see that but, recognizing that constructing this representation will take time, sets the child up to construct her number line while the rest of the class continues discussing other aspects of the problem.

The other children in the class listen with varying degrees of attentiveness while the teacher moves about the room. She occasionally leans over a pair of students, or straightens a pupil's notebook, or places her hand on a child's shoulder. She asks whether anyone else has a comment about Mei's solution. Unexpectedly, Keith says he agrees, but that first he "did something different" and that it was "wrong." The teacher asks whether he remembers what he did, and he explains:

> Keith: First, I made the same thing that she did, then I made the other piece longer, so I thought they were supposed to be the same size.

The teacher calls everyone's attention to what Keith said. She says it is "extremely important" and asks him to explain again what he did. As he talks, she draws the rectangles on the board, one like Mei's and one longer:



"Is this what you did?" she asks, and Keith nods. "Could you say it again?" asks the teacher. "That would be very helpful to some people in this class. Listen to Keith about what he did wrong the first time, he says."

Keith explains that he made his representation of $\frac{4}{8}$ "longer" and so the pictures made the two fractions seem the same. The teacher asks the class to comment, and Tory raises her hand and says that she had done the same thing and that

Table 2. Work of Teaching in Short Classroom Segment

12:58:35	Open the discussion: Use specific tone, body movement around the room, choose whom to call on, and call on that child.
12:58:38	Watch students while walking around; figure out who is drifting and encourage students' attention; maintain tenor of class while Mei draws.
1:00:58	Mei completes drawing. Decide what to do about "I took four out of it"; direct her to repeat, "more loudly"; ask others to comment; work to get other students to comment besides Betsy.
1:01:28	Daniel comments. Work to understand; manage risk of losing class; decide not to take up; close interchange with Daniel kindly.
1:02:40	Betsy suggests the number line. Decide to have her work on the side; make her a number line to work on.
1:02:57	Keith agrees and says that first he did something else that was wrong. Decide to probe and to take this up; highlight for others; amplify by drawing incorrect picture on board.
	. . .
1:24:57	Pose question to assess students' understanding; make up specific question; decide how to take up answers.

it is "too long" and asks to come to the board to make a correct picture.

The discussion continues for a few more minutes. At the end, the teacher poses a question: "What would you say if a fourth grader came to this class and said that $\frac{4}{8}$ and $\frac{4}{4}$ are actually the same because they are both four of something?" This question provokes the students to focus on the key issue involved in comparing fractions.

This brief visit to a classroom underscores the significant amount of coordination among people and ideas that is demanded by the work of teaching. In our analysis of this segment, we sought to identify the specific work—both cognitive and relational—in which the teacher engaged in the course of the 6 minutes. In Table 2, we display a brief summary of our results.

Although simple on the surface, the task focuses squarely on a key issue in comparing and ordering fractions, namely, that understanding a fraction requires knowing what the unit is and attending to the number of equal parts of the whole. Because the problem was posed without a specific context (cookies, pizzas, a number line), the students had to choose and use a representational context themselves. The teacher's choice of problem involves considering these mathematical affordances, as well as anticipating what students might do with it. In opening the discussion, the teacher had to decide what phrasing to use in asking her question, what tone of voice to employ, where to walk around the room, and on whom to call when. As the first student worked at the board, the teacher had to divide her attention among that child and all of the other children in the class. She chose which students to call on subsequently, what ideas to probe more deeply, and how, and she posed questions to check students' understanding. When Daniel, a limited English speaker, ventures an important mathematical observation that, although important, is off the main point, the teacher has to complete his turn without getting off track or making him feel sidelined. When Betsy volunteers to show the number line, the teacher makes a different judgment—that this is worth seeing and discussing but that it will take time, and so she uses a move that allows Betsy to proceed without slowing the progress of the whole class discussion. Although it is not immediately visible in the lesson, the teacher had to draw on her knowledge of fractions, of her students, and of her instructional goals (which were in turn referenced to multiple formal and informal expectations for what third graders should do in school and to other goals of public schooling; for example, to develop students' critical faculties or to develop dispositions for respect and civil disagreement) to make each of these decisions and was attending to how much time remained in the period allotted to the mathematics lesson.

