




# Preparing Teachers for a Changing World

*What Teachers Should Learn  
and Be Able to Do*

Sponsored by the National Academy of Education

Edited by  
Linda Darling-Hammond  
John Bransford

In Collaboration with  
Pamela LePage  
Karen Hammerness  
Helen Duffy

 **JOSSEY-BASS**  
A Wiley Imprint  
[www.josseybass.com](http://www.josseybass.com)



# CONTENTS

Preface vii

Committee on Teacher Education Members xi

Acknowledgments xiii

About the Authors xv

**1 Introduction 1**

*John Bransford, Linda Darling-Hammond, Pamela LePage*

**2 Theories of Learning and Their Roles in Teaching 40**

*John Bransford, Sharon Derry, David Berliner, Karen Hammerness  
With Kelly Lyn Beckett*

**3 Educating Teachers for Developmentally Appropriate Practice 88**

*Frances Degen Horowitz, Linda Darling-Hammond, John Bransford  
With James Comer, Kathy Rosebrock, Kim Austin, Frances Rust*

**4 Enhancing the Development of Students' Language(s) 126**

*Guadalupe Valdés, George Bunch, Catherine Snow, Carol Lee  
With Lucy Matos*

**5 Educational Goals and Purposes: Developing a Curricular Vision  
for Teaching 169**

*Linda Darling-Hammond, James Banks, Karen Zumwalt, Louis Gomez, Miriam  
Gamoran Sherin, Jacqueline Griesdorn, Lou-Ellen Finn*

UT  
Jethro  
D.  
Linn

Expert Knowledge

Tfba of Process (Sander)

- 6 Teaching Subject Matter 201**  
*Pamela Grossman, Alan Schoenfeld*  
*With Carol Lee*
- 7 Teaching Diverse Learners 232**  
*James Banks, Marilyn Cochran-Smith, Luis Moll, Anna Richert, Kenneth Zeichner,*  
*Pamela LePage, Linda Darling-Hammond, Helen Duffy*  
*With Morva McDonald*
- 8 Assessment 275**  
*Lorrie Shepard, Karen Hammerness, Linda Darling-Hammond, Frances Rust*  
*With Joan Baratz Snowden, Edmund Gordon, Cris Gutierrez, Arturo Pacheco*
- 9 Classroom Management 327**  
*Pamela LePage, Linda Darling-Hammond, Hanife Akar*  
*With Cris Gutierrez, Evelyn Jenkins-Gunn, Kathy Rosebrock*
- 10 How Teachers Learn and Develop 358**  
*Karen Hammerness, Linda Darling-Hammond, John Bransford*  
*With David Berliner, Marilyn Cochran-Smith, Morva McDonald, Kenneth Zeichner*
- 11 The Design of Teacher Education Programs 390**  
*Karen Hammerness, Linda Darling-Hammond*  
*With Pamela Grossman, Frances Rust, Lee Shulman*
- 12 Implementing Curriculum Renewal in Teacher Education:  
Managing Organizational and Policy Change 442**  
*Linda Darling-Hammond, Arturo Pacheco, Nicholas Michelli, Pamela LePage,*  
*Karen Hammerness*  
*With Peter Youngs*
- 13 References 480**
- Name Index 567**
- Subject Index 583**



## How Teachers Learn and Develop

Karen Hammerness, Linda Darling-Hammond, John Bransford,  
with David Berliner, Marilyn Cochran-Smith, Morva McDonald,  
Kenneth Zeichner

How teachers learn and develop as professionals is a question that has compelled teacher educators and researchers for many years. How do teachers learn to draw upon and use their understanding of subject matter, learning, development, culture, language, pedagogy, and assessment in addressing concrete problems of practice? How do they learn to balance the individual needs of diverse learners with the demands of the curriculum and the goals of the larger group? How do they learn to become members of a professional community that works together to improve student learning? How can teacher educators help prospective teachers learn to address the multiple challenges of classroom and school life?

This chapter reviews classic and contemporary theory and research on teacher learning and development. Our discussion is divided into four major sections. In the first, we return to a theme mentioned in Chapter One and discussed in more detail in Chapter Two: namely, the theme of adaptive expertise that supports lifelong learning (Hatano and Inagaki, 1986). Clearly, the knowledge, skills, and attitudes needed for optimal teaching are not something that can be fully developed in preservice education programs. Instead, teacher education candidates need to be equipped for lifelong learning. This is especially true in societies like ours where expectations regarding academic standards and equitable education are constantly being refined as our world changes. Rethinking what is most important to teach is one example: Do we need to teach a wider range of foreign languages and more about international relations as the

world gets smaller? Do we need to teach the calculation of square roots in an age of calculators? Rethinking how to teach and assess is another example. Can spreadsheets become a powerful tool for helping students understand the power of algebra? Can distance-learning technologies enhance global understanding? What strategies are most effective for teaching new English language learners in mathematics, in reading, and in other subject areas?

To successfully prepare effective teachers, teacher education should lay a foundation for lifelong learning. However, the concept of lifelong learning must become something more than a cliché. Given the relatively short period available for preparing teachers and the fact that not everything can be taught, decisions must be made about what content and strategies are most likely to prepare new entrants to be able to learn from their own practice, as well as the insights of other teachers and researchers.

In this chapter we explore theory and research relevant to the goal of helping teachers become professionals who are adaptive experts. We pay particular attention to three widely documented problems in learning to teach. First, learning to teach requires that new teachers come to think about (and understand) teaching in ways quite different from what they have learned from their own experience as students. Lortie (1975) called this the problem of “the apprenticeship of observation” to refer to the learning that takes place by virtue of being a student for twelve or more years in traditional classroom settings. These experiences have a major effect on preconceptions about teaching and learning that new teachers bring to the task of becoming professionals.

Second, helping teachers learn to teach more effectively requires them not only to develop the ability to “think like a teacher” but also to put what they know into action—what Mary Kennedy (1999) has termed “the problem of enactment.” They need not only to understand but also to *do* a wide variety of things, many of them simultaneously. Meeting this challenge requires much more than simply having students memorize facts and procedures or even discuss ideas. As Simon (1980) notes, there is a major difference between “knowing that” and “knowing why and how.”

A third issue in teacher preparation involves “the problem of complexity.” Teachers typically work with many students at once and have to juggle multiple academic and social goals requiring trade-offs from moment to moment and day to day (Jackson, 1974). Although some aspects of teaching can be made somewhat routine, what teachers do will still be influenced by changing student needs and unexpected classroom events. And many other decisions in teaching cannot be routinized because they are contingent upon student responses and the particular objectives sought at a given moment. Helping prospective teachers learn to think systematically about this complexity is extremely important. They need to develop metacognitive habits of mind that can guide decisions and reflection on practice in support of continual improvement.

Some approaches to learning to teach do not adequately respond to these problems. For example, telling teachers in general ways about strategies that might be used in the classroom, without examples and models, does not typically lead to deep understanding or enactment. Developing routines can be helpful and can free up teachers' attention for other aspects of their work; however, offering only routines does not help teachers develop the diagnostic and instructional skills for dealing with students who require different approaches or additional supports if they are to learn successfully.

The third section of this chapter examines research on the development of teaching expertise and its implications for instruction. We discuss evidence that suggests that teachers' development is influenced by the nature of the preparation they received initially, and we show how changes in some teacher education programs seem to influence what teachers are able to do early in their careers. The final section provides a framework for considering the knowledge, skills, and dispositions needed for effective teaching, and for helping teachers learn throughout their lives.

## TEACHERS AS ADAPTIVE EXPERTS

Carter (1990) notes that "how one frames the learning-to-teach question depends a great deal on how one conceives of what needs to be learned and how that learning might take place" (p. 307). This is consistent with Wiggins and McTighe's arguments (1998) that the design of effective learning opportunities needs to begin with a clear idea of what we want people to know and be able to do. It is also consistent with the problem-solving literature that suggests that the ways people initially frame problems has major effects on their solution strategies because different framings open up different "problem spaces" for people to explore (see, for example, Bransford and Stein, 1993; Newell and Simon, 1972).

As discussed in Chapter Two, the development of "adaptive expertise" provides an appropriate gold standard for becoming a professional. Figure 2.1 illustrates the hypothesis that there are two dimensions of expertise: efficiency and innovation (Schwartz and others, in press). In teaching, these dimensions might reflect a teacher's ability to efficiently and effectively use a specific classroom technique—such as reciprocal teaching conducted in small groups for reading—on the one hand, and her ability to develop a set of new strategies for a recently enrolled new English language learner for whom the existing routines are not enabling success. An important feature of adaptive experts lies in their abilities to balance these two dimensions.

Expertise along the *efficiency* dimension involves greater abilities to perform particular tasks without having to devote too many attentional resources to achieve them (see, for example, LaBerge and Samuels, 1974; Atkinson and

Schiffrin, 1968). Expert teachers are able to perform a variety of activities without having to stop and think about how to do them. Examples include how to manage a classroom while students are working in groups, how to give directions and hand out materials while keeping everyone's attention, how to predict the range of answers that students may give to a particular question about a concept in math, history, science, and so forth. Expert teachers are also able to notice patterns of classroom activity that, to the novice, often seem like disorganized chaos. (See "A Study of Teacher Expertise.")

### **A Study of Teacher Expertise**

Expert and novice teachers notice very different things when viewing videotapes of classroom lessons. For example, when examining the same segment of videotape, experts are able to see patterns of activity and quickly draw inferences about what is happening in the classroom, whereas novices see activity that is confusing and not patterned. Here is one example:

EXPERT 6: On the left monitor, the students' note taking indicates that they have seen sheets like this and have had presentations like this before. It's fairly efficient at this point because they're used to the format they are using.

EXPERT 7: I don't understand why the students can't be finding out this information on their own rather than listening to someone tell them because if you watch the faces of most of them, they start out for about the first 2 or 3 minutes sort of paying attention to what's going on and then just drift off.

EXPERT 2: I haven't heard a bell, but the students are already at their desks and seem to be doing purposeful activity, and this is about the time that I decide they must be an accelerated group because they came into the room and started something rather than just sitting down and socializing.

NOVICE 1: I can't tell what they are doing. They're getting ready for class, but I can't tell what they're doing.

NOVICE 3: She's trying to communicate with them here about something, but I sure couldn't tell what it was.

ANOTHER NOVICE: It's a lot to watch.

Adapted from Sabers, D., Cushing, K. S., Berliner, D. C. (1991). Differences among teachers in a task characterized by simultaneity, multidimensionality, and immediacy. *American Educational Journal*, 28(1), 63-88.

Lifelong learning along the *innovation* dimension typically involves moving beyond existing routines and often requires people to rethink key ideas, practices, and even values in order to change what they are doing. These kinds of activities can be highly emotionally charged, and the capacity to consider change without feeling threatened is an important ability. Land's (see Nierenberg, 1982) tongue-in-cheek definition of innovation as "the sudden cessation of stupidity" can be helpful for maintaining a sense of humor in the midst of the need for fundamental change.

The processes of efficiency and innovation are assumed to be complementary at a global level, although they can sometimes appear to be antagonistic at a local level. They are complementary when appropriate levels of efficiency make room for innovation. For example, assume that a student in a classroom generates an answer to a math word problem that is novel for a particular teacher. If the teacher is able efficiently to predict and understand the range of other answers given by students in the class, it becomes possible to think creatively about the novel answer and figure how and why the student might have generated it. With experience and instruction, problem situations change from being novel, nonroutine problems to routine problems (that is, problems that have been solved before or are very similar to ones solved before). However, if the entire range of answers generated by students seems novel to the teacher, he or she will be overwhelmed and unable to cope. Hence learning about common conceptions and misconceptions about specific topics in one's field supports teacher problem solving by allowing teachers to be more efficient in their planning and more effective in their responses to students. (See Chapters Two and Six, for example.)

An example of a teacher's attempt to deal with what to her was a student's novel response to a mathematics problem is illustrated in "The Capacity to Innovate: Dealing with a Puzzling Answer."

#### **The Capacity to Innovate: Dealing with a Puzzling Answer**

A second-grade teacher asked students to solve  $3 + 3$ . One boy, whom we'll call Jimmy, excitedly answered that the answer was 8. After asking him to rethink and still hearing the same answer, the teacher held up three fingers on each hand and asked Jimmy to count them. This time he got the answer "6." "Great," said the teacher, "so what is  $3 + 3$ ?" Jimmy again said "8," leaving the teacher perplexed.

Eventually it was discovered that Jimmy was highly visual and considered "8" to be the answer because a 3 and a reversed 3 made 8 visually. Initially it took considerable time for the teacher to understand the reasons for Jimmy's answer (which was far preferable than simply saying "you are wrong" and not helping him understand why).

Once the teacher understands Jimmy's reasoning, it should become much easier (more efficient) for her to diagnose similar answers from others who might also have a proclivity to think visually about these kinds of problems. Adding this information to the teachers' repertoire of familiar (routine) problems helps her become more likely to handle new sets of novel (nonroutine) teaching problems that may occur subsequently.

Efficiencies and innovation are antagonistic when one blocks the other. For example, a well-learned routine for teaching fractions, genetics, or other subject matters may turn out to limit a teacher's ability to help students develop a deep understanding of the subject matter if the teacher does not have a flexible command



of alternative explanations (for example, see National Research Council [in press]). Under these conditions, attempts to “unlearn” the efficient set of routines and learn new approaches can be difficult and emotionally painful. Indeed, during the process of learning new strategies, teachers may initially become less efficient than previously, as they let go of techniques that have been comfortable and well practiced for them. In these instances, it is important to help people understand that “letting go” of previously learned ideas and routines or incorporating new information into their practice—choosing what to abandon and what to keep or modify—is a big part of what it means to be a lifelong learner and an adaptive expert. For an adaptive expert, discovering the need to change is perceived not as a failure but, instead, as a success and an inevitable, continuous aspect of effective teaching (see, for example, Cognition and Technology Group at Vanderbilt, 1997; Wineburg, 1998).

### TEACHING STRATEGIES AND EFFICIENCY VERSUS INNOVATION

Teaching strategies vary according to the degree to which they emphasize the innovation versus efficiency dimensions. For example, some educators advocate teaching strategies that are highly scripted (see Sawyer, 2004). The goal is to reduce variability in implementation and produce outcomes that are better than what could be expected from a significant subset of teachers if they were left to their own devices. The effort to develop more routinized approaches to teaching is a response to at least two factors: (1) the perception of low levels of teaching skill on the part of practitioners, and (2) an attempt to create more standardization in students’ experiences across classrooms and schools.

Other educators argue that effective teaching needs to be highly interactive and should vary depending on the needs of each learner. For example, Gay (personal communication, March 12, 2004) suggests that effective teaching is sensitive to students’ needs and backgrounds and should be viewed as a creative act. Ball and Cohen (1999) also emphasize the role of innovation in teaching, “[Our] perspective views teachers’ capacity not as a fixed storehouse of facts and ideas but as a source and creator of knowledge and skills needed for instruction” (p. 6). For these educators, effective teaching ranks particularly high on the innovation dimension, but always with a base of efficiency for reasons noted earlier. For this reason, for example, Sawyer (2004) sees the alternative to “scripted teaching” as “disciplined improvisation,” with as much emphasis on the disciplined or structured elements of instruction as on the improvisation.

In each of these accounts of teaching there is implicit acknowledgment that being appropriately innovative requires the development of automatized schemas and routines that provide enough background efficiency to keep teachers from becoming overwhelmed and losing sight of important goals. Although highly scripted approaches have been criticized as not allowing enough room

to meet the needs of individual students who learn in different ways, thoughtfully considered curriculum materials, assessment tools, and classroom routines that are based on solid learning theory and well-grounded teaching strategies help teachers develop useful efficiencies in some areas of their teaching that then set the stage for additional innovation and adaptation.

However, if teachers have simply learned automatized routines "by rote" (for example, in a strictly scripted manner) they will not be prepared to be the kinds of adaptive experts who will solve problems that arise while continuing to meet the needs of students and improving over time (see, for example, Cognition and Technology Group at Vanderbilt, 2000; Judd, 1908). Although some have argued that teachers should begin with scripts for teaching with the goal of having them become more innovative over time, this could result in teachers learning a nonresponsive practice in which they do not know how to, nor expect to, individualize to meet students' needs. They may also lack a theoretical foundation and tools for reflection that would allow them to change course when what they are doing is not working well.

It is important to note that even the most scripted approach to teaching requires some room for innovation—for example, pausing one's teaching routines to accommodate an unexpected issue in the classroom. And as noted earlier, "disciplined improvisation" is far from simply being freewheeling—it involves innovation within a set of general constraints (for example, to ensure that relevant standards are met) and structured analysis of the innovation process to continue to evaluate and adapt the strategies that are used. Adaptive experts attempt to be particularly aware of the larger social contexts within which they operate. This helps them adapt in ways that are novel and appropriate: it helps them innovate within constraints. (See "Innovation Within Constraints.")

#### **Innovation Within Constraints**

The importance of "innovation within constraints" surfaced at a meeting at University of Washington in Seattle where teacher educators met with school professionals to identify potential gaps in the teacher education program. The school professionals identified one potential gap that was particularly important; namely, that University students are often taught "ideal" curriculum and teaching practices for teaching specific subject areas, including reading, mathematics, science, history, and so forth. To help students understand differences between strong and weaker approaches, students are often introduced to contrasting cases of curricula—some of which are very good and some that are far from ideal.

The school professionals were quite supportive of the goal of helping students develop deep understandings of stronger versus weaker approaches to teaching particular concepts and strategies, and they agreed that the use of contrasting cases was quite valuable. However, the school professionals added that new teachers often enter schools where particular curriculum content and practices are mandated by the

district. What if the curricula that are mandated fall in the "less than ideal" range according to the students' training? Should the new students quit their job, fight to change the system, simply comply and forget their previous training? These are dilemmas that many new teachers will face.

Once this issue was identified, teacher educators at the Seattle meeting realized the need to reframe their instruction and focus on the goal of helping students think about the challenges of "teaching effectively in an imperfect world." There are always constraints on people's activities. For teachers, there are usually ways to learn to teach creatively within these constraints. Indeed, being creative means being novel and appropriate (see, for example, Bransford and Stein, 1993). So constraints must always be acknowledged and taken into account.