The teacher had to choose specific instructional moves and coordinate among her content goals, what her students were doing, how much time she was using, and her estimate of the students' engagement. These actions are deliberate, aimed at specific learning goals. What the teacher was doing is also unnatural. When Mei makes her precise drawings and explains her solution, it is not natural to ask others if they would like to comment, for it is, after all, correct. When Keith admits to having made his drawings "wrong" but explains that he now understands, it is not natural to praise him for having said something "extremely important," to ask him to open up his error again, and to do so for all his classmates to hear. The teacher in this example is deeply engaged in the demanding and elaborate nature of the work of professional teaching; her decisions, moves, and interactions depend on specialized training.

Teaching Practice Inside Teacher Education: Toward a Practice-Focused Curriculum

If teachers are to be able to explain the concept of gravity to students, help students learn to write clear paragraphs, and

diagnose pupils' difficulties with fractions, then their professional training must be designed to prepare them to be skillful with these tasks. Assuming that most people can learn these difficult practices while trying to teach real students, or through observing and talking with more experienced teachers, is unrealistic. Drawing on our own and others' investigations, below we sketch the fundamental work that teacher educators would need to do to build a curriculum and pedagogy for teaching practice.

Shifting From Knowledge to Practice

To make practice the core of the curriculum of teacher education requires a shift from a focus on what teachers know and believe to a greater focus on what teachers do. This does not mean that knowledge and beliefs do not matter but, rather, that the knowledge that counts for practice is that entailed by the work. A practice-based theory of knowledge for teaching (Ball & Bass, 2003) is derived from the tasks and demands of practice and includes know-how as well as declarative knowledge. But a practice-focused curriculum for learning teaching would include significant attention not just to the knowledge demands of teaching but to the actual tasks and activities involved in the work. It would not settle for developing teachers' beliefs and commitments; instead, it would emphasize repeated opportunities for novices to practice carrying out the interactive work of teaching and not just to talk about that work. A practice-focused curriculum would also have to include foundational knowledge, but designed and developed differently from its usual treatment in teachers' preparation. Although we focus in this article on the problem of teaching the actual enactment of practice itself (Grossman & McDonald, 2008; Lampert & Graziani, 2009), we also discuss foundational knowledge briefly.

Building a practice-focused curriculum in teacher education requires specifying the *content*—what teachers need to learn to do—and unpacking it for learning. It requires developing instructional approaches to help teachers learn to do these things for particular purposes in context. Particularly challenging is how to design ways to teach practice that do not reduce it to propositional knowledge and beliefs. For example, in teaching novices how to conduct a short warm-up language activity at the beginning of the day, it is easy to shift into a discussion of the uses of warm-ups, an analysis of possible language activities, or a reflection on how well a particular activity worked. Learning to set up the task and to orchestrate a brief discussion of the children's work on it is different from designing or talking about the activity. To be sure, both analysis and action are part of teachers' work. But, the focus in teacher education can slip easily into an exclusively cognitive domain, emphasizing beliefs and ideas over the actual skills and judgment required in enactment. We argue not that practice with the pre-active or cognitive aspects of teaching should be eliminated but that teacher education should offer significantly more—and more deliberate—opportunities for novices to practice the interactive work of instruction.

Specifying the content of a practice-focused professional curriculum involves careful analysis of the core tasks of teaching. Feiman-Nemser and Remillard (1996) contrasted this with an approach centered on domains of professional knowledge, which often shortchanges the demands of using knowledge in practice. They argue that a "tasks of teaching" approach is congruent with how teachers learn to carry out and organize their work. In practice, teachers combine declarative knowledge with judgment and reasoning in context, deploying technique and actions toward specific ends. In practice-focused teacher education, similarly and by design, teachers would learn to do particular tasks such as creating a respectful learning environment, assessing students' math skills, or reviewing homework. They would learn to do these specific tasks, but they would also develop more general and adaptable skills of practice through their engagement in these tasks. They would learn how to consider the environments of their work and to coordinate their practice in context. Beginning with the work of teaching allows teacher educators to work analytically backward from what teachers have to do to what they have to know and believe (Ball, 2000; Ball, Hill, & Bass, 2005; Feiman-Nemser & Remillard, 1996).