In schools, "appropriate" is defined by both professional and community standards and by the needs of particular students. Prospective teachers must learn to understand the reasons for various constraints in their particular school and its community, and they must learn to find ways to teach effectively within them. Over time, teachers also need to understand how to work with others in the school and community and to become leaders who can collaborate to change system constraints when they seem clearly less than ideal. Helping prospective teachers see themselves as potential innovators and change agents who operate within systems that are much larger than their classrooms means that issues of organizations and leadership are important issues for prospective teachers to explore (see, for example, Fullan, 1993b; Hargreaves and others, 1994; Knapp and Turnbull, 1990).

An especially important aspect of adaptive expertise involves the ability to learn from others. This is not overly difficult when what is learned simply makes a teacher's existing teaching routines more efficient and elaborated. As noted earlier, however, lifelong learning often involves the kinds of changes (innovation) that require giving up old routines and transforming prior beliefs and practices. This is much easier said than done. A major part of the vision for future teachers must involve efforts to help them see that being a professional involves not simply "knowing the answers" but also having the skills and will to work with others in evaluating their own performances and searching for new answers when needed, both at the classroom level and the school level. Helping teachers learn to work in teams where they learn from one another is therefore extremely important. For example, watching a videotape of one's teaching with peers or inviting a colleague into the classroom to gain feedback is very helpful but can also be intimidating. When teachers have learned to develop their teaching in these collaborative contexts, they welcome rather than avoid such feedback. The propensity to seek rather than avoid feedback is important along a number of dimensions. For example, it is important when a school team asks how well students are doing in different classrooms and areas of the curriculum and considers how school curriculum, professional development, or organizational structures might need to change. While seeking feedback can be challenging, teachers who have experienced working in teams to consider such

questions will see this as part of the professional role and an important, ongoing activity rather than as a threat to what they have previously been doing. True adaptive expertise for a teaching professional involves a deep appreciation of the value of actively seeking feedback from many sources in order to make the best decisions for children and to continue to learn throughout one's life.

## SOME LEARNING PRINCIPLES FOR FACILITATING TEACHER DEVELOPMENT

Helping prospective teachers become adaptive experts who are able to engage in effective lifelong learning is not something that can be accomplished by simply telling them the information we have discussed in this volume. In this section we discuss research and theory relevant to key learning principles involved in helping people learn to teach and to improve their practices throughout their lives.

We organize our discussion around three major principles of learning that have been summarized in several reports from the National Academy of Sciences (National Research Council, in press; National Research Council, 2000). These three principles complement the *How People Learn* framework that we discussed in Chapters One and Two (see Figure 1.5). We use these principles to organize this discussion because they help readers align issues of teacher learning with other organizing principles for learning that are based on a strong body of research about how children and adults learn and acquire competence. The three principles are:

1. Prospective teachers come to the classroom with preconceptions about how the world, and teaching, works. These preconceptions, developed in their "apprenticeship of observation," condition what they learn. If their initial understanding is not engaged, they may fail to grasp the new concepts and information, or they may learn them for purposes of a test but revert to their preconceptions outside the classroom.
2. To develop competence in an area of inquiry that allows them to "enact" what they know, teachers must (i) have a deep foundation of factual and theoretical knowledge, (ii) understand facts and ideas in the context of a conceptual framework, and (iii) organize knowledge in ways that facilitate retrieval and action.
3. A "metacognitive" approach to instruction can help teachers learn to take control of their own learning by providing tools for analysis of events and situations that enable them to understand and handle the complexities of life in classrooms.

## The Importance of Addressing Student Preconceptions

In Chapter Two we discussed Lionni's (1970) *Fish is Fish* story as an illustration of the constructive nature of knowing. Just as the Fish had preconceptions that affected what it learned from the Frog, prospective teachers have preconceptions that affect what they learn from teacher educators and in-classroom experiences. These preconceptions come from years and years of observing people who taught them and using this information to draw inferences about what good teaching looks like and what makes it work.

The sociologist Dan Lortie (1975) used the term *apprenticeship of observation* to refer to the processes by which prospective teachers develop conceptions of teaching based on their own experiences as students. The good news of these apprenticeships is that students have had a great deal of experience in classrooms, and many draw inspiration from outstanding teachers who taught them. The bad news is that these apprenticeships can result in serious misconceptions about teaching. As Lortie (1975) notes: "Students do not receive invitations to watch the teacher's performance through the wings; they are not privy to the teacher's private intentions and personal reflections on classroom events. Students rarely participate in selecting goals, making preparations or postmortem analysis. Thus they are not pressed to place the teacher's actions in a pedagogically oriented framework" (p. 62).

The difficulty of inducing a deep understanding of actions through observation alone is illustrated in "Learning Through Observation and Induction."

### Learning Through Observation and Induction

Amy had learned to cook delicious ham dinners by watching her grandmother. For the grandmother's 85th birthday, Amy cooked a ham "just like grandmother used to make" and the grandmother stood by proudly to watch.

One of the secrets that Amy had observed was that her Grandmother always cut off a rather large piece of the end of the ham before cooking it. Amy had explained to her children that this allowed the juices to simmer in a very special way. As the Grandmother watched her granddaughter slice off the end of the ham, she asked, "Why did you cut off the end of the ham, Amy?" Amy replied, "Because you always did it, Grandmother, and your hams were always the best." The Grandmother smiled and explained, "I did it to fit the ham into my oven—it was much smaller than yours!"

(Author unknown)

Lortie (1975) concludes that students' long apprenticeship of observing teaching often leads to a number of misconceptions. One is the widespread idea that teaching is easy. Rather like the audience members watching the orchestra conductor we referred to at the beginning of Chapter One, students observe the superficial trappings of teaching, but not the underlying knowledge, skills, planning, and decision making. Part of the problem is that the limited vantage point of the student does not result in the acquisition of professional knowledge; that is,

knowledge that allows the selection and implementation of different strategies that will support learning for different purposes and different students. Instead it produces a tendency to imitate the most easily observed aspects of teaching. Munby, Russell, and Martin (2001) add that even when observing good teaching or experiencing it for oneself, one cannot easily glean a deep understanding of the complexity of the work: "Good teaching tends to reinforce the view that teaching is effortless because the knowledge and experience supporting it are invisible to those taught. Good teaching looks like the ordering and deployment of skills, so learning to teach looks like acquiring the skills" (p. 887).

Kennedy points out additional preconceptions that can make learning difficult for novice teachers. For example, many of the concepts and ideas discussed in preparation courses are ideas that already seem familiar to the students—concepts such as group learning, assessment, and diversity. Preservice teachers often already have clear beliefs associated with these concepts and therefore tend to assimilate what is being taught to their preexisting schemas. This can make it very difficult to develop deeper, more nuanced understandings of these concepts. For example, effective collaboration requires the use of tasks or problems that actually require diverse perspectives, the allocation of time for making sufficient progress, scaffolding of critical skills, and so forth (see, for example, Brown and Campione, 1996). Prospective teachers may have experienced groupwork yet have been totally unaware of the degree to which the tasks they were assigned or the procedures they followed actually supported collaboration. They may therefore think they understand collaborative learning when in fact they do not. Whether they had poor experiences in unguided, poorly planned groupwork or good experiences with well-designed collaborative tasks, they may not know what elements caused the experience to be more or less productive.

As noted earlier, novice teachers often use the same language as teacher educators but signify different things with their language than do teacher educators. One method for overcoming this overassimilation problem is to use carefully calibrated sets of contrasting cases, grounded in practice as well as theory, that help people progressively differentiate their understanding rather than simply assimilate new information to preexisting ideas (see, for example, Schwartz and Bransford, 1998). In Chapter Eleven we discuss the use of written and videotaped cases to illustrate teaching and learning concepts in ways that make more vivid the consequences associated with different kinds of practices.

In an extensive review of research on teacher change, Richardson and Placier (2001) have documented the beliefs about teaching that preservice teachers tend to bring to their classrooms. Many beliefs consist of unexamined assumptions that need to be made explicit and explored. These views tend to focus on affective qualities of teachers (for example, caring), teaching styles, and individual children, with little appreciation of the role of social contexts, subject matter, or pedagogical knowledge (Paine, 1990; Sugrue, 1996). As Paine (1990) notes

from a study of five teacher education programs, novices typically bring "an enthusiastic appreciation of personality factors and an underdeveloped sense of the role of content and context" (p. 20). Richardson and Placier (2001) note that many preconceptions in teacher education are hard to change and require interventions that are time-consuming and difficult. But if these preconceptions are not addressed, prospective teachers may retain problematic beliefs throughout their programs.

One important preconception that many candidates hold about *learning* is that it is the simple and rather mechanistic "transfer of information" from texts and teachers to students who acquire it through listening, reading, and memorization (Feiman-Nemser and Buchmann, 1989; Richardson, 1996). We noted in Chapter Two that constructivist theories play a major role in modern theories of learning and teaching, and that they are theories of knowing—not theories of pedagogy (teaching). A great deal of research establishes that individuals process and understand new information (correctly or incorrectly) in light of their experiences and prior knowledge and beliefs, and that they will often fail to remember, understand, or apply ideas that have no connections to their experience and no context for acquiring meaning. Although constructivist theorists acknowledge that there are indeed "times for telling" (Schwartz and Bransford, 1998), these theories help explain why attempts to "directly transmit" new information often fail and offer alternatives that have been found to foster learning much more successfully (see, for example, Schwartz and others, in press). Preconceptions that teaching is only about "transmission" can make it difficult for teacher educators who seek to prepare teachers to teach in ways that are more compatible with what we now know about how people learn. These more successful methods are often fundamentally different from how the student teachers were taught, and, sometimes, from how the teacher educators themselves learned as students (Borko and Mayfield, 1995).

Studies suggest that there is a wide distribution of preconceptions about teaching that are held by novices. In a review of the literature, Wideen, Mayer-Smith, and Moon (1998) concluded that prospective teachers are not an undifferentiated group and instead, hold a variety of images of and understandings about teaching and learning. These entering beliefs are more nuanced—and extend across a wider range of possibilities—than many people had imagined. These findings suggest that teacher educators will have different work to do with different candidates and warn against a "one size fits all" approach.

Many short-term interventions have shown little capacity to change preconceptions (Wideen and others, 1998). In contrast, longer-term approaches that explicitly seek to elicit and work with novice teachers' initial beliefs and concerns have shown some success. For example, in a three-year longitudinal study, Gunstone and colleagues (1993) found that teachers' beliefs and understanding about the teaching and learning of science changed significantly as they

completed a one-year preservice program that explicitly drew upon and addressed their experiences, concerns, and needs. The program consciously provided new information and experiences relevant to those evolving concerns. Similar findings in other teaching fields have also been reported (see, for example, Fosnot, 1996; Graber, 1996). All of these studies involved cases where teacher educators used their students' "apprenticeship of observation" as a springboard from which to begin the process of conceptual and behavioral change.

### The Importance of Learning for Understanding and Enactment

The preceding discussion focused on the importance of taking account of prospective teachers' preconceptions about the nature of teaching. A second challenge of learning to teach is what Mary Kennedy (1999) has termed the *problem of enactment*. If it is difficult to help preservice teachers learn to "think like a teacher," it is even more complicated to help them learn to put their intentions into action. Teachers must learn to weigh difficult dilemmas and to make and implement decisions on the fly; to put their plans into action effectively as well as to alter plans for unforeseen circumstances while they are in the midst of teaching; to respond to children and to represent well the material they are teaching. This challenge relates to the second *How People Learn* principle discussed by the National Research Council (in press), one that focuses on ways to help novices develop the kinds of organized understanding and skills that support effective action. This principle can be described as follows: "To develop competence in an area of inquiry, students must: (a) have a deep foundation of factual knowledge, (b) understand facts and ideas in the context of a conceptual framework, and (c) organize knowledge in ways that facilitate retrieval and action" (National Research Council, in press).

A strong body of research indicates that learning experiences that support understanding and effective action are different from those that simply support the ability to remember facts or perform rote sets of skills (see, for example, Donovan and others, in press; Good and Brophy, 1995, pp. 293-318; Resnick, 1987). Furthermore, actions that are supported by understanding are often more effective than those that occur without understanding. An example is provided in *Experience and Understanding*, which continues the story of *Fish is Fish*.

#### Experience and Understanding

In the first part of Lionni's (1970) *Fish is Fish* story (discussed earlier), we saw the Fish imagining fish-like birds, cows, and people, and we noted that this illustrated the role of preconceptions in constructing new understandings. Lionni's story continues with the Fish beginning to act on the knowledge that it thinks it has learned from the Frog. In particular, the Fish is so excited by the Frog's descriptions that it leaps from the water to experience life on land for itself. Because it can neither breathe nor

m  
L  
de  
in  
  
of  
co  
en  
it  
Re

So  
roc

of  
st  
U  
st  
ce  
la  
no  
no

B  
bi  
ta  
o:  
th

ic  
p  
er



maneuver on land, the Fish must be saved by the amphibious Frog. This part of Lionni's story illustrates how knowledge of events affects subsequent actions and decisions. The Fish did not have a real understanding of the differences between life in water and on the land.

Experience played a critical role in helping the Fish understand some key aspects of life on the land. Thankfully, the experience was "supervised" by the Frog, who could avert potentially disastrous consequences. However, experience alone is not enough either. The Fish's misunderstanding would presumably have persisted even if it had seen real birds, cows, and humans, or accurate pictures of them. The National Research Council (in press) argues the following:

Some additional, critical concepts are needed: for example, the concept of adaptation. Species that move through a medium of air rather than through water have a different mobility challenge. And species that are warm blooded, unlike those that are cold blooded, must maintain their body temperature. It will take more explaining of course, but if the fish is to see a bird as something other than a fish with feathers and wings, and a human as something other than an upright fish with clothing, then feathers and clothing must be seen as adaptations that help solve the problem of maintaining body temperature, and the upright posture and wings must be seen as different solutions to the problem of mobility outside water. Conceptual information such as a theory of adaptation represents a kind of knowledge that is unlikely to be induced from everyday experiences. It typically takes generations of inquiry to develop this kind of knowledge, and people usually need some kind of help (e.g. interactions with "knowledgeable others") in order to grasp organizing concepts such as this (e.g. Hanson, 1970).

Source: Reprinted with permission from *How Students Learn: History, Mathematics, and Science in the Classroom*, © 2005 by the National Academy of Sciences, courtesy of the National Academies Press, Washington, D.C.

Our earlier discussion of Lortie's (1975) work on the "apprenticeship of observation" touched on the difficulty of inducing important levels of understanding simply by watching. In the *Fish is Fish* example in Experience and Understanding, it is quite plausible that the Fish would not have deeply understood adaptation and mobility even if the Frog had tried to explain these concepts. But after it experienced its own inabilities to breathe and move when on land, a "time for telling" emerged where new opportunities for learning should now be possible. As we discuss in the following section, the time and the manner of telling, however, have to be carefully considered.

**Because Wisdom Can't Be Told.** In his 1940 article, "Because Wisdom Can't be Told," Charles L. Gragg of the Harvard Business School begins with this quotation from Balzac: "So he had grown rich at last, and thought to transmit to his only son all the cut-and-dried experience which he himself had purchased at the price of his lost illusions: a noble last illusion of age" (see Gragg, 1940).

Except for the part about growing rich, many educators find that Balzac's ideas fit their experiences quite well. Educators frequently attempt to prepare people for the future by imparting the wisdom gleaned from their own experiences. Sometimes these efforts are rewarded, but often they are less successful

than people would like them to be and we need to understand why. Examples of this problem are discussed in "Using Knowledge in Action."

### Using Knowledge in Action

College students were taught about problem solving from the perspective of the IDEAL model—a model that emphasizes the importance of *Identifying* problems, *Defining* them from at least two perspectives, *Exploring* strategies for solution, *Acting* on the basis of strategies, and *Looking* at the effects (Bransford and Stein, 1993). Students were able to learn the material; for example, they could explain the purposes and steps of the IDEAL model and provide examples of how to use it to solve problems assigned in class. Nevertheless, students often failed to use the model spontaneously, when not asked to do so. For example, unless explicitly prompted to do so, students often failed to apply the model to their attempts to formulate their own topic for a paper related to discussions of problem identification and definition. They could think about the model, but they tended not to "think in terms of the model" (Bransford, Nitsch, and Franks, 1977) or "think with" the model (Broudy, 1977). The model had not become what some call a *conceptual tool* (Bransford and Stein, 1993).

Bereiter and Scardamalia (1989) provide an additional illustration of failure to spontaneously use important information. They note that a teacher of educational psychology gave her students a long, difficult article and told the students they had ten minutes to learn as much as they could about it. Almost without exception, the students began with the first sentence of the article and read as far as they could until the time was up. Later, when discussing the strategies, the students acknowledged that they knew better than simply to begin reading. They had all had classes that taught them to skim for main ideas, consult section headings, and so forth. But they did not spontaneously use these strategies when it would have helped.

The problem of knowing something but failing to have it guide one's actions is ubiquitous. Many years ago, Alfred Whitehead (1929) warned about the dangers of inert knowledge. This involves knowledge that is available to people in the sense that they can talk about it when explicitly asked to do so (for example, when asked to explain the IDEAL model, or explain strategies for reading research articles). However, the knowledge is inert in the sense that it does not guide one's thinking and actions in new settings. Whitehead made the provocative claim, demonstrated by research several decades later, that traditional educational practices tend to produce knowledge that remains inert (see also Bereiter and Scardamalia, 1989; Brown, Campione, and Day, 1981; Gick and Holyoak, 1980).

Gragg's (1940) "Wisdom Can't be Told" article discusses problems with Harvard Business School graduates in the 1930s. Employers said that the Harvard graduates had acquired an impressive array of knowledge and skills, but they were not "prepared for action" (for example, they could not make useful decisions in business settings). Barrows (1985) noted similar problems with respect to medical education. Michael, a language therapist, provides a particularly interesting story about this problem. She served for several years as a clinical supervisor of college students who were beginning a practicum in language

therapy for language-delayed children. The students had all passed the required college course on theories of language and their implications for therapy, but there was almost no evidence that the students ever attempted to use this knowledge in the clinical therapy sessions. Michael concluded that the college course must have been very poorly taught.

Michael was later asked to teach that college course herself. She did what she thought was a highly competent job and was pleased with the general performance of the students on her tests. A year later, she encountered a number of students again in the clinical practicum on language therapy. Much to her surprise and dismay, these students also showed little evidence of applying what they had learned in their language course. Many could remember facts when explicitly asked about them, but they did not automatically draw on that knowledge to help them solve problems in the clinic.

Because she had taught the practicum, Michael was reluctant to conclude that her college students performed poorly because of poor instruction. Instead she was motivated to explore problems with traditional approaches to instruction and to study ways to overcome them. Her Ph.D. thesis successfully explored new teaching methods that were designed to improve the degree to which her students were prepared for action when they moved from the classroom to the clinical lab (Michael, Klee, Bransford, and Warren, 1993).

To better prepare people for action, a number of professional schools (law schools, medical schools, and business schools, for example) use a variety of approaches called "case-based" and "problem-based" instruction. (See Williams [1992] for an excellent review and analysis of this general approach.) The essence of the approach is to organize instruction around actual situations that students are likely to encounter later in their careers or perhaps have already encountered. In business, for example, a case might focus on a company that is in trouble and needs to be restructured. In medicine, a case might involve a patient with certain symptoms that need to be diagnosed. In Michael's work on language therapy (discussed earlier), faculty anchored their instruction around videos of language experts who were working with children, and students analyzed these examples from different theoretical perspectives (for example, behavioral, linguistic, social/linguistic).

In all these examples, students work on cases over some fixed period, set learning goals for acquiring new information that is needed to solve the problem, and eventually discuss their ideas with classmates and with the professor. Ideally, students move from simple cases to more complex ones. In the process, they acquire relevant knowledge while learning to analyze problems, set learning goals, and present and discuss their ideas. Overall, these kinds of experiences appear to help students think and act more professionally when dealing with everyday problems relevant to their disciplines (see, for example, Hmelo-Silver, 2004; Michael and others, 1993). These approaches to instruction

represent attempts to avoid Whitehead's lament that many traditional forms of instruction tend to produce knowledge and skills that tend to remain inert once students leave the classroom and enter the world. Research like this underlies a number of the pedagogies for teacher education that we describe in Chapter Eleven.

**Challenges of Enactment in Teacher Education.** The issues teachers face regarding enactment are similar to those encountered in other professional fields, but there are differences as well. The preconceptions about educational ideas carried into teacher education by prospective teachers may be stronger than those of other novice professionals because of the long apprenticeship of observation in elementary and secondary schools. In addition, even when novice teachers have developed solid ideas about teaching, putting them into action is extremely challenging, as teachers do many more things at once, with many more clients assembled at one time, than do most other professionals. Developing an authoritative classroom presence, good radar for watching and interpreting what many different students are doing and feeling at each moment, and skills for explaining, questioning, discussing, giving feedback, constructing tasks, facilitating work, and managing the classroom—all at once—is not simple.

A number of scholars have specifically explored the challenges involved in preparing *teachers* for effective action. Schön (1983), for example, suggests that there are some kinds of professions—he includes teaching as a prime example—in which much of the information needed to make effective teaching decisions *emerges in the context of the practice*. For example, information about what ideas students have developed about a topic, how they are understanding or misunderstanding the material being taught, and how different students learn best emerges in the actual work of teaching—and guides future planning and instruction. How different strategies work with this or that *group* of students, as well as individuals, also emerges in the course of enacting plans, and cannot be fully known ahead of time in the abstract.

Some describe learning for understanding and enactment as learning to “apply” knowledge to practice. However, our earlier discussions of adaptive expertise suggest that effective actions involve *more* than the ability to simply apply previously acquired routines and schemas. The efficiency dimension (see Figure 2.1) highlights the importance of acquiring and using well-learned schemas and routines that set the stage for effective action without commanding too much attention. However, the innovation dimension involves “disciplined improvisation” (Sawyer, 2003) where new ideas and actions often emerge in the context of ongoing interactions. As discussed earlier, the upshot of this analysis is that “application” and “innovation” are tightly intertwined and need to be learned together, in the context of a schema that provides a means for reflection and further learning.

If the information needed to teach well emerges during the practice itself, then learning how to think and act professionally is unusually difficult at the start of a teaching career, and many ways of preparing prospective teachers will not be sufficient to guide their actions. For example, if a teacher preparation program emphasizes "book learning" rather than opportunities to practice and reflect in supervised classrooms, students' actual postgraduation teaching experiences would be expected to have more effect on their subsequent teaching than their book-based classroom experiences. And indeed, data show that, for good or for ill, teachers' initial classroom experiences, especially in the first one or two years, are consistently a predictor of teacher effectiveness (Rowan, Correnti, and Miller, 2002). Evidence also shows that these initial classroom experiences are much different for candidates who have had strong preservice preparation and those who have not (see, for example, Darling-Hammond, Chung, and Frelow, 2002).

One inference from these studies of learning is that teacher educators need to make sure that candidates have opportunities to practice and reflect on teaching *while enrolled in their preparation programs*. During both the preservice period and initial years in the field, new teachers need support in interpreting their experiences and expanding their repertoire, so that they can continue to learn how to become effective rather than infer the wrong lessons from their early attempts at teaching. Findings from several studies suggest that how teacher education is conducted can make a difference in teachers' abilities to enact what they are learning. These studies have found that, when a well-supervised student teaching experience precedes or is conducted jointly with coursework, students appear more able to connect theoretical learning to practice, become more comfortable with the process of learning to teach, and are more able to enact what they are learning in practice (Chin and Russell, 1995; Darling-Hammond and Macdonald, 2000; Koppich, 2000; Snyder, 2000; Sumara and Luce-Kapler, 1996; Whitford, Ruscoe, and Fickel, 2000). Other studies suggest that when teachers learn content-specific strategies and tools that they are able to try immediately and continue to refine with a group of colleagues in a learning community, they are more able to enact new practices effectively (Cohen and Hill, 2000; Lieberman and Wood, 2003).

### Metacognition and the Problem of Complexity

A third challenge in learning to teach is that teaching is an incredibly complex and demanding task (Lampert, 2001; McDonald, 1992). Effective teachers become increasingly aware of the complexities involved in teaching and learn how to think systematically about them so that they can better assess their own performances. As McDonald explains, "Real teaching happens within a wild triangle of relations—among teacher, students, subject—and the points of this triangle shift continuously. What shall I teach amid all that I should teach? How can I grasp it myself so that my grasping might enable theirs? What are they thinking and feeling—toward me, toward each other, toward the thing I am

trying to teach? How near should I come, how far off should I stay? How much clutch, how much gas?" (1992, p. 1).

A principle of learning that is extremely important for helping teachers become adaptive experts who can manage complexity involves the concept of metacognition—or the ability to think about one's own thinking. John Flavell (1979) described two aspects of metacognition: *metacognitive knowledge*—that is, understanding one's own thinking and developing strategies for planning, analyzing, and gaining more knowledge—and *metacognitive regulation*—that is, being able to define learning goals and monitoring one's progress in achieving them (see also National Research Council, 2000). A continuation of the *Fish is Fish* story provides more information about the nature and role of metacognition in learning (see *Developing Metacognition in the Cause of Learning*).

### **Developing Metacognition in the Cause of Learning**

Hero though he is for saving the Fish's life, the Frog in our story gets poor marks as a teacher. But the burden of learning does not fall on the teacher alone. Even the best instructional efforts can be successful only if the student can make use of the opportunity to learn. Helping students become effective learners is relevant to the third key principle: a metacognitive, or self-monitoring, approach can help students develop the ability to take control of their own learning by defining learning goals and monitoring their progress in achieving them.

Our Fish accepted the information about life on land rather passively. Had it been analyzing and monitoring its understanding, it might have noted that putting on a hat and jacket would be rather uncomfortable for a fish, and would slow its swimming in the worst way. Had the Fish been more engaged in figuring out what the Frog meant, it might have asked why humans would make themselves uncomfortable and compromise their mobility. A good answer to the Fish's questions might have set the stage for learning about differences between humans and fish, and ultimately the notion of adaptation.

*Source:* Reprinted with permission from *How Students Learn: History, Mathematics, and Science in the Classroom*, © 2005 by the National Academy of Sciences, courtesy of the National Academies Press, Washington, D.C.

There is a strong research literature demonstrating that efforts to help students become more active monitors of their own learning facilitate their performances (see, for example, Brown, Bransford, Ferrera, and Campione, 1983; National Research Council, in press). Data showing the benefits of metacognitive reflection range from work with children to adults. Metacognition is an especially important component of adaptive expertise (National Research Council, 2000). People with high levels of metacognitive awareness have developed habits of mind that prompt them to continually self-assess their performances and modify their assumptions and actions as needed. People who are less metacognitive rely on external feedback from others to tell them what to do and how to change.

Effective teachers particularly need to be metacognitive about their work. The more they learn about teaching and learning the more accurately they can reflect

on what they are doing well and on what needs to be improved. For example, beginning teachers frequently focus on their teaching practices rather than on what their students are learning. They need to be able to figure out what they do and do not yet understand about how their students are performing and what to do about it. They also need to be able to ask themselves and others questions to guide their learning and decision making. These include questions about the spheres of decision making that matter in interpreting what is going on in the classroom—for example, the aspects of learners' experiences, content representations, and social contexts that are in play in a given situation. And they need to be able to analyze acts of teaching as well as reactions and interactions that occur, so that they can reflect on these outcomes and adapt what they do.

In describing the complexity of teaching, Lampert outlines some of the many factors a teacher must consider and some of the areas in which metacognitive deliberations are critical to her ability to make sound decisions:

One reason teaching is a complex practice is that many of the problems a teacher must address to get students to learn occur simultaneously, not one after another. Because of this simultaneity, several different problems must be addressed in a single action. And a teacher's actions are not taken independently; there are interactions with students, individually and as a group. A teacher acts in different social arrangements in the same time frame. A teacher also acts in different time frames and at different levels of ideas with individuals, groups and the class to make each lesson coherent, to link one lesson to another, and to cover a curriculum over the course of a year. Problems exist across social, temporal, and intellectual domains, and often the actions that need to be taken to solve problems are different in different domains.

When I am teaching fifth-grade mathematics, for example, I teach a mathematical idea or procedure to a student while also teaching that student to be civil to classmates and to me, to complete the tasks assigned, and to think of himself and herself and everyone else in the class as capable of learning, no matter what their gender, race or parents' income. As I work to get students to learn something like "improper fractions," I know I will also need to be teaching them the meaning of division, how division relates to other operations, and the nature of our number system. While I take action to get some particular content to be studied by a particular student in a particular moment, I simultaneously have to do the work of engaging all of the students in my class in the lesson as a whole, even as I am paying different kinds of attention to groups of students with diverse characteristics. And I need to act in a way that preserves my potential to keep acting productively day after day, throughout the year. (Lampert, M. (2001). *Teaching problems and the problems of teaching*. New Haven: Yale University Press.)

Lampert's account of the multiple considerations that shape her teaching of mathematics to fifth graders suggests at least four elements for reflecting on the complexity of teaching. First, *teaching is never routine*. Students do not learn at the same pace or in the same ways. Their needs are both diverse and

ever-changing. The "wild triangle" to which McDonald refers is constantly shifting—teachers must constantly cope with changing situations, learning needs, challenges, questions, and dilemmas. Second, *teaching has multiple goals* that often must be addressed simultaneously. As Lampert explains, for instance, at the same time a teacher is teaching content, she is simultaneously teaching social and intellectual development, helping students work in groups, and paying attention to the way she interacts with the child who needs some extra support and the child who needs to be the center of attention. Third, *teaching is done in relationship to very diverse groups of students*. In contrast to the individual problems confronted one at a time by doctors, lawyers, or architects, teachers must find a way to meet the needs of a group of students who are diverse in terms of their learning needs, strengths, backgrounds, areas of challenge, and range of abilities. Finally, *teaching requires multiple kinds of knowledge to be brought together in an integrated way*. For instance, teachers must constantly integrate their knowledge of child development, of subject matter, of group interactions, of students' different cultures and backgrounds, and of their particular students' interests, needs, and strengths together in a way that advances the learning of all their students. In sum, helping new teachers learn about and reflect upon the multidimensionality and simultaneity of teaching (Jackson, 1974) is clearly important. And it is also no easy task.

Not only is there great complexity in the classroom, but there is also a complicated set of factors from outside the classroom that influence teachers and students. The way the school is organized shapes the prior experiences—norms, access to knowledge, and supports—students will have had before entering a given teachers' classroom, as well as their current experiences. Furthermore, the conditions and relationships existing in the community served by the school will influence how children are raised, what resources have been available to them, how alike or different groups served by the school are and what kinds of expectations and values they bring. To be effective over the course of a career, teachers need to understand and manage these factors, and, eventually, to influence them on behalf of the students they serve.

## THE PROCESS OF TEACHER DEVELOPMENT

It would be helpful if there were predictable phases of teacher development that could guide teacher educators. As is the case with child development (see Chapter Three), it is important to understand different theories of development and the contributions of each.



## Developmental Progressions

A number of stage theories have been advanced to describe teachers' development (Berliner, 1994; Feiman-Nemser, 1983; Fuller, 1969; Richardson and Placier, 2001; Sprinthall, Reiman, and Theis-Sprinthall, 1996) as well as the course of their careers (Huberman, 1989). For example, drawing upon a review of ten studies of teacher's concerns, Fuller (1969) proposed that new teachers develop through phases in which they focus initially on themselves and their teaching—for instance, their ability to control the classroom, what their supervisors think about them as teachers—and then eventually on concerns that are related to student learning, such as designing curriculum, finding effective teaching strategies, and assessing student learning. This developmental progression—from early concerns with “self” to a gradual focus upon issues related to students and student learning, and, eventually, conditions of schools and schooling—has been observed in a number of studies.

Descriptions of classroom practice suggest that some teachers eventually develop a strong focus on student welfare and learning that drives their teaching decisions and self-improvement efforts, whereas others stop short of this state, developing techniques of teaching that “work,” in that they get teachers through the day, but that do not result in high levels of learning for students or high levels of teacher concern when learning does not occur. Both the speed and endpoint of this progression appear to be related to teachers' preparation, as we discuss in the next section.

Other research has focused on the development of teaching knowledge by examining the differences in thinking between expert and novice teachers (Berliner, 1994, 1986; Carter, Cushing, Sabers, Stein, and Berliner, 1988; Lin, 1999). This line of research, described at the beginning of this chapter, has found, for example, that when beginning and experienced teachers are asked to evaluate classroom scenes, novices tend to offer superficial, general observations that do not attend to the intellectual work of the classroom. (See “A Study of Teacher Expertise,” p. 361.) On the other hand, more expert teachers attend to specific aspects of the classroom that are linked directly to the intellectual work of students, to generate more detailed observations and hypotheses about what they see, to qualify their observations and interpretations, to weigh the relative importance of certain kinds of information, and to “take into account the complexity of problems which exist in classrooms” (Carter and others, 1988).

Like experts in other domains, teaching experts quickly recognize patterns in what they observe; see more complexities and bring to bear many sources of knowledge about how to respond to them; are more opportunistic and flexible in their practice than novices, responding to demands of the situation and

the task; and have a broad repertoire of skills they can easily access and implement to achieve their goals (Berliner, 2001). Studies of expertise in fields such as physics (Chi, Feltovitch, and Glasser, 1981; Chi, Glaser, and Rees, 1982), chess (de Groot, 1965; Newell and Simon, 1972; Chase and Simon, 1973), and history (Wineburg, 1991, 1998) suggest similar features in other fields.

Berliner (1994) has proposed that teachers develop expertise through a set of stages—from novice to advanced beginner, competent, proficient, and ultimately to expert. Over time, they progress from learning the basic elements of the task to be performed and accumulating knowledge about learning, teaching, and students to making conscious decisions about what they are going to do, reflecting on what is working based on their experience, and, ultimately, at the expert level (Stage 5), sensing the appropriate responses to be made in any given situation. Teachers appear to develop competence over a period of about five to seven years, and only a small percentage of teachers continue to develop into experts (Berliner, 2001). Some research, described later, suggests that the metacognitive elements that are involved in the development of expertise can be developed in teacher education, enabling more teachers to reach this level of strong competence and to do so earlier than might otherwise be the case (see, for example, Hammerness and others, 2002).

Finally, some researchers have examined the process of development of specific teaching skills. For example, Joyce and Showers (2002) have described how teachers go through an iterative process of learning, experimenting, and reflecting as they develop new skills for use in their classrooms. They have also studied how the developmental process of learning to enact new skills can be supported by skilled coaching in peer support groups that allow teachers to explore, develop, strengthen, and refine teaching skills together. Both the feedback and the collegial nature of the process appear to stimulate reflection and greater skill development. Approaching this kind of process from a developmental perspective strengthens both implementation and student achievement gains.

Stage theories have been useful in describing the trajectory of teachers' development and the nature of teachers' expertise. However, they do not tell us as much about the characteristics of the learning experiences that may help teachers progress in their concerns and acquire expert skills (Berliner, 2001). Furthermore, many stage theories that have guided teacher education decisions have been interpreted as suggesting that teachers' development progressed in a linear fashion, in fairly fixed stages, suggesting teacher development is "invariant, sequential and hierarchical" (Richardson and Placier, 2001). Yet, other frameworks for describing teacher development suggest more complex paths in learning to teach, as well as differences in teachers' concerns and capacities

when they have had different kinds of preparation (see, for example, Grossman, 1992, in response to Kagan, 1992).