However, identifying a set of agreed-on core tasks of teaching is surprisingly far from straightforward. As familiar as teaching is, a starting problem is that there is little agreement about the fundamental work. Reynolds (1992) reviewed research on effective teaching to propose a set of core tasks of teaching, but skeptics raised doubts about the basis for her list, questioning the underlying view of good teaching. Thus, required first is a shared view of the main purposes of practice. We propose Cohen's (in press) definition of teaching as the deliberate activity of increasing the probability that students will develop robust skill in and knowledge of the subject under study and coordinated with larger educational aims. We assume ambitious (Cohen, 1988; Lampert & Graziani, 2009) goals for subject matter learning as well as for students' personal development and preparation for participation in a diverse democratic society. We assert also that the goal of teachers' efforts must be the learning of every student in their charge.[3] Being able to teach well, given this tripartite definition, depends on a flexible repertoire of high-leverage strategies and techniques that can be deployed with good judgment depending on the specific situation and context.

A second problem in identifying the core tasks of teaching rests with a dominant contemporary view of teaching as highly improvisational and wholly context dependent. This view of practice resists the notion that complex practice, including techniques, judgments, and coordination, can be specified and taught. Describing this as an endemic tension between flexibility and stability, Lampert and Graziani (2009) wrote,

> How can novices be prepared for the interactively challenging work of ambitious teaching if it constantly needs to be invented from scratch and be tailored to particular students? If professional education for teaching is to make ambitious teaching more common, it seems that we would need to make several assumptions that contradict the idea that this kind of teaching is entirely context bound and independently constructed. We would need to assume, first, that this kind of teaching involves stable and learnable practices and that we could specify the kind of skills and knowledge needed to do it. We would also need to assume that teacher educators could teach these skills and knowledge, and that novices could learn them. In order to figure out how to build knowledge for teacher education if the goal is ambitious teaching, we need to confront this paradox (p. 492).

Lampert and Graziani (2009) investigated how improvisation is learned in other domains, such as theater and jazz, and learned that skilled responsiveness depends on substantial structure and practice. This shaped their investigation of the teacher education program that they studied; in a domain (language instruction) characterized by improvisation and interaction, they fruitfully uncovered a robust curriculum for teaching practice, an existence proof that complex practice can be named, taught, and learned.

Developing Pedagogies for Practice

Agreeing on the fundamental purposes of practice, and on a conception of teaching as predictable enough to allow significant specification, leads to the next step in articulating a practice-focused professional curriculum. From their comparative study of the teaching and learning of practice across four professions, Grossman and her colleagues (2009) identified what they call "decomposition" as key to "breaking down complex practice into its constituent parts" to make it visible to and learnable by novices (Lewis, 2007). The goal is to break down practice into parts that "are integral to practice and can be improved through targeted instruction." The parts can be identified discretely and have an integrity of their own but are deployed in the context of integrated practice. Given the broad scope of teaching practice, the time constraints of initial teacher education, and the demands of working with novices, some teacher educators are currently attempting not only to decompose practice into its constituent parts but to identify those parts of the work of teaching that have the highest "leverage" for new teachers. High-leverage[4] practices include tasks and activities that are essential for skillful beginning teachers to understand, take responsibility for, and be prepared to carry out in order to enact their core instructional responsibilities. Unpacking teaching and choosing high-leverage elements on which to focus novices' education, and creating language with which to talk about work that experts often perform tacitly, can begin to build the foundation for a curriculum aimed at developing practitioners and, hence, improving the quality of practice.

Now that a set of fundamental components of skilled practice has been named, required are instructional activities with which to teach and learn professional work. Novices need opportunities to try out and experiment, with support, aspects of complex practice, gradually increasing their complexity and reducing the scaffolding. One way to do this is to create "approximations" of practice (Grossman et al., 2009), asking a series of probing questions of a learner, for example, but where the questions are already detailed and the student's likely responses described. Another is to role-play a phone call to a parent or to work with a small group of learners without having to manage the other students. Each of these examples offers novices the opportunity to experiment with a more bounded or supported segment of practice. The work of designing instructional activities for the teaching and learning of practice is an extensive and vital part of developing a curriculum focused on the enactment of professional practice. Grossman and her colleagues (2009) refer to this as the design of "pedagogies of enactment." In their study of a teacher education program that prepares teachers for an ambitious practice of language instruction, Lampert and Graziani (2009) identified 13 distinct instructional activities used by the teacher educators in the program, in a daily cycle of presentation–demonstration–scaffolded planning–coached rehearsal–teaching–debriefing, that focused on the development of skilled practice by novices.

Constructing Settings for Learning Practice

Closely related to creating ways to teach and learn practice is to develop settings in which practice can be tried out, corrected, refined, and mastered. Lampert (2006) proposed a continuum of settings, from "virtual settings," or digital environments that permit the use of records of practice and other electronic tools to represent and permit close analysis of practice, to "designed settings," or environments that are constructed for the explicit purpose of teaching practice, to "actual settings," or real schools and classrooms in which novices can practice under entirely realistic conditions. Virtual and designed settings allow teacher educators to eliminate or reduce the need for students to engage with some aspects of the work of teaching while focusing their attention on particular parts of the work. Over the past 150 years, teacher educators have experimented with several types of designed settings, including model and practice schools, "demonstration" or "critique" lessons, and laboratory classes (Frazer, 2007; Ogren, 2005). Few of these settings have been systematically incorporated into contemporary teacher education, which may have limited the development of practice-focused teacher education.

Teaching Practice: Two Examples

To illustrate what it might mean to teach practice, we draw on two current examples of teacher education. One uses demonstration and critique to help students learn to model subtraction to elementary school students; the other uses rehearsal and coaching to help students learn to read a story aloud to young pupils. In both instances, the teacher educator makes use of what Lampert would call a designed setting: The first example takes place in a university classroom where undergraduate student teachers are studying methods of teaching elementary mathematics; the second occurs in a special classroom in an actual elementary school that is set up such that student teachers can rehearse their work together before delivering the same lessons in the school's regular classrooms.

In the first instance, the teacher educator focuses on helping students use mathematical knowledge for teaching while developing skill and precision in modeling a subtraction problem on the chalkboard.[5] With her class of student teachers watching, she works at the board to model carefully the procedure for subtraction with regrouping ("borrowing") 52 – 13. To begin, she writes the problem in a large clear format on the board and then uses five beansticks and two loose beans to represent 52 (see Figure 2).

Beansticks are an inexpensive material for representing concepts and procedures of base ten numeration. Constructed of popsicle sticks and dried kidney beans, the tens are made with 10 beans glued to a stick and the ones with loose beans. The instructor explains that, although as they know, subtraction can be interpreted as comparison of two quantities or taking away one quantity from the other, she is going to use a "take-away interpretation" to solve the problem. She points out that that is why she has not also modeled the number 13: "I have 52 and I am going to take 13 from that." Next—and narrating her actions as she might with elementary school students—she trades in one of the ten-sticks for 10 loose beans that are stored nearby. She records what she has done by crossing out the 5 in the problem and writing 4 above it; she then crosses out the 2 and writes 12 above it (see Figure 4).

As she works, she comments that she has not changed the value of either of the numbers in the problem but simply "regrouped" them to make it possible to take away 13: "One thing I want to point out is that I still have 52 beans." Next, she removes 1 ten-stick and 3 loose beans to represent taking away 13, as taking away 1 ten from 4 tens, and 3 ones from 12 ones. She counts out loud how many beans she has left and arrives at the correct answer of 39, which she then also writes on the board underneath the problem (see Figure 5).

At this point, the teacher educator concludes the demonstration and asks her student teachers to comment on the model or to offer critique. The students make several fine-tuned observations, most of which indicate their close attention to the detailed work of coordinating the physical materials with the written algorithm and the conceptual language.

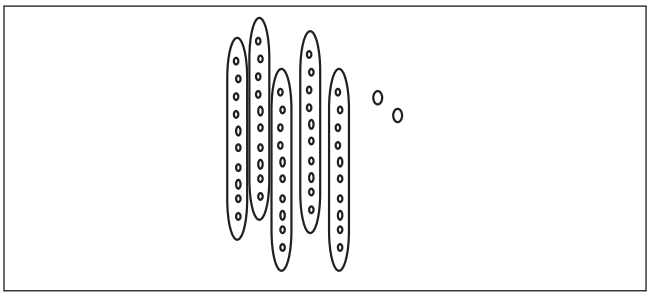


Figure 2. Fifty-two represented with beansticks as 5 tens and 2 ones, using ten-sticks and loose beans