Furthermore, many studies describing teacher development in terms of what beginning teachers "can" and "cannot" do were conducted at a time when most teacher education programs were fairly weak interventions. Thus they may underestimate the potential of new teachers to practice in more sophisticated ways, particularly if those new teachers are prepared in programs that can leverage their development productively. Some recent studies designed to examine the kinds of teacher education that support teacher learning suggest that, under the right circumstances, with particular kinds of learning experiences, new teachers can develop a more expert practice even as beginning practitioners (Darling-Hammond, 2000b; Darling-Hammond and Macdonald, 2000; Hammerness and others, 2002; Koppich, 2000; Merseth and Koppich, 2000; Miller and Silvernail, 2000; Snyder, 2000; Whitford and others, 2000; Zeichner, 2000).

These findings parallel recent findings in cognitive development demonstrating that, given well-chosen tasks with appropriate scaffolding and supportive learning environments, children can learn much more than may have been anticipated by earlier biologically based theories of development (Boaler, 1997; Brown and Campione, 1994; Lee, 1995; Palinscar and Brown, 1984; Rogoff, 1990; Vygotsky, 1978). This recent evidence of powerful novice teaching is also particularly important because the studies examined teacher education features that appear to make a substantial difference for preservice teachers' learning and development. These features are discussed more fully in Chapter Eleven.

This research does not suggest that new teachers can immediately develop the kind of expertise that a master teacher develops over years of experience. Such learning about teaching, students, culture, development, and subject matter develops over time. Grossman, Smagorinsky, and Valencia (1999) have distinguished between "appropriating tools" and "mastery," suggesting that "If mastery means the skill to use a tool effectively, then this more fully realized grasp of a concept most likely would take years of practice to achieve" (p. 18). However, this recent research does suggest that new teachers can demonstrate more accomplished practice than previously thought when they experience stronger, more purposeful preparation.

Studies of teacher development have provided evidence for a potential trajectory of teacher development. And although the sequence and timing of particular stages may not be invariant, particularly when new teachers can benefit from especially well-designed teacher education, the descriptions of expertise have helped undergird much of our understanding of what accomplished practice might look like. They provide a basis for characterizing some of the practices we might hope teachers begin to learn and demonstrate as skilled and thoughtful practitioners.

## THEORIES OF TEACHER DEVELOPMENT IN COMMUNITIES OF PRACTICE

Current conceptions of learning to teach have also been informed by theories of learning in a community (Au, 2002; Cochran-Smith and Lytle, 1999a; Grossman and others, 1999; Oakes, Franke, Quartz, and Rogers, 2002). A focus upon learning in communities of practice has evolved out of multiple research traditions in the United States and other countries. It can be traced back to scholars such as Kurt Lewin, a social psychologist; to the educational philosophy of John Dewey; and to movements that called for teachers to collaborate and participate in research in their classrooms alongside university researchers, which were in evidence as early as the 1950s (see Zeichner and Noffke, 2001, for a review of these traditions). In addition, this work has been informed by the work of cognitive psychologists who have focused in particular upon the situated and contextualized nature of learning within such communities (see, for example, Bruner, 1996; Cole, 1977; D'Andrade, 1981; Lave and Wenger, 1991; Vygotsky, 1978).

Research on teacher development within learning communities also emphasizes the importance of a particular kind of knowledge development: knowledge that is developed within both teaching contexts and professional contexts. Cochran-Smith and Lytle (1999) outline several approaches to knowledge development, including the development of knowledge *for* practice, knowledge *in* practice, and knowledge *of* practice. The first of these refers to the kinds of knowledge teachers may need to rely upon in developing their practice: knowledge of subject matter content, content pedagogy, theories of learning and development, and research about the effects of various teaching strategies. This kind of knowledge has been the traditional emphasis of teacher education and it has often been thought of as knowledge to be transmitted from scholars to teachers or from experts to novices.

The second perspective emphasizes knowledge in action: what accomplished teachers know as it is expressed in their practice, their reflections, and their narratives. To be sure, some of this knowledge is reflected in the first category, when it has been the subject of formal research on teaching. However, the notion of knowledge *in* practice emphasizes that much of the knowledge of accomplished teachers is practical, highly situated, and acquired through reflection upon experience. Although one teacher's knowledge in practice, when studied by other teachers, can become knowledge for practice, learning from the actions of expert teachers as they make choices and decisions depends upon learning how to "think like a teacher"—how to observe students, reflect upon their needs, evaluate curriculum options, and put plans into action.

Finally, knowledge *of practice* emphasizes the relationship between knowledge and practice and the theoretical aspects of both, assuming that "the knowledge teachers need to teach well emanates from systematic inquiries about teaching, learners and learning, curriculum, schools and schooling. This knowledge is constructed collectively within local and broader communities" (Cochran-Smith and Lytle, 1999a, p. 274). It emphasizes the role of the teacher in constructing knowledge and learning, and growing through that process. And, it suggests the importance of ongoing inquiry by teachers in their own classrooms and into other systematic and practical sources of knowledge for addressing critical problems of practice. In this conception, communities of practice play a central role in developing and transmitting knowledge from practice to research and back again. These notions of knowledge for practice, developed within a professional community of inquiring teachers, inform many of the emerging pedagogies in teacher education that have been found to be associated with implementation of new teaching strategies and improvements in student learning (see, for example, Joyce and Showers, 2002; Cohen and Hill, 2000).

These conceptions of teacher development within professional communities highlight the ways in which the learning of beginning and experienced teachers is similar. As Cochran-Smith and Lytle (1999) explain, "Working together in communities, both new and more experienced teachers pose problems, identify discrepancies between theories and practices, challenge common routines, draw on the work of others for generative frameworks, and attempt to make visible much of that which is taken for granted about teaching and learning" (p. 293). This conception poses an image of the teacher as a member of a professional community and as a lifelong learner, focusing upon collegial, career-long development.

### CRITICAL ASPECTS OF IDENTITY DEVELOPMENT IN TEACHERS

In addition to developing knowledge and skills, teachers are developing along many other dimensions. Teachers are developing as professionals (Feiman-Nemser, 2001a); as scholars and practitioners within a subject matter context (Shulman, 1986; Grossman and Stodolsky, 1995); as change agents (Ayers 1995; Darling-Hammond, French, and Garcia-Lopez, 2002); as nurturers and child advocates (Cummins, 1986); and as moral agents (Fullan, 1993b). As teachers develop a vision for what teachers do, what good teaching is, and what they hope to accomplish as a teacher, they begin to forge an identity that will guide them in their work (Hammerness, in press). Developing an identity as a teacher is an important part of securing teachers' commitment to their work and adherence to professional norms of practice.

Preparation programs deliberately and inadvertently reinforce the development of different kinds of teaching identities as they emphasize various aspects of what it means to be a teacher and as they place student teachers in different environments where they will see certain kinds of norms modeled. Though not always explicitly considered, this aspect of preparation is critically important, as the identities teachers develop shape their dispositions, where they place their effort, whether and how they seek out professional development opportunities, and what obligations they see as intrinsic to their role.

Teachers are also developing in their identities as members of racial/ethnic groups and in their views about members of other groups. Research on the development of racial identity suggests that through childhood (as early as three or four years of age) and into adulthood, people move through a variety of stages in making sense of their own racial/ethnic identity and culture and those of others (Katz, 1982; McAllister and Irvine, 2000; Phinney and Rotheram, 1987; Tatum, 1997). This process of racial identity development influences how teachers treat the students they teach as well as how they see their role in confronting social and institutional barriers to equity. This process can be facilitated by teacher education if teacher educators understand how it unfolds and can be supported (Carter and Goodwin, 1994).

Of course, children in the classrooms of teachers also go through these stages. Thus it is equally important to note that teachers play a particularly influential role in the development of children's racial/ethnic identity and their academic self-concepts. As Banks (1988) argues, "Teachers are even more important than the material they use because the ways in which they present material highly influence how they are viewed by students" (p. 88). As teachers bring their own assumptions and beliefs (and even prejudices and biases) to bear upon the materials they use in the classroom, the way they interact with materials or describe them to children can create a lens with which the children themselves view the materials. In this process, teachers can reinforce or counteract racial biases and stereotypes that children bring into school with them, and can display negative or positive attitudes to children of color. Because of teachers' critical role in the identity development of children, teacher educators argue that teachers need to develop consciousness about their own racial identity and consider how they can support positive racial identity development among their students (Carter and Goodwin, 1994).

Furthermore, as Hernández (1989) asserts, teaching is always a cross-cultural encounter no matter what the ethnicity or race of teachers and students, because culture so deeply informs the entire teaching and learning process. Teachers naturally bring their own cultural values, beliefs, and understandings to their work with children, and children always bring their own cultural understandings and ways of knowing to their experiences with teachers, with knowledge and ideas, and with each other.

Of particular challenge is helping preservice teachers from the majority culture develop an understanding of cross-cultural issues and experiences such as discrimination. Surveys suggest that many white teachers have limited awareness of these issues (Sleeter, 2001). Qualitative studies suggest that many have had few cross-cultural experiences, and this lack of experience may lead them to unintentionally or unconsciously accept forms of racial, ethnic, language, or cultural discrimination (McIntyre, 1997; Smith, Moallem, and Sherrill, 1997; Valli, 1995). This limited experience also affects many teachers' understanding of culturally appropriate classroom practices. Many preservice teachers have trouble imagining what multicultural teaching can look like (Goodwin, 1994), in part because of the lack of models of multicultural practices in their own experiences as students and in their placements. Indeed, for these same reasons, preservice teachers of color do not necessarily know more about culturally relevant pedagogical practices than white preservice teachers (Goodwin, 1997b). As we describe in Chapter Seven, preservice programs can provide much-needed opportunities for teacher education students of all backgrounds to develop culturally relevant practices and pedagogical approaches that can serve a diverse range of students (Ladson-Billings, 2001; Sleeter, 2001).

### A FRAMEWORK FOR TEACHER LEARNING

In recent years, a number of scholars have offered theoretical frameworks for teacher learning that incorporate much of the research described earlier (Cochran-Smith and Lytle, 1999; Feiman-Nemser, 2001a; Grossman and others, 1999; Shulman and Shulman, 2004). In addition, professional standards for teaching, especially those offered by the Interstate New Teacher Assessment and Support Consortium (INTASC) and the National Board for Professional Teaching Standards (NBPTS), also build upon this research in describing what competent beginners and accomplished teachers need to know and be able to do in order to teach challenging content to diverse students.

We draw from these efforts in offering a framework for teacher learning. As depicted in Figure 10.1, this framework suggests that new teachers learn to teach in a community that enables them to develop a *vision* for their practice; a set of *understandings* about teaching, learning, and children; *dispositions* about how to use this knowledge; *practices* that allow them to act on their intentions and beliefs; and *tools* that support their efforts.

As we argue in Chapter Five, teachers need to have a sense of where they are going and how they are going to get students there. Zumwalt (1989) has called this a sense of "curricular vision." This vision, along with powerful images of good practice (Feiman-Nemser, 2001a; Shulman and Shulman, in press; Zumwalt, 1989) can help new teachers reflect on their work, guide their practice, and direct

their future learning (Hammerness, in press). Feiman-Nemser argues that these images are critical for teacher learning: "Teacher candidates must . . . form visions of what is possible and desirable in teaching to inspire and guide their professional learning and practice. Such visions connect important values and goals to concrete classroom practices. They help teachers construct a normative basis for developing and assessing their teaching and their students' learning" (2001a, p. 1017). Developing a vision for teaching is the first step toward addressing the apprenticeship of observation and the process of enactment.

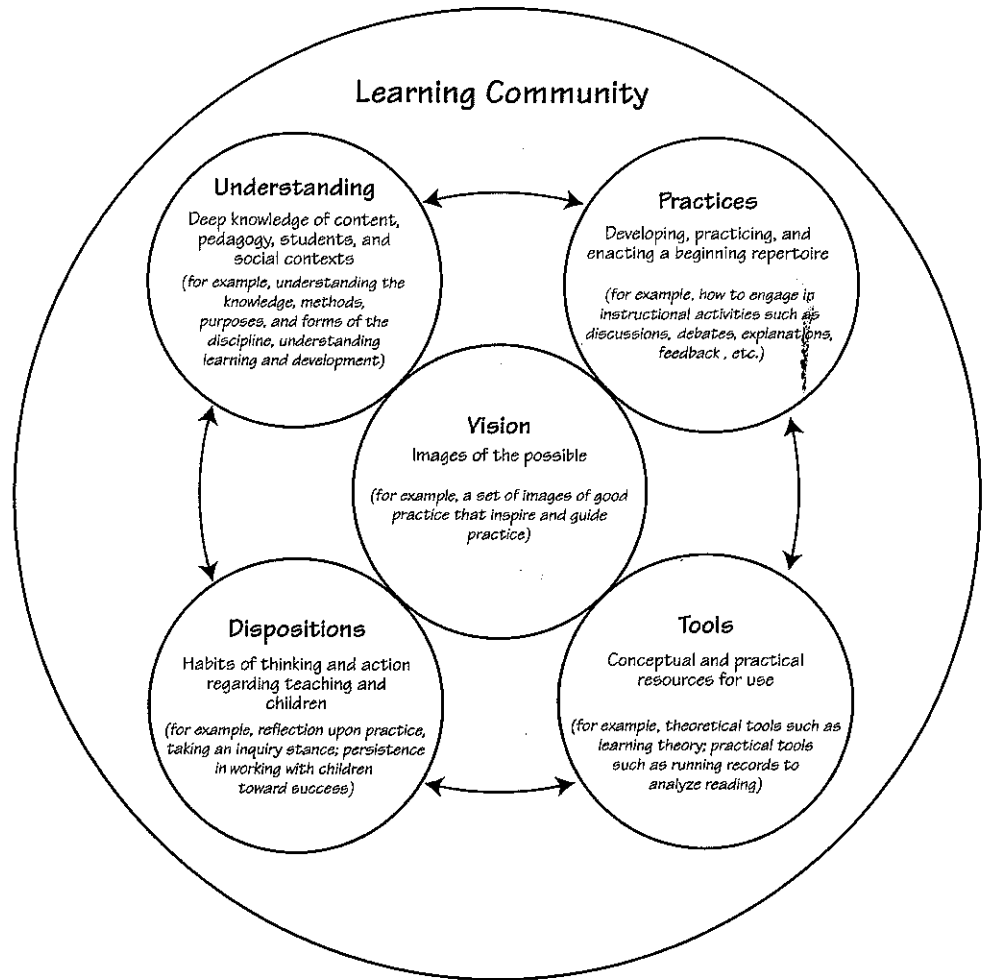


Figure 10.1 Learning to Teach in Community



As we discussed in Chapter Six, scholars agree that teachers need to have a deep knowledge, or *understanding*, of their subject and how to make it accessible to others (Shulman and Shulman, 2004). Making content accessible relies, in turn, on an understanding of students and their prior knowledge and experiences, and an understanding of the learning process. In their definition of disciplinary understanding, Boix-Mansilla and Gardner (1997) argue that deep disciplinary understanding includes understanding the knowledge, the purposes, the methods, and the forms of a subject. This model suggests that teachers need to possess a coherent and rich conceptual map of the discipline (knowledge); an understanding of how knowledge is developed and validated within different social contexts (methods); an understanding of why the subject is important (purposes); and finally, an understanding of how one can communicate knowledge of that subject to others (form). Communicating that knowledge effectively rests upon an understanding of students' thinking, experiences, development, and learning processes and of how curriculum can be constructed and classrooms managed to allow the learning process to unfold productively.

To put these understandings into practice, teachers also need to develop *tools* (Grossman and others, 1999)—conceptual and practical resources for use in the classroom. Grossman and colleagues make the distinction between conceptual and practical tools, noting that *conceptual tools* can include learning theories, frameworks, and ideas about teaching and learning (concepts such as the zone of proximal development or culturally relevant teaching). They suggest that *practical tools* include particular instructional approaches and strategies, and resources, such as textbooks, assessment tools, and other materials. Such tools help teachers to work smarter and to enact their intentions in practice.

These understandings and tools need to be integrated into a set of *practices*, or what Feiman-Nemser (2001a, p. 1018) has termed a *beginning repertoire* of classroom enactment. These practices can include a variety of instructional activities to promote student learning, such as explaining concepts, holding discussions, designing experiments, developing simulations, planning debates, and organizing writing workshops (Feiman-Nemser, 2001a). Practices also include activities like learning to design and carry out unit plans and daily lessons that build understanding; developing and implementing formative and summative assessments; and offering feedback that is constructive and specific. Feiman-Nemser points out that student teachers should be learning not only the content of these strategies, but “when, where, how and why to use particular approaches.”

In addition to understanding that is connected to tools and practices, teachers need to develop a set of *dispositions*—or habits of thinking and action—about teaching, children, and the role of the teacher. Teaching dispositions include the disposition to reflect and to learn from practice, which Cochran-Smith and Lytle have termed *inquiry as stance* (1999, p. 250). Dispositions toward children include determination and persistence that support the ability to

work with children until they succeed (Haberman, 1996), including the inclination to take responsibility for children's learning and the will to continue to seek new approaches to teaching that will allow greater success with students. Ladson-Billings, for example, has found that the belief that all children can succeed is a particularly important attribute of successful teachers of African American children (1994). Dispositions can also include a personal orientation (Haberman, 1996) characterized by appreciation of the need for good rapport and strong relationships with children, and of valuing, respecting, and caring for children.

This framework also takes into account the understanding that learning to teach occurs within communities (Cochran-Smith and Lytle, 1999). Professional communities include those found in classroom and clinical settings, such as the peers and faculty candidates work with in their coursework and in student teaching. Purposefully constructed professional communities that share norms and practices can be especially powerful influences on learning. In addition, teachers learn to teach in different kinds of local and regional communities that offer different kinds of opportunities for learning and practice. These settings—which can differ by culture, socioeconomic status, language diversity, political and social norms, and many other factors, pose distinctive challenges for teacher preparation. If their candidates are to be successful, teacher preparation programs must take into account the role of community contexts in children's learning and development and must respond to the particular diversity of children, schools, and communities served by their programs (Haberman, 1996).

This model of teacher learning also invites teacher educators to examine whether and how teachers' learning in school settings complements what is learned in university settings and vice versa (Grossman and others, 1999). Visions of good practice may differ in different settings, and different settings may emphasize or demonstrate different tools, practices, and even dispositions. This model helps demonstrate the importance of coherence—or at the very least, helps teacher educators consider the potential conflicts and differences their students may encounter as they learn to teach in different settings.

Finally, this framework helps us to think about how teacher educators can equip teachers in ways that address the three persistent problems of learning to teach that we identified earlier in this chapter. For example, Feiman-Nemser has pointed out that developing vision, or a set of images of the possible, is a critical step in addressing the problem of the apprenticeship of observation: "Unless teacher educators engage prospective students in a critical examination of their entering beliefs in light of compelling alternatives and help them develop powerful images of good teaching and strong professional commitments, these entering beliefs will continue to shape their ideas and practices" (2001a, p. 1017). Similarly, Cochran-Smith and Lytle point out that the disposition to take an inquiry stance can help teachers deal with the complexity of teaching;

they offer illustrations of "colleagues working together, bringing their perspectives to bear on inquiries into the complexities and messiness of teaching and learning" (1999, p. 279).

From this model, we can see that rather than conceptualizing the process of teacher development as moving in lockstep through a series of universal stages (regardless of setting or experiences), teacher educators are now emphasizing the interrelationships between teachers' *learning and development* and the *context* of teachers' learning. In turn, they are beginning to focus upon the particular features of those contexts and experiences that might help teachers develop these capabilities. This perspective parallels the development of learning theory over the past twenty years, as psychologists have moved from behaviorists' quest for a direct relationship between stimulus and response, to cognitive psychologists' exploration of how individual learning unfolds, to the broader focus offered by sociocultural theory on the contexts and conditions that promote learning.

Although some researchers have previously interpreted research on stage theories to imply that beginning teachers cannot profitably focus on student learning or curriculum issues until they have mastered classroom routines (Kagan, 1992), recent research supports Grossman's (1992) argument that new teachers have the potential to make fruitful strides on these matters even as novices, if they have the right kinds of support. In Chapter Eleven, we focus on some of the characteristics of teachers' learning experiences that appear to contribute to the development of teachers' visions, understandings, tools, practices, and dispositions.



## The Design of Teacher Education Programs

Linda Darling-Hammond, Karen Hammerness,  
with Pamela Grossman, Frances Rust, Lee Shulman

Given what we know about how teachers learn and develop, how can we create teacher education programs that are effective in enabling teachers to acquire the knowledge, skills, and dispositions that will allow them to succeed? In Chapter Ten, we examined the nature of teachers' learning and identified three particular problems in learning to teach: the problems associated with the "apprenticeship of observation," the difficulty of enacting teaching intentions, and the enormous complexity of teaching, which requires integrating many kinds of knowledge and skills in making judgments about how to pursue multiple goals with learners who have diverse needs.

In this chapter, we examine some central issues in curriculum and program design, including issues of content and coherence, as well as concerns about scope and sequence. We then explore some of the features of programs that appear to support teacher learning and development. Finally, we move to an exploration of long-standing and emerging pedagogies that are used in teacher education and their implications for teacher learning. These include the construction of clinical experiences, including student teaching and strategies like microteaching; the use of performance assessments and portfolios; analyses of teaching and learning; case methods; teacher inquiry; and autobiography.

Some of these approaches have been developed explicitly to address one or more of the "problems of teaching" we described earlier. Some have been designed to help new teachers develop and practice particular skills they will use in the classroom (the "efficiency" dimension of our adaptive expertise schema,

described in Chapter Ten). Others are designed to enable teachers to make judgments in the face of uncertainty, to innovate, and to be able to continue to learn from their practice; that is, to become adaptive experts. We explore the uses of these pedagogies for various purposes and goals of teacher education. We present them not as a "top ten list" of best strategies, but as examples of approaches that have gained currency because they are viewed as meeting particular needs or solving particular dilemmas in the learning-to-teach process.

Several lines of research have been helpful in outlining features of teachers' experiences that influence their learning. Many decades ago the Teacher Education and Learning to Teach (TELT) research program at Michigan State University explored the features of different teacher education programs that appear to change teaching practices and affect student learning outcomes. A series of case studies of exemplary teacher education programs by the National Commission on Teaching and America's Future provided empirical data about the nature of preservice teachers' learning experiences in programs viewed by graduates and employers as highly successful. Recent studies by researchers at the University of Michigan offer important large-scale data about the nature and features of professional learning experiences in the context of mathematics and science teaching reforms, whereas researchers at Ohio State University have examined the features of urban teacher education programs. In addition, a line of research from the University of Pennsylvania and the University of Wisconsin-Madison has documented how teachers can learn to generate knowledge about practice and to critically analyze the social contexts of schooling by working in teacher research, action research, or inquiry communities.

These studies and others suggest that, although there is no single best way to organize teachers' learning experiences in a preparation program, there are some common considerations in developing programs and a growing repertoire of strategies to draw upon in doing so.

## ISSUES OF PROGRAM DESIGN

### Connection and Coherence

In the recent past, many teacher education programs have been criticized for being overly theoretical, having little connection to practice, offering fragmented and incoherent courses, and lacking in a clear, shared conception of teaching among faculty. Indeed, conceptual and structural fragmentation is a consistent theme in studies of teacher education, especially those conducted throughout the 1980s (Feiman-Nemser, 1990; Floden, McDiarmid, and Werners, 1989; Goodlad, Soder, and Sirotnik, 1990; Howey and Zimpher, 1989; Zeichner and Gore, 1990). Programs that are largely a collection of unrelated courses without a common

conception of teaching and learning have been found to be relatively feeble change agents for affecting practice among new teachers (Zeichner and Gore, 1990). In a large-scale study of a wide range of programs, Goodlad (1990) found only a small number of programs that provided prospective teachers with opportunities to learn to teach consistent with a particular vision of teaching and learning.

Beginning in the late 1980s, teacher education reforms began to produce program designs representing more integrated, coherent programs that emphasize a consistent vision of good teaching. These programs seek to create stronger links among courses and between clinical experiences and formal coursework, in part by using pedagogies that are connected to classroom practices (Cabello, Eckmier, and Baghieri, 1995; Graber, 1996; Grossman, 1994; Grossman and McDaniel, 1990; Hammerness and Darling-Hammond, 2002; Oakes, 1996; Ross, 1989). These pedagogies emerged as programs were restructured around theories of professional learning that suggest that teachers need to do more than simply implement particular techniques; they need to be able to think pedagogically, reason through dilemmas, investigate problems, and analyze student learning to develop appropriate curriculum for a diverse group of learners.

Since then, a number of studies have offered empirical evidence that teacher education programs that have coherent visions of teaching and learning, and that integrate related strategies across courses and field placements, have a greater impact on the initial conceptions and practices of prospective teachers than those that remain a collection of relatively disconnected courses. In a set of studies of seven exemplary teacher education programs—programs in which graduates and their employers find they are significantly better prepared than most other beginning teachers—one of the most striking characteristics is that the programs are particularly well integrated and coherent: they have integrated clinical work with coursework so that it reinforces and reflects key ideas and both aspects of the program build toward a deeper understanding of teaching and learning. These programs are founded on a set of big ideas that are continuously revisited and hence more deeply understood. In addition, researchers found that the programs are built around a strong, shared vision of good teaching practice; they use common standards of practice that guide and assess coursework and clinical work; and they demonstrate shared knowledge and common beliefs about teaching and learning among university and school-based faculty (Darling-Hammond, 1999; for cases, see Darling-Hammond and MacDonald, 2000; Koppich, 2000; Merseth and Koppich, 2000; Miller and Silvernail, 2000; Snyder, 2000; Whitford and others, 2000; Zeichner, 2000).

These findings echo those of Howey and Zimpher (1989), who found in their study of teacher education that strong programs

... Have one or more frameworks grounded in theory and research as well as practice: frameworks that explicate, justify, and build consensus around such fundamental conceptions as the *role* of the teacher, the *nature* of teaching and

learning, and the *mission* of the school in this democracy . . . Programs embedded in such frameworks clearly establish priorities in terms of key dispositional attitudes and behaviors that are enabled and monitored in repeated structured experiences . . . Conceptually coherent programs enable needed and *shared* faculty leadership by underscoring collective roles as well as individual course responsibilities. Programs also contribute to more mutual endeavors in research and evaluation beyond the individual course level. (p. 242)

Similarly, a study of nine teacher education programs conducted as part of the Institute of Research on Teaching's Teacher Education and Learning to Teach (TELT) study found that more coherent programs, those with a strong vision of the type of teaching they were aiming to develop and consistent goals across courses, were more influential and effective in supporting student teacher learning and, for programs that emphasized constructivist learning theories, in helping new teachers understand the nature of teaching diverse populations (Tatto, 1996).

The importance of program coherence was further emphasized in the conclusions of a review of ninety-three empirical studies on learning to teach that examined efforts to change entering student teachers' beliefs, understanding, and behaviors with respect to teaching, learning, and students. The authors concluded that

In the short-term interventions, which in all but one or two cases involved a single course, we saw little reported impact. In the studies of year-long programs, however, it was much more common for the researchers to report positive effects. Duration of intervention, as such, was not the main variable. More significant was what a given time period enabled those in the program to do. In the short-term interventions there seemed a tendency for the other elements of the program to interfere with or even nullify the effects of the intervention . . . the hidden curriculum in this case emanates from the type of structured fragmentation Gore and Zeichner (1991) refer to. *Longer-term programs on the other hand were effective when the teacher educators maintained a consistent focus and message.* (Wideen and others, 1998, p. 151, emphasis added)

That coherence should be important is not surprising. Studies of learning suggest that learning is enhanced when learners encounter mutually reinforcing ideas and skills across learning experiences, particularly when these are grounded in strategically chosen content and conveyed through effective pedagogies (National Research Council, 2000; Bruner, 1960/1977, 1990). Repeated experiences with a set of conceptual ideas, along with repeated opportunities to practice skills and modes of analysis, support deeper learning and the development of expertise (Ericsson, Krampe, and Tesch-Romer, 1993; Gick and Holyoak, 1983). It is particularly important for learners to be able to use theories and practices that can help them make sense of the phenomena they experience

and observe rather than encountering mixed messages, contradictory theories, and ideas that are superficially conveyed. Tatto (1996) argues, however, that having a coherent program does not necessarily require that all faculty think alike, as diversity of thought contributes to rich learning experiences. She emphasizes, rather, that coherence should abide in the common ground among faculty around professional norms and expectations, as well as in the way that learning experiences are organized and conceptualized.

An effort to develop coherence in professional visions, norms, and expectations has implications for the policies used to staff and manage teacher education programs. In none of the highly coherent and impactful programs that were the subjects of the research noted earlier was it the practice to staff the program with large numbers of adjunct instructors who changed frequently. All of these programs had dedicated, long-term faculty members who worked out the program plan together and revisited it frequently. Although there were adjunct instructors employed in most of the programs, these were generally school-based faculty who taught or cotaught courses on a regular basis as members of the faculty team, rather than temporary employees who came and went without engagement in the intellectual life of the program. It is extraordinarily difficult to create a coherent program if much of the teaching is conducted by part-timers with different notions about what good teaching is and how to get there, and who have little opportunity to connect with what else is happening in the program.

In addition, the faculty in many of the programs cited earlier included many who themselves had been K-12 teachers before becoming university professors; some continued a teaching presence in schools as well as conducting research about teaching. Engagement in scholarship on curriculum, teaching, and learning was widespread among the university-based faculty and often extended to school-based faculty as well. This engagement supported a continuous dialogue about how to improve the program in light of the outcomes participants sought and observed.

### Organizing Content: Considerations of Scope and Sequence

Research suggests that several elements make a difference in the design of a teacher education program, including:

1. The *content* of teacher education—what is taught and how it is connected, including the extent to which candidates are helped to acquire a *cognitive map* of teaching that allows them to see relationships among the domains of teaching knowledge and connect useful theory to practices that support student learning;
2. The learning *process*—the extent to which the curriculum builds on and enables candidates' *readiness* and is grounded in the materials and



- tools of practice in ways that allow teachers' understandings to be enacted in the classroom; and
3. The learning *context*—the extent to which teacher learning is situated in contexts that allow the development of expert practice; such contexts include both subject matter domains and a community of practitioners who share practices, dispositions, and a growing base of knowledge.

### Content: The Subject Matters

Although much research has focused on the processes of teacher learning, evidence suggests that *what* teachers learn matters at least as much as how they learn. It is worth noting, first of all, that teachers learn different things from diverse preparation programs (Kennedy, 1998, 1999); that they feel differentially well prepared for specific aspects of teaching, depending on the kind of pathway into teaching they have pursued and program they have completed (Darling-Hammond, Chung, and Frelow, 2002; Imbimbo and Silvernail, 1999); and they vary in their sense of efficaciousness and effectiveness as a consequence of their learning experiences (Andrew, 1990; Andrew and Schwab, 1995; Cohen and Hill, 2000; Denton and Lacina, 1984; Desimone, Porter, Garet, Yoon, and Birman, 2002).

**Considering What is Taught.** This entire volume has sought to provide a rationale for critical content to be considered in initial teacher education. But do decisions about the content of the curriculum matter to what teachers know and can do? Though it may seem hardly worth stating, decisions about what gets taught in teacher education matter.

A number of large-scale studies have found relationships between teacher effectiveness and the quantity of training teachers have received in subject matter and content-specific teaching methods (Begle, 1979; Druva and Anderson, 1983; Ferguson and Womack, 1993; Goldhaber and Brewer, 2000; Monk, 1994; Monk and King, 1994). Although these studies were unable to examine the nature of this training, more recent studies have examined the substance of training as well as the amount. For example, Wenglinsky (2002) found that, in addition to subject matter background, more effective middle school math and science teachers had more professional preparation in how to work with diverse student populations (a combined measure of training in cultural diversity, teaching limited English proficient students, and teaching students with special needs), how to develop higher-order thinking skills, and how to use hands-on methods.

Although some studies have found effects from the amount or length of training, other research suggests that the duration of professional learning experiences is less influential in its effects on teacher practices than the content of the learning experience and the pedagogy used to teach that content. (For a review, see Kennedy, 1998.) Another set of studies that followed students

from eight different teacher education programs over time found, among other things, that the substantive content of programs made a difference for what teachers learned, and teachers prepared in programs with different content emphases learned to practice in different ways. For example, Kennedy (1999) reported that teachers who participated in "traditional" programs that emphasized management and the technical aspects of teaching tended to become more concerned about grammar, conventions, and prescriptive aspects of writing than about students' abilities to communicate their ideas. Similarly, Desimone and colleagues (2002) found that teachers who participated in what they called "reform-oriented" professional development programs tended to focus more upon students' own strategies and purposes. In a study examining the effects of professional development on teachers' instructional practices for 207 teachers in thirty schools, these researchers found that the content of the learning experience—opportunities to review student work, to obtain feedback on teaching, and its connection to other current activities—had strong effects on teachers' using those practices in their classrooms.

Other research suggests that when teachers have opportunities to interact with their subject matter in ways that they aim for their own students to do (such as engaging in writing workshops, getting feedback on their own writing, giving critiques), they are more likely to engage in those practices in their classrooms (Lieberman and Wood, 2003). Earlier studies suggest these differences in teaching practice matter for what students learn, and that certain kinds of teacher education and associated teaching practices appear to be more effective in bringing about basic skills learning, whereas other approaches to teaching and teacher development appear to be more effective in supporting more transferable learning of more complex higher-order skills (Brophy and Good, 1986; Crawford and Stallings, 1978).

Recognition that various practices are differentially useful for different learning goals has caused conceptions of the teacher education curriculum to change dramatically over the years. In the past, ideas about what teachers needed to know in order to teach were quite limited, often to a bit about classroom management and some "tricks of the trade" that might include how to present a lesson or how to introduce a lecture to one's students. Little emphasis was placed upon the importance of understanding how people learn or the design of curriculum and assessment. However, the growing emphasis on student learning—and teachers' responsibility for it—has stimulated the development of a curriculum for teachers that includes knowledge about influences on learning, including child development, social contexts of education, language acquisition, educational purposes, and aspects of pedagogy, along with specific building blocks for teaching, including content knowledge and how to teach it to diverse students at different stages, and the design of curriculum, classroom environments, and assessments.

**Creating a Cognitive Map of Teaching.** This volume has organized its discussion around a number of domains of knowledge for teaching. However, there is a danger in considering domains of the curriculum in a piecemeal fashion. Research suggests that when learners begin with a sense of the whole and are helped to see how ideas are connected and related, it deepens their understanding and allows them to integrate and use more of what they learn. Studies of memory and learning have found that students learn best when they have a *conceptual framework*, a *cognitive map*, or a *schema*, which enables them to organize categories of information and to recognize the relationship among concepts (Singley and Anderson, 1989), something that is much more difficult when they encounter an unrelated set of facts or a decontextualized introduction to discrete skills. Learners benefit from encountering a curriculum that is organized around the structure of a subject—the fundamental ideas, concepts, and issues of a field—noting that, as Bruner has argued, “to learn structure, in short, is to learn how things are related” (1960/1977, p. 7). Learning ideas within the context of an overarching conceptual framework not only helps students understand the “big picture” but also enables them to begin to recognize how all the individual ideas and theories fit together and relate to one another.

Having this structure explicitly described and explained is helpful for candidates' later learning. Clearly, for this to take place, teacher educators themselves must have worked out such a framework, both within and across courses, so that they can structure the content they are teaching and explain this structure to prospective teachers. Whereas at one time, teacher educators had not generally considered this kind of conceptual framework, recent standards from NCATE and other accrediting agencies require that programs develop and defend such a framework, thus increasing the likelihood that a shared understanding of how it all “fits together” will be held across the faculty. Going a step further formally to articulate this conceptual map to the teacher candidates themselves could help candidates better use the ideas they encounter.