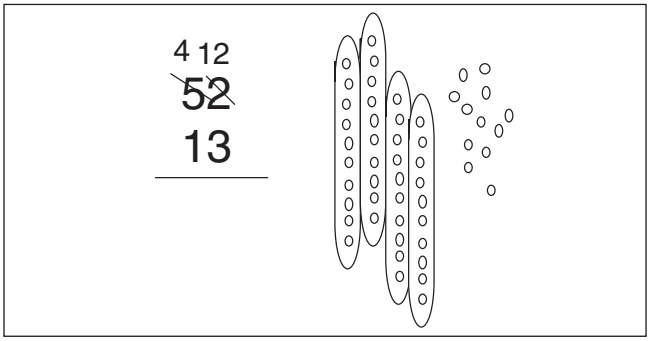


Figure 3. Modeling subtraction with regrouping by coordinating a concrete representation and the written algorithm (first step)

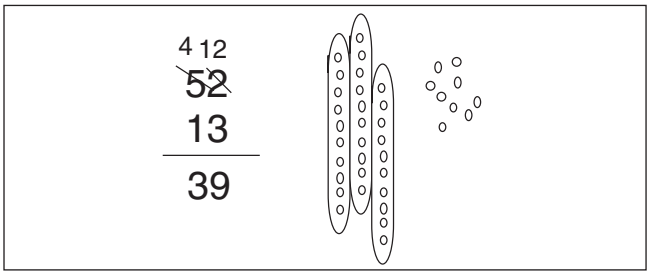


Figure 4. Modeling subtraction with regrouping by coordinating a concrete representation and the written algorithm (second step)

Noteworthy about this example are the deliberateness with which the instructor in the model worked and the extent to which her modeling permitted her to direct her students' attention to the precision involved in mapping the actions on the materials with the familiar written steps and to anticipate several important aspects of the content that would require attention when working with pupils. One aspect was the care with which the materials (i.e., the ten-sticks and loose beans) were selected, how the particular numerical example was chosen, and why. Another was the actual enactment of the example—in the size and clarity of the way the numbers were written on the board and the care taken to coordinate

closely between the actions taken with the materials and the symbolic representation of the numbers in the problem. Still another aspect was the close attention paid to the key mathematical point that, in regrouping 52 to 4 tens and 12 ones, the total quantity remains unchanged; the number is simply written in a more convenient form for the subtraction. Available for scrutiny was the instructor's use of her voice and body; she speaks slowly, points at the numbers and actions with the beansticks and coordinates that with her talk, and avoids blocking the view of the chalkboard with her body.

In this example, the teacher educator is providing the student teachers with a detailed model of the careful use of physical materials to explain mathematical procedures. She is making a specific example available for close analysis. Because she has designed the episode in advance and carried it out in the controlled environment of a university classroom, she can ensure that each element of the work that she wants her students to have an opportunity to observe and to study is present in the example. She demonstrates the care needed to link representations and the work involved in doing that with mathematical care (Lewis, 2007) and with pedagogical attentiveness.

A similar deliberate and unabashed prescriptiveness is evident in our second example. In this case, a student teacher practices reading aloud a storybook about a group of children who go on a fishing trip, in preparation for the lesson she will subsequently teach to real pupils in a classroom where she is working. The instructor sits immediately in front of the student teacher, paying close attention to her performance and stopping her to provide feedback and coaching.[6] The student's peers watch her rehearse what she will do with her class and periodically ask questions or make suggestions. The student teacher begins by mentioning to her anticipated pupils how they had read from this story the day before and then begins reading haltingly. Almost immediately, the instructor steps in, prompting her not just to tell her pupils where they left off in the book the last time they read together but to provide some explicit reminders about what was happening at that point in the book. She suggests that the student teacher might ask one of the children to remind the others what was going on when they last read. The teacher educator adds a compliment about how the student teacher reminded her pupils of the names of the characters in the book. After reading a few more sentences, the student teacher stops to ask whether she should incorporate "technical fishing terms" (e.g., "reeling") into her discussion of the story with her pupils. She says she does not know enough about fishing to do so. The teacher educator suggests discussing the term *reel*. Later, when the student teacher writes the word *wound*—which appears in the text—on a whiteboard in anticipation of student difficulty with it, the teacher educator prompts her to be "careful with your *u*s" and asks her to rewrite the letter *u* so that it will not look like an *o*. She also encourages her to use her clipboard carefully and to project her voice so that children will be able to hear her.