One way to give novices a sense of the big picture is by explanation and illustration. As illustrated in Chapter Two, helping students develop and use a cognitive map (for example, the frameworks offered by the book *How People Learn* [Donovan and others, 1999]) can help in creating a basis for understanding and analyzing teaching and learning. Standards for teaching, such as those developed by the National Board for Professional Teaching Standards and by state certification agencies, also provide a schema that can help people understand what dimensions of teaching are important and how they are supposed to fit together. An experientially powerful way to help build a schema is to develop a sense from guided observations and engagement in practice of what the act of teaching is and what kinds of knowledge it may require before or while encountering an intellectual framework for interpreting practice.

For this reason, many programs now emphasize the importance of providing clinical experience early and throughout a teacher education program—so that prospective teachers develop an image of what teaching involves and requires. This allows them to begin to understand some of the challenges and thinking involved so that they can better make sense of how the ideas and theories they encounter in their coursework fit in the process of developing practice. Some teacher educators contend that providing novices with these early practicum experiences actually provides a conceptual structure for them to organize and better understand the theories that are addressed in their academic work. Some empirical work lends support to this claim, suggesting greater effectiveness on several measures of teaching for those with more and earlier clinical experiences (Denton, 1982; Denton, Morris, and Tooke, 1982; Henry, 1983; Ross, Hughes, and Hill, 1981; Sunal, 1980).

Helping candidates understand the bigger picture allows them to locate what they are learning. In addition, deep understanding involves *returning to central ideas and concepts* again and again, so that over time students are able to understand them more thoroughly and to appreciate their relationship to other concepts, ideas, and theories. Bruner's (1960/1977) notion of a "spiral curriculum" suggests that "a continual deepening of one's understanding of [key ideas] comes from learning to use them in progressively more complex forms." Bruner argues, "A curriculum as it develops should revisit these basic ideas repeatedly, building upon them until the student has grasped the full formal apparatus that goes with them" (p.13).

Research on learning and transfer supports this conception. Studies of transfer indicate that when ideas are taught in multiple contexts and include both attention to key principles and examples of how the ideas are applied (Biederman and Shiffrar, 1987), learners are more likely to be able to abstract the relevant and important features of key concepts and to develop more flexible knowledge about the topic at hand (Gick and Holyoak, 1983). This kind of learning is facilitated both by a curriculum that is coherent and reinforcing across settings and by an iterative design, like that described earlier in the Developmental Teacher Education Program at the University of California at Berkeley, where developmental concepts are reencountered over the four semesters of a sequence of developmental courses. (See "The Power of a Coherent, Purposeful Teacher Education Program.")

### **The Power of a Coherent, Purposeful Teacher Education Program**

Recent research on powerful teacher education programs not only suggests that new teachers may be able to move farther along in the journey of developing as a teacher more quickly than was previously thought, but also that it is possible for new teachers to learn much more about teaching and to attend to more aspects of the classroom than previously expected. For instance, in a case study of the University of California–Berkeley's Developmental Teacher Education Program (DTE), Snyder (2000) describes the classroom of a graduate who is a first-year teacher,

revising curriculum based upon her perception of her first-grade students' needs and interests. (See Chapter Nine.) She was able to revamp a "packaged curriculum" so that it engaged students in authentic science inquiry in which they recorded data, generated and evaluated hypotheses, and drew data-based conclusions. She was also able to create and use cooperative groups that balanced the racial, language, and ethnic diversity of her students and that encouraged students' leadership and interpersonal skills; scaffold work for students' different levels of language proficiency; and manage a classroom expertly so that students got their work done and could focus on the intellectual work at hand.

Snyder details a connection between this beginning teacher's skills, abilities, and approaches and the experiences DTE offers candidates in their teacher preparation programs. For instance, the DTE program involves students in four "core" seminars on human development in which students observe children's behavior in classrooms, evaluate their developmental levels, and offer explanations of children's learning and activity based upon theories of child development. Student teachers also take courses in subject matter teaching methods, which focus upon actively engaging students in "hands-on" science and mathematics. As Snyder explains, the purposeful links between the "core" and "methods" courses create a consistent, cumulative experience for the student teachers:

The content of the teaching methods is only half the story. The concurrent experiences provided in the core seminars link the study of development with the developmental demands of schools and school subjects. Introducing an activity that holds the interests of the students is only one half of the task. The other half is to identify the knowledge that is the target of the activity, and how this knowledge relates to previous and future understandings. To do this well requires an understanding of developing cognitive abilities within a particular content area, the kind of activities that promote their development, and how the same abilities are manifested in other areas of the curriculum. (2000, p. 108)

While DTE students are taking their courses, they are "always in classrooms simultaneously." In fact, students have five placements in different classroom settings (to vary by age groups as well as context) over the period of two years in their master's degree program, designed so that student teachers can begin to consciously integrate what they are learning across a variety of contexts—as well as to develop a rich understanding of what teaching practice can look like.

### The Learning Process

Considering how to introduce, work with, and revisit key concepts so that they are truly understood in ways that can be enacted and integrated into a sophisticated practice is no small problem. To do this well, teacher educators need to consider how to develop candidates' readiness for learning about particular aspects of teaching and how to bring to life theory in practice and practice in theory.

**Developing Readiness.** The concept of *readiness* undergirds approaches to scope and sequence, which involves identifying key foundational ideas and experiences that can lay the foundation for later learning. The starting point for

learning is always one's own prior knowledge, which must be connected in some way to new learning opportunities. As we have noted, in teacher education, candidates' prior knowledge poses both problems and possibilities that derive from the apprenticeship of observation they have all experienced. To both confront and use this prior knowledge, and to help candidates begin to realize that students will learn in different ways and have different experiences and perspectives, many preparation programs begin with candidates' personal experience as a productive way to trigger discussion of beliefs and their bases as well as to build more systematic knowledge. Some programs begin courses of study in teaching by engaging students in writing and sharing educational autobiographies and narratives, which can assist students in critically examining their own educational experiences and becoming ready to engage in professional pedagogical thinking.

As is true in children's development, considerations of readiness should not be used to restrict learning experiences but instead to guide decisions about where to start and how to scaffold learning so that students are *enabled* to develop critical skills and abilities. So, for example, although research on new teachers indicates that they do not often begin with a focus upon student learning and are instead concerned with their own actions in the classroom, novices can be helped to focus upon their students and the learning process through purposefully constructed experiences and coursework. Many successful teacher education programs begin their course of study in teaching with work on learning and development—hoping to start new teachers with a focus upon students and student learning from the beginning. Such courses require students very early on in their programs to observe children and to collect detailed information about their development and learning, as well as their learning contexts, thus bringing the child's experience and learning into focus.

Often assessments of student learning and related analyses of curriculum and teaching are a trigger for this process of focusing on learning and its relation to teaching decisions. Tying close observations and discussions of children's behavior and learning to analyses of teaching also allows novices to understand the relationship between curriculum plans and what children do. This helps them realize that their early concerns about control and classroom management will be as much addressed by their learning about effective planning and teaching as by their development of classroom rules or routines.

Finally, if teacher educators want novices to develop expert thinking and skills of enactment, they need to think about what the components of that skill set are, which understandings and skills are the foundation for others, and what experiences will be needed to help ensure that candidates can make progress toward the broader goals of the program. Just as in other kinds of cognitive apprenticeship, the processes of clarifying goals, articulating what the desired performance consists of and what it looks like, modeling and demonstration,

scaffolding, making thinking visible, and practice with coaching are essential. These processes need to be thought out across courses and clinical learning experiences, so that the overall curriculum for teacher education makes sense and adds up to readiness for teaching.

**Learning About Practice in Practice.** A key element for successful learning is the opportunity to apply what is being learned and refine it (National Research Council, 2000). Indeed, cognitive psychologists have found that “deliberate practice”—purposefully and critically rehearsing certain kinds of performances—is particularly important to the development of expertise (Ericsson and others, 1993). Whereas in the traditional undergraduate program, student teaching was often placed at the end of a program, as a kind of culminating experience, many programs are now entwining carefully designed clinical experiences early and throughout a program. Many teacher educators argue that student teachers *see and understand* both theory and practice differently if they are taking coursework concurrently with fieldwork. Research on the outcomes of teacher education efforts lends support to this idea that carefully constructed field experiences can enable new teachers to reinforce, apply, and synthesize concepts they are learning in their coursework (Denton, 1982; Denton and others, 1982; Henry, 1983; Ross and others, 1981; Baumgartner, Koerner, and Rust, 2002; Sunal, 1980).

It appears that novices who have some experience with teaching when they encounter coursework are more prepared to make sense of the ideas, theories, and concepts that are addressed in their academic work. For instance, in a study of 139 undergraduate teacher education students which compared those with thirty hours of field experiences ( $n = 61$ ) and those who had no early field experiences ( $n = 78$ ), Denton (1982) found that students with early field experiences performed significantly better in their methods courses than those without early field experience. The author concluded that early field experiences appear to increase learning and understanding about the principles of how to teach within a content area. It appears that when teachers have multiple opportunities to experience and study the relationship of theory with practice, their learning is enhanced.

It is not just the availability of classroom experience that enables teachers to apply what they are learning. Recent studies of learning to teach suggest that immersing teachers in the materials of practice and working on particular concepts using these materials has the potential to be particularly powerful for teachers' learning (Ball and Cohen, 1999; Lampert and Ball, 1998). As we discuss in the following section, examples of student work, artifacts from the classroom, videotapes of teaching and learning in classrooms, and cases of teaching and learning enable them to relate their coursework to classrooms and children. Ball and Cohen (1999) have termed this kind of learning “learning *in and from* practice.” Although this notion emphasizes the importance of preservice

teachers spending substantial time learning in real classrooms, Ball and Cohen explain that "learning in practice" does not necessarily mean that teachers need always to be in the classroom in "real time." It can also happen away from real classrooms, as long as the work being done is centered in authentic classroom materials:

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 opportunities 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 student 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 represent salient problems of practice. (1999, p. 14)

Learning in practice does not just happen on its own, of course. Though the importance of teaching experience has been reinforced by much research, it is important to recognize that practice alone does not make perfect, or even good, performance. Opportunities to connect practice to expert knowledge must be built into learning experiences for teachers. For example, a recent study of experienced teachers who elected to enter a preservice teacher education program after several years of teaching found that these teachers—far from feeling that they had learned everything they needed to know about teaching from experience—reported that the teacher education program taught them for the first time how to design productive curriculum, how to support struggling students, and how to assess, reflect on, and improve their teaching (Kunzman, 2002).

Studies of teachers' learning have suggested that when opportunities to reflect on their work and to connect it to research and theory are included in teacher education, teachers are better able to identify areas needing improvement, to consider alternative strategies for the future, and to problem solve and reason through pedagogical dilemmas (Freese, 1999; Hammerness and others, 2002; Laboskey, 1992). This is consonant with research that has found that unguided experience is not nearly as effective as inquiry tied to instruction that outlines the major concepts about which experience raises questions and provides examples. There is, as Schwartz and Bransford (1998) found, a "time for telling," which is especially effective when it joins strong conceptual explanations with specific examples and opportunities for application and analysis. This study and others have found that either "telling" alone or hands-on inquiry alone is less effective than both together. That is, in a recent resolution of the long-standing debates about "direct instruction" versus "indirect instruction," learning that involves deep understanding and transfer often



is a product of the skillful integration of both inquiry and explanation. This kind of conceptual learning also appears to support the application or enactment of the concepts studied.

Many studies from different lines of research on teacher learning provide examples of the importance of conceptual explanation about pedagogical approaches tied to direct opportunities for inquiry and application. In a number of experimental studies, teachers who have experienced targeted preservice preparation or professional development focused on effective teaching practices in specific content areas, including immediate opportunities to apply what they have learned, have produced student achievement gains that are significantly greater than those of comparison or control group teachers (Angrist and Lavy, 1998; Crawford and Stallings, 1978; Ebmeier and Good, 1979; Good and Grouws, 1979; Lawrenz and McCreath, 1988; Mason and Good, 1993).

One such study, aimed at improving classroom management strategies, randomly assigned experienced teachers to a group that received no training and one that received training in research-based classroom management strategies. The strategies were described in a text outlining the conceptual approach along with specific classroom-based approaches, and were taught with small-group problem-solving sessions based on classroom scenarios and supported by staff who could link the problems to concepts that had been studied. The training occurred in two sets of sessions about a month apart. The group that received the training demonstrated a significant increase in use of the management strategies and a significant decrease in student misbehavior coupled with an increase in student engagement and on-task learning, whereas no changes occurred for the control group (Evertson, Emmer, Sanford, and Clements, 1983). Experience alone had not taught teachers to enact these kinds of strategies. Key to what teachers said enabled their learning were both the increased awareness they gained from being exposed to a conceptual framework for organizing their classrooms and the concrete, specific, and practical suggestions for *how* to enact the theories, which they could immediately seek to apply in practice. They also felt they learned from sessions that allowed them to share problems and strategies with other teachers within the context of this conceptual framework as they attempted to implement the new ideas.

### Situating Learning in Productive Contexts

Finally, modern learning theory makes clear that expertise is developed within specific domains and learning is situated within specific contexts where it needs to be developed and from which it must be helped to transfer. Whereas programs of teacher education have sometimes focused on generic conceptions of knowledge and skill development, it now seems clear that, to be enacted, teachers' learning should be developed in ways that derive from and connect to the content and students they teach. At the same time, teachers need to learn how

to evaluate how aspects of what they have learned in one context may apply to new contexts or problems they encounter.

**Treating Content as Context.** Recent research in cognitive psychology suggests that expertise is developed within particular domains rather than generically. Because of this, current discussions of scope in teacher education now acknowledge the importance of content pedagogy (see, for example, Ball and Bass, 2000; Grossman and Stodolsky, 1995; Shulman, 1987). The importance and nature of content pedagogy have become better appreciated over time, especially as research on learning and teaching has focused within specific domains. This research suggests that much of what teachers must learn about teaching is particular to different content areas: prospective teachers need opportunities to wrestle with and think about how students learn concepts of ratio in mathematics or strategies for composing a persuasive essay in language arts. To help students understand the structure of the discipline, teachers need to examine what the key modes of inquiry and thinking are in the field and what key ideas are foundational in their field. To plan curriculum and address learning problems, they need to understand the common challenges and misconceptions learners often face in learning their subject.

There have also been a series of studies that suggest that professional development focused upon how students learn specific content within subject matter areas is helpful for teachers, particularly if the instruction is focused upon assisting students toward deeper conceptual understandings (Cohen and Hill, 2000; Desimone and others, 2002; Fennima and others, 1996; Ma, 1999). For instance, Cohen and Hill's study (2000), which included 595 California elementary school teachers, found that teachers who had opportunities to learn about particular mathematics curriculum in specific topic areas, and who worked together on teaching strategies for implementing this content, reported significant changes in their practice. They also found that these changes were associated with stronger student achievement.

**Learning in Professional Communities.** Research suggests that professional communities in which teachers share understandings about the nature of good teaching and work together to enact them provide particularly conducive settings for learning to teach. For example, in Desimone's previously cited study of teachers' learning, she and her colleagues (2002) found that a number of different elements in teachers' learning experiences had cumulative effects on changing teachers' practices. Not only did a focus on particular teaching practices—in this case, technology use, use of higher-order instructional methods, and alternative student assessments—increase teachers' use of those practices in their classrooms, the use of active learning strategies during professional development for teachers also increased use of the practices. The effects on practice were stronger

when teachers from a school, grade level, or department participated as a group and when the strategy was consistent with other practices in the teachers' classroom or school, thus suggesting the importance of a coherent approach to learning to teach and the potential power of communities of practice.

The effects of working within a community of practice on specific teaching strategies were noted in other studies we have reviewed (for example, Cohen and Hill, 2000; Evertson and others, 1983). In addition, emerging research suggests that opportunities to engage in "lesson study," where groups of teachers are engaged in joint observation, analysis, and evaluation of lessons, may have particular promise as a learning environment in which teachers engage in learning with their peers (Fernandez, 2002; Lewis and Tsuchida, 1998; Stigler and Hiebert, 1999).

Cochran-Smith and Lytle (1993; see also Cochran-Smith, 1991) have emphasized the role that communities of inquiry can play in preservice teacher's learning. In their description of Program START, a fifth-year program in elementary education at the University of Pennsylvania, they explain that the intention of the program is to invite student teachers into a group of teachers who are participating in "a community of school-based and university-based learners, and essentially a way of life as teachers, by emphasizing reform and inquiry across the professional lifespan" (pp. 65, 68). Rather than acting as "experts" to be imitated, cooperating teachers' roles are to help initiate new teachers into the experience of framing questions and engaging in inquiry into questions of teaching, learning, and schooling. Documentation of graduates' thinking and practices suggests that they learn both dispositions and strategies that carry forward from this experience.

The role of inquiry is viewed as critical where the goal of teacher education is a lifelong ability to learn *from* teaching, rather than a more contained image of learning *for* teaching that is expected to be complete within a short span of time. As Cochran-Smith and Lytle (1993) argue: "Learning from teaching ought to be regarded as the primary task of teacher education across the professional life span. By 'learning from teaching' we mean that inquiry ought to be regarded as an integral part of the activity of teaching and . . . classrooms and schools ought to be treated as research sites" (pp. 63-64).

In sum, contemporary research suggests that learning about teaching develops through participation in a community of learners where content is encountered in contexts in which it can be applied. Emerging evidence suggests that teachers benefit from participating in the culture of teaching—by working with the *materials and tools of teaching practice*; examining teaching plans and student learning while immersed in theory about learning, development, and subject matter. They also benefit from *participating in practice* as they observe teaching, work closely with experienced teachers, and work with students to use what they are learning. And this learning is strengthened when it is

embedded within a broad *community* of practitioners—experienced teachers, other student teachers, teacher educators, and students, so that they can gain access to the experiences, practices, theories, and knowledge of the profession.