This example, like the previous one, illustrates the notion of close professional training in teacher education. Evident in the teacher educator's work is a clear and detailed sense of what a competent storybook read-aloud is like; in the feedback and coaching that the teacher educator provides, she demonstrates specific moves and techniques and explains the rationale for her insertions. Moreover, the teacher educator attends to aspects of the work of reading aloud that would go unnoticed by many adults reading to children. Although many adults read aloud to children, the professional work of reading aloud is very different, and not intuitive or natural. The tentativeness with which the student teacher in the example approaches the activity and the multiple and varied comments and suggestions by the teacher educator make clear the complexity of the seemingly simple task of reading a storybook aloud to children in a classroom and the corresponding need for explicit professional preparation. The instructor's interventions are focused on developing beginning teachers' professional skills with this important instructional activity.

There are several significant similarities in these two cases of teaching practice. Both instances take place outside of regular classrooms but are still "in practice" in the sense that both include engagement in the work of teaching. Situating teachers' learning in practice is less about where the learning takes place than it is about whether it is centered in the work of teaching itself. Here, both are attentive to the particularities of teaching specific subjects and both are focused on real pieces of the work of teaching. Both instances involve a large group of student teachers in watching and critiquing practice. There are also some significant differences, including grain size. The work on modeling subtraction focuses on a discrete component of the work of teaching mathematics, whereas the reading example takes on a larger size teaching activity that incorporates many smaller elements of the work of teaching reading. And, in the first example, only the teacher educator actually practices the work; her students' role is limited to observer and critic, and there is no opportunity to provide feedback and coaching. The demands on the teacher educator are significant in both cases, but each instance requires a different set of skills. Both examples offer affordances for learning the work of teaching, and both types are likely to have an important place in a practice-focused teacher education curriculum.

Making the shift from a theory- and knowledge-based teacher education curriculum to one focused on practice is a complex undertaking. It would include not only the development of a common language for talking about instruction but careful work to identify the special features and components of pedagogical moves for teaching different subjects and grade levels. Another crucial part of the project would be a

reorientation—but not abandonment—of the foundations of education in preparing teachers. For example, as professionals, teachers need to appreciate the historical, cultural, political, economic, and social contexts of their work. But, instead of offering broad academic studies, which is often the approach, teacher education could offer students of teaching opportunities to delve into these issues close to the points at which the need for perspective and insight arises in teaching. How did testing come to be such a large part of the U.S. educational landscape? What have been its stages of development? What does its prominence suggest about American views of teaching and learning? How is this similar and different in other countries? Or, with respect to educational and social inequality, how have scholars described the mechanisms by which schooling interacts with other sources of inequality? What is known about when and how schooling either reproduces or intervenes on such inequality? How are resources related to educational outcomes, and what constitutes a resource? These and many other questions are authentic, on-the-ground problems that shape teachers' professional practice; using records of practice and cases, examples and concrete instances, and linking those with theory and empirical social science research would enable a practice-based approach to the broader foundations on which teaching rests, and that implicitly and explicitly shapes teachers' work.

At least as important would be work to delineate instructional tasks and approaches that are particularly important for different populations of students or in different contexts and to identify the ways in which content and foundational knowledge inform every action that a teacher takes. For each instructional task or activity that students learned to perform, they would study and practice how to modify the work to meet the needs of their particular pupils, with explicit attention to the ways in which race, class, gender, socioeconomic status, and other backgrounds and characteristics interact with instruction and classroom dynamics. For example, they would analyze examples of whole-group discussions among pupils whose language backgrounds and practices differ from their own or differ from one another and practice leading effective discussions with varied groups of pupils. They would learn to choose examples in mathematics with an eye toward their pupils' familiarity or lack thereof with the context and with attention to the ways in which the example might impede or promote the learning of their pupils. They would practice conducting phone calls or face-to-face meetings with parents from different kinds of communities and from different kinds of backgrounds, learning to adjust their approach, demeanor, language, and cultural practices with sensitivity.