Some programs have graduates who report significantly higher feelings of preparedness than their peers and are more highly rated by employers, who say they seek out these candidates because they are more effective in the classroom from their very first days of teaching. A recent study of seven such programs found common features among a group of large and small programs located in both public and private colleges and universities. These features include:

- A shared vision of good teaching that is consistent in courses and clinical work;
- Well-defined standards of practice and performance that are used to guide the design and assessment of coursework and clinical work;
- A common core curriculum grounded in substantial knowledge of development, learning, and subject matter pedagogy, taught in the context of practice;
- Extended clinical experiences (at least thirty weeks) that reflect the program's vision of good teaching, are interwoven with coursework, and are carefully mentored;
- Strong relationships, based on common knowledge and beliefs, between universities and reform-minded schools; and
- Extensive use of case study methods, teacher research, performance assessments, and portfolio examinations that relate teachers' learning to classroom practice (Darling-Hammond, 1999).

The same kinds of program features and pedagogical tools are noted in other studies of strong programs (see, for example, Cabello and others, 1995; Graber, 1996) that have documented outcomes on candidates' preparedness and performance.

### **PEDAGOGIES FOR PREPARING TEACHERS: EMERGING RESPONSES TO THE PROBLEMS OF LEARNING TO TEACH**

Although research on the pedagogies of teacher education is still in the very early stages of development (Grossman, in press), researchers are beginning to accrue some evidence about particular practices that seem to help teachers develop the visions, understandings, practices, and dispositions for teaching we have discussed. In addition to the usual tools of education—carefully chosen

readings and materials, well-crafted lectures, and descriptions or demonstrations of particular strategies—a number of pedagogies have emerged in response to the perennial problems of learning to teach, such as overcoming the apprenticeship of observation, supporting enactment, and managing the complexity of teaching. Many have been developed explicitly to aid in the professional problem of helping novices connect theory to practice, focusing upon learning *in* practice with the aid of both direct instruction and inquiry. This learning is increasingly lodged within communities of practice—cohorts of student teachers who learn together as well as placements with veteran colleagues within professional development schools and other collegial work settings. These communities are used as supports for learning and problem solving. Finally, some of these pedagogies appear to be especially useful for developing adaptive expertise.

None of these pedagogies is a silver bullet; each has particular strengths and limitations, and all can be implemented well or poorly and, in the execution, differentially capture key elements that are needed to make them productive. As Grossman (in press) notes, the utility teacher educators might attach to different approaches depends on how they view the goals of teaching:

The plethora of pedagogies used in teacher education reflects, in part, the different conceptions of teaching practice that exist. Teaching has been described as a set of techniques or behaviors, as a form of clinical decision-making, as a cognitive apprenticeship based in disciplinary understanding, as a therapeutic relationship, and as a process of continuing inquiry. Each of these views of the nature of practice might lead to a different form of pedagogy in professional education. Training models such as micro-teaching, for example, are closely linked to the technical view of teaching, in which teachers are trained in the discrete skills of teaching. Case methods have been advocated to develop teachers' capacities to make informed decisions in the face of uncertainty, while others advocate the use of teacher research to prepare teachers to adopt an inquiry-stance into their teaching.

In their work on models of teaching, Joyce and Weil (2003) have noted that different approaches to teaching are associated with different models of and goals for learning; for example, information processing, social learning, personal development, or behavioral training. From this perspective, teachers can learn to choose strategies in relation to their objectives, drawing from multiple models as they balance the many goals they hold for student learning and development. Although there is quite a bit of evidence that different goals for students are best pursued through distinctive strategies, the pedagogies we discuss here are in many cases useful across different models of teaching, although the content of what is modeled, analyzed, evaluated, or attempted would change from one approach to another.

We begin with clinical experiences, including *student teaching*, as a signature pedagogy that is increasingly tied to coursework throughout the entire experience and forms the spine of most strong programs. Strategies like student teaching and its laboratory counterpart, *microteaching*, were developed to deal with the problem of enactment. We also address new ways to represent practice that include structured *performance assessments and portfolios* demonstrating particular abilities. In particular, we discuss the kinds of portfolios that ask teachers to demonstrate their practice and represent it through videotapes, commentaries, and artifacts, such as those created as part of the National Board for Professional Teaching Standards, some states' licensing portfolios, and the preservice Performance Assessment for California Teachers [PACT]. These performance assessments are even more systematic than student teaching in terms of what teachers are supposed to learn, in that they introduce certain practices that must be demonstrated, and these practices are evaluated against standards. These assessments add analytic expectations for student teachers' learning. They must learn to make sense of practice and learn from it, with a particular focus on understanding how their teaching decisions have enabled or undermined student learning.

We then turn to another way to examine one's own and others' practices and to connect theory and practice, through *analyses of teaching and learning* and *case methods*, which seek to make the process of student teaching more purposefully analytic and coursework more practice-based. Case methods are one way to analyze teaching and learning that deals explicitly with the problem of theory-practice connections. There are also other tools for analyzing teaching and learning that include videotapes and multimedia platforms (sometimes these are video "cases," sometimes demonstrations of particular techniques, sometimes sites for broader inquiry) and structured examinations of student work. The notion of "common texts" for studying teaching ties these together.

Another kind of text or narrative is the *autobiography*, used as a tool to confront the "apprenticeship of observation," to bring insight to one's own motivations and experiences, to learn from reflecting on experience, and to learn from others by sharing experiences. As discussed in Chapter Seven, Teaching Diverse Learners, this kind of experience can help teachers recognize that people learn differently and that many have had different learning experiences than they have, thus broadening their perspectives.

And finally, whereas autobiographies and cases typically look backward, we address *practitioner inquiry* that looks forward. It allows teachers to use these analytic tools to pose new questions that guide their current and future practice and that enable them to take a larger view, even beyond the classroom. Inquiry approaches deal with the problems of enactment (action), theory-practice connections (research), and personal experience or apprenticeship in one's own classroom. In each of the following sections, we briefly describe

the pedagogy and its rationale, relevant research findings, and key features of the pedagogy that seem important in supporting student teachers' learning.

### Construction of Clinical Experiences

Perhaps the most pervasive pedagogy in teacher education is that of supervised student teaching, which has long been acknowledged as having a profound impact on student teachers. Many teachers have claimed that the most important elements in their professional education were the school experiences found in student teaching (Guyton and McIntyre, 1990). Yet at the same time, current conceptions of the purposes of student teaching, what it should encompass, and how it should be constructed, differ markedly from institution to institution. Typically, the ideal has been a placement in which student teachers are supported by purposeful coaching from an expert cooperating teacher in the same teaching field who offers modeling, coplanning, frequent feedback, repeated opportunities to practice, and reflection upon practice while the student teacher gradually takes on more responsibility.

However, the actual experience of student teaching is highly variable both within and across programs, depending on how cooperating teachers are recruited, whether and how the process is guided, and what the expectations are for performance by both the novice and cooperating teacher. The experience can range from the most passive version of student teaching in which the prospective teacher sits in the back of a classroom and simply observes and, perhaps, grades papers, to a kind of "trial by fire" in which the student teacher takes over a more experienced teacher's classroom immediately and teaches alone, sometimes with little coaching, coplanning, or conceptual framework to guide what he or she does in the classroom. The practices of cooperating teachers may reflect the program's goals and contemporary research on learning and teaching to widely varying degrees.

Some internship models that aim for prospective teachers to become teachers of record fairly quickly are designed to offer and build on student teaching experiences, whereas others replace student teaching with independent teaching, usually with the expectation of close mentoring. Like the variability noted in student teaching, the mentoring intended for internship models has been found to materialize to varying degrees, sometimes intense and other times erratic, sometimes by teachers in the same field and other times not, sometimes with the opportunity of some modeling and demonstration and other times without novices having the chance to see modeled what they are trying to create in practice, with differing outcomes for candidate performance (Shields and others, 2001; California State University, 2002a).

Very different practices arise out of different conceptions and traditions, which frequently are unexamined. Programs have different ideas about what clinical experiences ought to accomplish, when and where they should occur

and over what period of time, whether and how they should relate to coursework, and how many different settings a given student teacher should experience. Different strategies bring with them different benefits and limitations. For example, having multiple different settings for practice teaching may allow student teachers more explicitly to consider what kinds of generalizations can and cannot be made across settings and how contexts make a difference in the choice of strategies and how to use them. At the same time, multiple short placements reduce the opportunities to deeply understand a group of students and a kind of practice, and may make it difficult for student teachers to learn how what came before influences what is happening now in the classroom. Shorter placements also place burdens on schools without the compensating benefits of the contribution a more seasoned student teacher (for example, one who spends an entire semester or year) can make, thus making it more difficult to maintain strong partnerships for practicum placements.

There is no one right answer to these trade-offs, and there are many ways of resolving them appropriately. Whatever the design of student teaching chosen, it is important that prospective teachers' clinical experiences are constructed with careful consideration of *what* the experience should be like and *why*. For instance, decisions to design a program that will place students in more than one student teaching setting should take into account both the benefits (experiences with different students; exposures to a variety of approaches to teaching; opportunities for observing multiple models of good practice) and the downsides (student teachers cannot stay long enough to get to know the children well; to work through a whole cycle of practice; or to see the beginning and end of the learning cycle of a group of learners), so that the program can optimize the experiences offered.

**Factors Influencing the Success of Student Teaching.** Theories of learning can inform decisions about how to construct clinical experiences for teachers. Key features of cognitive apprenticeships include the importance of *clarity about the goals* of the experience, including the performances and practices to be developed; *modeling* of good practices by more expert teachers in which teachers *make their thinking visible*; frequent *opportunities for practice* with continuous *formative feedback* and *coaching*; multiple opportunities to *relate classroom work to university coursework*; *graduated responsibility* for all aspects of classroom teaching; and structured opportunities to *reflect* (Collins, Brown, and Holum, 1991). Use of these principles may help address some of the challenges inherent in the apprenticeship of observation by making expert teachers' work and thinking more "visible" to novices, while also providing multiple opportunities for novices to practice, get feedback, and gain more responsibility as they continue to develop expertise themselves.

There is some evidence that both the amount and timing of student teaching affect outcomes. Whereas student teaching has been often meager—averaging



only about ten to twelve weeks for many programs—recent research suggests that more supervised experience with graduated responsibility can have positive effects on candidates' practice and self-confidence (Orland-Barak, 2002; LaBoskey and Richert, 2002; Baumgartner and others, 2002). For instance, some studies indicate that having a longer student teaching experience, especially when it is concurrent with theoretical coursework, is associated with stronger outcomes for teachers in terms of ability to apply learning to practice (Chin and Russell, 1995; Sumara and Luce-Kaplar, 1996).

A related finding is that program designs that include more practicum experiences and student teaching, integrated with coursework, appear to make a difference in teachers' practices, confidence, and long-term commitment to teaching. For example, Andrew (1990) found, in his study of a comparison sample of 144 graduates of a five-year program and 163 graduates of a four-year program within the same institution, that graduates of the five-year program, who had more extensive student teaching integrated with their coursework rather than a dollop added to the end of undergraduate courses, tended to spend more time evaluating their students, used a broader repertoire of teaching strategies, and conferred more with colleagues and parents than graduates of the four-year program. In a related study that examined the performance and leadership behaviors of a random sample of 1390 graduates from eleven universities with both four- and five-year teacher education programs, the authors found that graduates of five-year programs, which typically offered a full year of student teaching along with earlier practicum experiences, were more likely to enter and remain in teaching than those of four-year programs (Andrew and Schwab, 1995). The teachers from the five-year programs felt more confident in their teaching and were viewed by their supervisors as more competent.

Some studies have gathered data on the relationships between extended clinical experiences for new teachers and their students' learning. In a set of studies of two groups of secondary student teachers with different amounts of teacher education preparation within the same institution, the group of teachers with more extensive field experiences and more education coursework produced stronger student gains on pre- and post-tests of learning within curriculum units designed by the student teachers (Denton and Lacina, 1984; Denton, Morris, and Tooke, 1982; Denton and Smith, 1983; Denton and Tooke, 1981). Some research also suggests that student teachers who have a number of opportunities to teach in a variety of classrooms seem to start off their first years on more solid ground than those with only one limited clinical experience because they have a stronger "frame" with which to interpret important concepts in teaching and learning (Baumgartner and others, 2002).

The nature of the support during clinical work appears to be critical in enabling preservice teachers to make sense of their experience and learn from it. Just as cognitive research has found that children can learn more when supported within their "zone of proximal development" by more capable peers

or adults, so it appears that teachers learn more when supported by expert practitioners. There are a series of studies that suggest that powerful learning does not usually occur from letting a teacher “sink or swim” in her practicum experience (Feiman-Nemser and Buchmann, 1985; Britzman, 1991) but that guidance and mentorship as well as peer support are important for novices to receive the modeling, coaching, and feedback they need (Rodriguez and Sjostrom, 1995; Sparks, 1986). Novices often attest to the important role that school and university supervisors play in the teaching and learning of practice, although there is little systematic research on exactly what the most effective supervisors do. The following example provides some suggestive insights from one successful mentor’s experience in helping support student teachers’ developing practice, and thinking about practice.

### **Strategic Mentoring Practices**

Feiman-Nemser (2001b) examined the practice of an exemplary supervisor, Pete Frazer, and found several key strategies that characterized his work. Frazer described his role as balancing the tension between student teachers’ personal expression and maintaining a sense of professional accountability that comes from understanding good practice, and he discussed several strategies:

- “Finding openings”—noticing fruitful topics that are not obvious to a novice teacher but that lead to key issues that all teachers need to think about.
- “Pinpointing problems”—helping student teachers develop language to frame and articulate problems in practice so they can get help and support. He also helps them understand the relationship between the typical problems of novices (discipline and management) and curriculum and instruction—for instance, how discipline problems can actually arise when tasks are unclear or directions to children are inadequate.
- “Probing novice’s thinking” involves asking student teachers to carefully articulate their rationales and thinking. In doing this, Frazer helps novices develop an analytic stance and more precise language, so that they can explain themselves to others as well as inquire into their own practice.

Other strategies include the supervisor’s effort to recognize signs of growth on the part of the student teachers and to keep focused upon the students in the teachers’ classrooms, to direct discussion to students and their learning.

Sources of coaching and feedback can come from supervisors, teacher education instructors, cooperating teachers, other veteran teachers, and even fellow candidates. The availability of modeling is extremely important. For example, Rodriguez and Sjostrom (1995) found that the presence of experienced teachers who could model multicultural pedagogy was a central factor in whether new teachers enacted such pedagogy for themselves in their own classrooms. Another study found that training in a set of teaching techniques followed by peer coaching and observation was even more effective in producing changes

in practice than was training alone (Sparks, 1986). This work is consistent with findings from sociocultural theory suggesting that learning from peers who provide feedback can be valuable (Vygotsky, 1978).

The integration of the student teaching experience within the institution also matters with respect to the issues of coherence. Student teaching placements that are consistent with a program's vision of teaching are more powerful learning sites, as are those where there is shared understanding among student teachers, cooperating teachers, and university supervisors about the purposes and activities of the student teaching placement (Koerner, Rust, and Baumgartner, 2002; LaBoskey and Richert, 2002). This shared understanding can be encouraged not only through the traditional means of contact and collaboration but also through on-line technologies that provide examples of teaching artifacts and videotapes of classrooms, feedback and coaching from school- and university-based faculty, and opportunities for joint inquiry. (See "Technological Innovations to Support Coaching and School-University Connections.")

### **Technological Innovations to Support Coaching and School-University Connections**

The Teaching Tele-Apprenticeship Program (TTA) uses e-mail to go beyond the typical face-to-face apprenticeship model (Thomas, Larson, Clift, and Levin, 1996). The program offers preservice teachers an on-line network consisting of university faculty, supervisors, and mentor teachers. Preservice teachers use the network to receive timely responses to their questions and to engage in extended discussions around issues related to teaching and learning. TTA's goal is to use networking to create an interinstitutional context for teacher learning. The Inquiry Learning Forum (ILF) also aims to support communication among these different professionals, providing a variety of contexts in which participants can share ideas (Barab and others, 2001). ILF is developed around the metaphor of a school in which users enter different "rooms" to engage in activities. In the "library" for instance, participants can access lesson plans and unit materials. They can also visit "classrooms" to view video excerpts of lessons from teachers who have chosen to make these materials available to others. In the "lounge," participants take part in discussions concerning inquiry-based teaching strategies. Research on ILF has shown it to be a productive environment for developing communities of learners and for bridging the worlds of the university and the classroom (Barnett, Harwood, Keating, and Saam, 2002).

*Source:* Gomez, Sherin, Griesdorn, and Finn (2003).

Indeed, research has indicated that school placements that are not aligned in significant ways with the philosophy and practice of the teacher education program can be problematic for the student teacher, the cooperating teacher, and university faculty. For example, some research has documented how even teachers who already have some teaching experience, have strong content knowledge, and felt strongly about the teaching vision of the program have trouble

with placements that are not consistent with the program and are often unable to apply what they are learning (LaBoskey and Richert, 2002). Similarly, in a study of student teachers in a field-based teacher education program (in which students spend four of five quarters in teaching placements), Goodman (1985) found that despite the program's emphasis on diversity, if student teachers did not experience a similar emphasis in their teaching settings they were unable to overcome their lay assumptions about knowledge, learning, and children.

Feiman-Nemser and Buchmann (1985) have termed this disjuncture the *two-worlds* pitfall. Student teachers, already in a difficult position of little authority and status in the classroom, cannot easily overcome the disconnect between the ideas about teaching and learning espoused in their program and those they encounter in the classroom—leaving them feeling confused, guilty, and discouraged about their ability to be successful teachers. Furthermore, negative examples—that is, placements in which student teachers are encouraged *not* to teach in the ways that their cooperating teacher does—appear not only to be ineffective, but they may actually interrupt student teachers' learning (Knowles and Hoefler, 1989; LaBoskey and Richert, 2002).

These studies suggest that consistency and coherence are important to learning in a community: learning to teach with faculty and peers who are all providing reinforcing messages about the nature of teaching, learning, and students provides a particularly strong experience of learning.