Redesigned around practice, the teacher education curriculum would include at its core opportunities to learn to perform a repertoire of teaching tasks and to choose among them with deliberate attention to pupils, as well as opportunities to acquire content and foundational knowledge centrally important to the work of teaching. Although a few topics or learning experiences not directly related to practice might warrant a place in the curriculum, most would be included in professional studies on the basis of their explicit connection to and importance for the work that teachers do. This need not be narrow; our conception allows for a respectful intersection of liberal orientation with professional skill (Borrowman, 1956). As our discussion implies, several teacher educators across the United States have begun to take on the investigations that would be necessary to the construction of a practice-focused curriculum, to clarify the goals of professional training, and to design instructional activities and settings that will support student teachers in learning to do the work of teaching. Several challenges are likely to confront pursuit of the agenda that they have set, and in the next section, we consider these as well as the resources that exist for the work.

Centering Teacher Education in Practice: Challenges and Resources

Any effort to center teacher education in and on practice would face significant challenges. One impediment is the widely held view of teaching as improvisational, uncertain, and impervious to specification. Even among some teacher educators, there is resistance to a view of teaching as a high-precision and exacting practice. In the United States, there is a commonly held conception of teaching as an art form that is individually constructed and context bound. Arguments for greater prescriptiveness and training in teacher education have typically met with opposition rooted in concern that such approaches would "de-skill" the work of teaching. It is ironic that attending more to the detailed and intricate nature of practice is seen as in tension with respecting the entailed professional skill. Part of this resistance is due to the view of teaching as improvisational. But, part is inherent in the nature of expertise: At least some of the knowledge and skill wielded by experts is tacit, and not all practitioners are able to make the understanding and reasoning that guide their actions visible to others (Polyanyi, 1958). One challenge involved in centering teacher education in practice is careful deconstruction and articulation of the work of teaching with an eye toward making the most detailed elements of instruction learnable without reducing teaching practice to an atomized collection of discrete and unconnected tiny acts (Grossman & McDonald, 2008). Furthermore, this close work on practice must be done in ways that enable teachers to learn how to situate and adapt their work to the specific pupils and contexts with which they will work.

Another challenge is the insufficiency of the knowledge base about teaching practice. Effective professional education would prepare teachers with knowledge and skills that

would enable them to engage in instruction that helps children learn. However, the field lacks a broad and deep understanding of the kinds of instructional practices that make a difference to students' learning (for a summary of the knowledge base for the teaching of reading comprehension, for example, see Rand, 2002; for a similar discussion of the knowledge base for mathematics instruction, see U.S. Department of Education, 2008). And, although this varies across school subject areas, understanding of the kinds of skills, dispositions, and knowledge that might enable teachers to engage in effective instructional practice is similarly thin (Ball et al., 2005; Cohen, 2007; Rand, 2002; U.S. Department of Education, 2008). Moreover, research on teaching still lacks a common framework for describing and analyzing instruction; neither scholars nor educators have been able to agree even on descriptions for the various components of instructional practice (Grossman & McDonald, 2008). The lack of a precise professional language further inhibits our capacity to specify and teach practice.

A related area of ambiguity concerns the process of schooling and the effect of different kinds of resources on students' learning. Research has not been able to differentiate sufficiently among the effects of professional knowledge, dispositions, and skills; curricula; class size; or money, to name a few of the inputs into the schooling process, on what students learn in school (Cohen, 2007). Analysts also do not understand how different kinds of resources matter to pupils of different backgrounds. These shortcomings of the knowledge base make it more difficult to determine what the content of the teacher education curriculum should be because it is unclear what is necessary for effective instructional practice. The design of practice-focused teacher education will depend on greater investments into basic research on teaching and learning.

These are daunting challenges. Teacher educators in the 21st century, however, are not the first to have faced them, and several sets of resources exist that might appreciably inform current efforts to design effective, explicit, and practice-focused teacher education. One is the legacy of previous attempts to build professional education around teacher behaviors that research had linked to student achievement. In 1951, the American Educational Research Association established the Committee on the Criteria of Teacher Effectiveness (Barr, 1952; Barr et al., 1952), a move that ultimately led to process-product research (see Gage, 1978) and then to related innovations in teacher education including micro-teaching, mini-courses, competency-based teacher education, and computer simulations (see Gage, 1978; Grossman, 2005; MacLeod, 1987; Smith, 1980b). Although these earlier approaches to teacher education focused on the actual skills needed for teaching, they have been criticized for representing teaching as a set of decontextualized and atomized practices. Nonetheless, they still do offer helpful illustrations, even if too simplified, of what it might look like to develop teacher education around approximations of teaching practice (Grossman & McDonald, 2008). By clarifying what was useful about these approaches and how more sophisticated versions of practice-focused teacher education would look different, teacher educators can take a clear step forward (Berliner, 1985). Among the features that are likely to distinguish the next generation of practice-oriented teacher education pedagogies is the integration of subject-matter knowledge for teaching and the capacity for discretionary adaptation and judgment with discrete behaviors and actions.

The progress that has been made in the past 50 years to identify content knowledge for teaching would also constitute resources for this work. Beginning with the introduction of the construct of "pedagogical content knowledge" by Shulman (1986, 1987) and his colleagues, scholars have probed the use of content knowledge in teaching. Grossman (1990) explicated how English teachers' orientations to their subject shape the sort of work they do with students; Wilson and Wineburg (1988) showed how social studies teachers who were trained in different disciplines taught with different emphases. Ball and her colleagues have studied and specified the specialized mathematical knowledge entailed by the work of teaching mathematics (e.g., Ball & Bass, 2003; Ball et al., 2005; Hill, Rowan, & Ball, 2005). In addition, investigations of professional training in other fields have yielded insights that might help teacher educators develop consensus around a curriculum of practice, broaden the idea of "clinical" work and develop ways to structure and support novices' learning of it, and attend to the relational or interpersonal work that is pervasive in professional practice (Grossman et al., 2009). In short, examples of detailed, practice-focused professional education abound, and although the knowledge base for teaching practice remains underdeveloped, it is growing steadily. Teacher educators and education researchers have many resources on which to draw as they pursue the agenda of change that we have described.

In Praise of Detailed Training in Teachers' Education

In the context of deep concern about poor and uneven student learning in our nation's schools, there is an urgent need to build a system of professional training that can reliably prepare large numbers of regular adults to do the skilled work involved in helping young people learn and develop. To view teaching as a highly skilled practice, one that requires close training, is to respect the professional demands of the work. However, the common resistance to the notion of detailed professional preparation, and even the need for training, stands in the way of improving teachers' preparation for the work of teaching. Other professions comfortably embrace the demands for professional training (Grossman et al., 2009), perhaps because they are less distracted by proving their professional status, whereas teacher education

is often preoccupied with its place in the academy or in the public discourse. We argue, however, that making practice the centerpiece of teachers' education would elevate, not diminish, the professionalism of teaching and teacher education. Conversely, a system that implies that teaching is predominantly improvisational, impossible to specify, and developed idiosyncratically through individual experience is no system at all and not at all professional. There is an urgent need to be able to supply teachers ready for the demands of educating our nation's youth; it is time to lay down our resistance to acknowledging that teaching is hard work that many people need to learn to do well, and build a system of reliable professional preparation.

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Notes

1. The data in this example come from a large collection of records of practice, assembled in a National Science Foundation-funded project directed by the first author and Magdalene Lampert, in which the teaching and learning of mathematics were documented across an entire school year in two classrooms.
2. All names used are pseudonyms, selected from the students' own cultures and of types similar to their real names (e.g., a popular Nepalese name would be chosen as the pseudonym for a Nepalese child with another common name from that country).
3. Lampert and Graziani (2009) defined what they call "ambitious teaching" as "teaching that deliberately aims to get all kinds of students—across ethnic, racial, class, and gender categories—not only to acquire, but also to understand and use knowledge, and to use it to solve authentic problems." We use the term to apply to the academic learning goals.
4. The term *high leverage*, as a criterion for those practices most valuable for teachers to be able to learn and carry out, has caught on rapidly. Among those developing this notion are the Mathematics Methods Planning Group and the Curriculum Group of the Teacher Education Initiative at the University of Michigan; Megan Franke and her colleagues at the University of California, Los Angeles; and Pam Grossman and her colleagues at Stanford University.
5. The teacher educator in this case is a member of the Mathematics Methods Planning Group (MMPG) at the University of Michigan School of Education. The episode of teaching described in this case was collectively designed by members of the MMPG. For more information about the MMPG, see Ball, Sleep, Boerst, and Bass (2009).
6. The teacher educator in this case is Sarah E. Scott of the University of Pittsburgh, who was at the time an instructor in the teacher education program at the University of Michigan School of Education.

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