**Professional Development Schools.** One strategy that purposefully seeks to construct communities of practice and a greater degree of coherence between university coursework and student teaching experiences is the professional development school (PDS), a descendant of the laboratory schools of the early twentieth century. The intentions for such schools are consistent with learning theory that emphasizes inquiry about practice in learning communities. In these sites, new teachers learn to teach alongside more experienced teachers who plan and work together, and university- and school-based faculty work collaboratively to design and implement learning experiences for new and experienced teachers, as well as for students (Holmes Group, 1990). Ideally, the university program and the school develop a shared conception of good teaching that informs their joint work. Developing sites where state-of-the-art practice is possible has been one of the difficulties in constructing clinical experiences for prospective teachers: quite often if novices are to see and emulate high-quality practice, especially in schools serving low-income students and students of color, it is necessary not only to seek out individual cooperating teachers but to develop the quality of the schools where prospective teachers can learn productively and to create settings where advances in knowledge and practice can occur. Thus PDSs aim to develop *school practice* as well as the *individual practice* of new teacher candidates.

Key features of professional development school models include more extensive experience within the school for prospective teachers, more frequent and sustained supervision and feedback, more collective planning and decision making among teachers at the school as well as among school- and university-based faculty, and participation in research and inquiry about teaching and teacher education by novices, veteran teachers, and university faculty (Abdal-Haqq, 1998, pp. 13-14; Darling-Hammond, 1994). These features were found to be present in most of a group of "highly-developed" PDSs (Trachtman, 1996). In addition, novices in these schools had a schoolwide, rather than just an individual classroom, experience and worked with school teams on such tasks as curriculum development, school reform, and action research. In most of these sites, university faculty were teaching courses and organizing professional development at the school-site and were also involved in teaching children.

As of 1998, the American Association of Colleges for Teacher Education estimated that there were more than 1,000 professional schools in forty-seven states in operation across the country (Abdal-Haqq, 1998). However, like all reform ideas, the ideals of professional development schools have been unevenly implemented, and many sites that have adopted the label have not created the strong relationships or adopted the set of practices anticipated for such schools (Fullan, 1995; Mantle-Bromley, 2002). Thus there are competing findings about whether teachers trained in schools with this label are better prepared (see, for example, Ridley, Carlile, and Hurwitz, 2001). However, where the difficult work of creating these practices has been accomplished, there is evidence of positive consequences for teacher preparation, veteran teacher learning, teaching practice, and student learning.

In terms of preparation, studies of highly developed PDSs have suggested that teachers who graduate from such programs feel more knowledgeable and prepared to teach (Gettys, 1999; Sandholtz and Dadlez, 2000; Stallings, Bossung, and Martin, 1990; Yerian and Grossman, 1997). For instance, Yerian and Grossman (1997) compared three cohorts (thirty candidates) who learned to teach in a middle-level PDS program with forty candidates who had been in a traditional teacher education program. Surveys and interviews suggested that graduates of the PDS program felt more knowledgeable about early adolescents; more prepared to teach at the middle level; and better able to make connections between ideas in coursework and their clinical experiences. In contrast, graduates from the traditional program felt significantly less sure of their ability to support student learning by using different teaching strategies.

Similarly, in a longitudinal study of four cohorts of graduates from a PDS-based program at the University of California-Riverside, Sandholtz and Dadlez (2000) found that graduates of the PDS program rated their preparation for teaching and their sense of self-efficacy higher than graduates of traditional teacher preparation programs in the area. In a follow-up study based upon

interviews with graduates of the PDS program where she worked, Freese (1999) found that the graduates felt that learning about reflective practice alongside experienced teachers and close collegial relationships with teachers and faculty were factors that helped them to implement that reflective practice in their own teaching.

There are only a few studies that have tried to evaluate outcomes of PDS participation for teaching practice and student achievement, but these few are promising. In studies polling employers and supervisors, PDS graduates were viewed as much better prepared than other new teachers (Hayes and Weatherill, 1996; Mantle-Bromley, 2002). Veteran teachers working in highly developed PDSs have reported changes in their own practice and improvements at both the classroom and school levels as a result of the professional development, action research, and mentoring that are part of the PDS (Trachtman, 1996; Crow, Stokes, Kauchak, Hobbs, and Bullough, 1996; Houston Consortium, 1996; Jett-Simpson, Pugach, and Whipp, 1992).

Although research is still limited on the relationship between teachers' experiences in PDSs and the impact on their teaching practice (Zeichner, Miller, and Lieberman, 1997), recent studies suggest some of the promise of programs that embed learning in communities of practice. Comparison group studies have found that PDS-prepared teachers have been rated stronger in various areas of teaching, ranging from classroom management and uses of technology to content area skills (Gill and Hove, 1999; Neubert and Binko, 1998; Shroyer, Wright, and Ramey-Gassert, 1996).

A small set of studies has documented gains in student performance and achievement tied directly to curriculum and teaching interventions resulting from the professional development and curriculum work professional development schools have undertaken with their university partners (see, for example, Frey, 2002; Gill and Hove, 1999; Glaeser, Karge, Smith, and Weatherill, 2002; Fischetti and Larson, 2002; Houston and others, 1995; Judge, Carriedo, and Johnson, 1995; Wiseman and Cooner, 1996). In a study of a group of PDS sites associated with a midwestern university, not all of them implemented the same kinds of PDS work and not all experienced achievement gains: those that experienced student achievement gains were the ones that implemented high quality professional development efforts at the site (Marchant, 2002).

Although research has also demonstrated how difficult these partnerships are to enact, many schools of education and some districts are moving toward preparing all of their prospective teachers in such settings, both because they allow prospective teachers to learn to teach in professional learning communities—and this concern can be addressed more consistently and systematically through PDS partnerships—and because such work is a key to changing school cultures so that they become more productive environments for the learning of all students and teachers (Abdal-Haq, 1998).

Sc  
work  
vide  
scho  
inad  
ple,  
2002  
ers c  
scho  
dent  
cuss  
to le  
broa  
know  
scho

Lea  
lear  
ties.  
As  
teac  
plac  
pers  
the  
imp  
ing  
gro  
pla  
the  
and  
ove  
ilie  
the  
wo  
ula  
ult  
199

tive  
tov  
an  
An

Some universities have sought to create PDS relationships in schools that are working explicitly on an equity agenda, either in new schools designed to provide more equitable access to high-quality curriculum for diverse learners or in schools where faculty are actively confronting issues of tracking, poor teaching, inadequate or fragmented curriculum, and unresponsive systems (see, for example, Darling-Hammond, 1994; Darling-Hammond, French, and Garcia-Lopez, 2002; Guadarrama, Ramsey, and Nath, 2002). In these schools, student teachers or interns are encouraged to learn about and participate in all aspects of school functioning, ranging from special education and support services for students, to parent meetings, home visits, and community outreach, to faculty discussions and projects aimed at ongoing improvement in students' opportunities to learn. This kind of participation helps prospective teachers understand the broader institutional context for teaching and learning and begin to develop the knowledge and skills needed for effective participation in collegial work around school improvement throughout their careers.

**Learning in Community Settings.** Some teacher educators also point out that learning in a community of practice may actually involve multiple communities, including the local community in which students and their families live. As we describe in Chapter Seven, *Teaching Diverse Learners*, a number of teacher education programs have incorporated community-based internships or placements in non-school organizations to help prospective teachers gain new perspectives on local communities and an appreciation for the lives of students they will encounter in their classrooms. These kinds of placements provide important opportunities beyond those that student teaching provides for preparing all teachers to work with students who come from a variety of diverse backgrounds. As Gallego (2001) notes: "Though teacher education students may be placed in schools with large, culturally diverse student populations, many of these schools are isolated from and not responsive to their local communities and therefore do not provide the kind of contact with communities needed to overcome negative attitudes toward culturally different students and their families and communities (Zeichner, 1992). Indeed, without connections between the classroom, school, and local communities, classroom field experiences may work to strengthen preservice teachers' stereotypes of children, rather than stimulate their examination (Cochran-Smith, 1995; Haberman and Post, 1992), and ultimately compromise teachers' effectiveness in the classroom (Zeichner, 1996)" (p. 314).

Studies of experiential community-based learning opportunities for prospective teachers have noted that they can develop positive dispositions and attitudes toward children and families that carry over to teaching. For example, Stachowski and Mahan (1998) surveyed 109 participants in cultural immersion projects—the American Indian Reservation project and the Overseas Project—and found that

those involved gained important insights about teaching and diverse cultures, including that community people can be sources of cultural knowledge and learning, an aspect of what Luis Moll and colleagues (1992) have described as "funds of knowledge." Bondy and Davis (2000) studied prospective teachers who tutored youth living in a local public housing neighborhood and found that these experiences challenged teachers to use forms of caring to help them develop relationships with children different from themselves. Similarly, Boyle-Baise (1998) found that, as a result of service-learning experiences, teachers expressed a willingness to adapt curriculum and instruction to meet students' needs or interests. A survey of 136 preservice teachers who participated in a service-learning project in human service agencies as part of a course in the teacher education program at the University of Nebraska-Kearney, found significant attitudinal growth in the areas of caring, empathy, willingness to serve others, and higher expectations for students (Pothoff and others, 2000).

As a group these studies suggest that clinical experiences in community settings may be valuable in the preparation of teachers to work with students from diverse backgrounds. The results of some studies caution, however, that experienced guidance is a critical element to ensuring that such forays can support learning. Without such guidance, experiences in communities different from one's own may actually reinforce stereotypical assumptions and beliefs about diverse children (Boyle-Baise, 1998; Duesterberg, 1998). As Dewey (1938) argued, "The belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative. Experience and education cannot be directly equated to each other. For some experiences are miseducative" (p. 25). Seminars and readings, along with regular reflections that occasion feedback from a thoughtful guide, can help make community experiences genuinely educative so that they expand rather than restrict novices' notions of what is possible in teaching diverse learners.

Gallego (2001) details another strategy with potential for occasioning useful insights about students and how they might be taught. In a program that coupled a community-based experience (in an after-school literacy development program) with a school-based practicum, candidates were given the opportunity to compare and contrast what they learned about their students and the possibilities and constraints of different settings for supporting students' growth. These contrasts, considered in reflections and discussion sessions, offered not only insights into students' capabilities and their learning contexts, but also provoked new ways of thinking about teaching strategies in both settings, strengthening teachers' repertoires in the process.

Some programs involve prospective teachers in school and community studies to help them understand the contexts for student learning and become more prepared to work both as culturally responsive teachers and change agents in those contexts. Strategies include mini-ethnographies focused around specific questions regarding practices or conditions in the community or potential



curriculum connections between aspects of the community life and school (see, for example, Sleeter, 1995; Tellez and others, 1994; Moll and others, 1992), community interviews (Stachowski and Mahan, 1998), and studies that illuminate inequalities in various services available to socioeconomically different communities (see, for example, Martin, 1995) or in the school resources allocated to different students (Darling-Hammond, French, and Garcia-Lopez, 2002).

Cochran-Smith (1995) outlines an approach to school and community studies that involves teams of prospective teachers in gathering information about the school and community in which they are working (through statistical reports, photographs, community newspapers, visits to community centers, back-to-school nights, parent-teacher meetings, and interviews of school personnel, students, parents, and community members), which they pool to provide an overview of the school and community that is presented to others in the teacher education course. This helps them become cognizant of the different perspectives of members of the community, differences between and among schools and communities, and issues surrounding the relationships between schools and communities. With this broader view of the contexts of education, teachers can become more ready to think about the ways in which community contexts and school decisions influence students' opportunities and their own roles.

### Performance Assessment Strategies

Although clinical experiences provide the opportunity for practice, they are often rather haphazard opportunities that may not ensure either the occasion to encounter certain kinds of teaching problems or the impetus to develop and demonstrate particular skills. More structured performance tasks can be used to afford these opportunities and provide another way to deal with the problem of enactment by enabling student teachers to demonstrate certain practices and analyze them (along with their effects).

An early attempt to create such targeted opportunities was the practice of microteaching. More recent efforts to create contexts for developing important skills have evolved under the banner of performance assessments and the related practice of developing portfolios that require the demonstration of certain practices and the analysis of those practices and their effects. These strategies operate at different "grain sizes" with respect to the elements of teaching to be worked out, demonstrated, practiced, and analyzed. For example, in the case of microteaching, the skills are typically quite specific and discrete (for example, using a specific style of questioning), whereas in the case of performance tasks, they are typically more multifaceted (for example, developing a lesson plan or giving a lecture that requires an understanding of a number of features of content pedagogy). Portfolios are even more comprehensive, integrating knowledge and skills across the multiple domains of teaching (for example, planning, teaching, assessing, evaluating student work, reflecting, and adapting plans in response to these findings). Through portfolios, teacher educators aim to help teacher

candidates analyze and evaluate materials from their own teaching; they can also assist prospective teachers in collecting such materials in ways that provide grist for deeper analysis and reflection.

**Microteaching.** Microteaching was launched in the 1960s to help novices focus their attempts at learning teaching skills on discrete areas to be tackled one at a time. It was thought to permit greater concentration and reduce anxiety for novices. As Gage (1978) described it: "Microteaching is scaled-down teaching—teaching conducted for only five or ten minutes at a time, with only five or ten students, and focused on only one or a few aspects of the teacher's role. The teacher tries, say, reinforcing participation or making an assignment, rather than undertaking the whole of what a teacher does, in all its multifaceted complexity, with a class of 30 for a whole period of instruction" (p. 47).

Microteaching was frequently conducted with teacher education peers and sometimes with K-12 students in lab settings or classrooms. It often included modeling of practices to be learned, opportunities to plan and teach a brief lesson using these practices, videotaping and feedback, and sometimes, additional practice. A number of studies found that microteaching led to an increase in candidates' ability to demonstrate the desired behaviors or practice in the microteaching sessions, although the literature also includes some counterexamples, which are sometimes explained by the particular microteaching model or type of feedback attempted (see reviews by Copeland, 1982; MacLeod, 1987). There is some modest evidence about effects on student achievement. For example, in one recent study where microteaching produced greater implementation of teaching behaviors associated with instructional clarity, the students taught scored higher on end-of-lesson tests (Metcalf, 1989). The few studies that have evaluated whether teachers were able to transfer microteaching practices to real classroom settings and call upon them successfully in the context of other activities have produced mixed results. (See, for example, Harris, Lee, and Pigge, 1970, for evidence of successful transfer of skills developed in microteaching to an elementary science classroom lesson, and Andersen and Antes, 1971, for evidence suggesting little correlation between microteaching using classroom management skills aimed at creating a positive environment for culturally diverse children and later classroom performance as a teaching intern.) Sounding a theme that echoes throughout the microteaching literature, Andersen and Antes (1971) noted that, in their study, prospective teachers rated the opportunity to teach and receive feedback as strengths of microteaching, but the "artificial situation" afforded by microteaching as a weakness. In explaining the lack of correlation between microteaching evaluations and later teaching evaluations, the authors commented:

Microteaching is a technique that focuses on a single aspect of teaching for a limited time with a small number of learners . . . In the classroom, the interns were called upon to use the whole complex of skills and techniques

n also  
e grist  
  
focus  
e at a  
ty for  
ing—  
or ten  
1. The  
r than  
plex-  
  
s and  
luded  
ef les-  
tional  
1 can-  
teach-  
which  
feed-  
some  
recent  
ehav-  
1 end-  
ether  
ttings  
luded  
ice of  
ience  
; little  
red at  
room  
ut the  
study,  
ck as  
each-  
ching

necessary in this type of situation. Therefore, the outcomes may not stem from the lack of value of microteaching, but from the differences between the two situations. These differences lay in the number of people and the amount of time involved, and in the dissimilarity between the ability to practice on skills effectively under controlled conditions and the ability to practice a whole complex of skills in a variable situation. In this study the difficulty lay not in microteaching, but in the limited value it seemed to have for the general act of teaching. (pp. 148-149)

The complexity of teaching may be one aspect of the transfer difficulty for strategies like microteaching. Efforts to secure some of the benefits of microteaching while reducing the artificiality of the task have led to broader kinds of performance assessments, described in the following section.

Another important factor may be the extent to which students develop an analytic framework for what they are trying to accomplish that is available to them when they are trying to apply strategies in action. A number of studies have examined alternatives to microteaching that are more cognitive than behavioral in nature (see Gage, 1978, pp. 48-52). One intriguing study compared microteaching to cognitive discrimination training. Using a random assignment experimental design, Wagner (1973) examined the teaching performance of college students who had been given a brief explanation of student-centered questioning techniques and then asked to use them in microteaching, as compared to another group given the same explanation followed by discrimination training in which they were asked to watch videotapes of teachers and code the teachers' responses, with explanations integrated into the coding process. A third group received the brief explanation of the teaching goal and taught without the benefit of either discrimination training or microteaching (which provided a review of one's own videotape with feedback between teaching attempts). Contrary to the conventional wisdom that emphasizes the importance of practice, the students who were given stronger conceptual preparation and discrimination training, which also included models of practice that could be analyzed, actually performed significantly better when it was their turn to demonstrate these questioning techniques than the students who had had the opportunity to try the techniques twice through microteaching with videotaping and feedback. The microteaching group, which lacked both models and the opportunity to gain a deeper conceptual understanding of the behavior they were trying to develop, performed no differently from the control group.

This early study provided an indication that close analyses of other teachers' practices can be a potentially productive learning opportunity for teachers seeking to develop specific pedagogical skills. As we discuss later, there are a number of recent efforts to create opportunities for such close analyses of teaching and, increasingly, of learning as well.

**Performance Tasks.** Many teacher education programs have developed specific performance tasks they require of students (for example, planning and delivering a lesson, delivering a lecture, conducting a Socratic seminar, completing and teaching a curriculum unit) around which they organize coursework and practice opportunities. In addition, assessments for teacher licensing and certification have begun to incorporate performance elements that require teachers to complete specific tasks; for example, to perform and videotape specific tasks in the classroom (for example, conduct a whole group discussion about a work of literature), write a commentary and reflection, and, in some cases, provide evidence about student work and learning.

Performance tasks are often structured as public exhibitions of knowledge and practice that are measured against shared, public criteria, with opportunities for feedback. One of the most highly developed systems of performance assessment was created at Alverno College, which uses frequent exhibitions of performance, benchmarked against standards, as the foundation for much of its work. The tasks, which are designed to measure eight general education abilities (expected of all students in the college) and five advanced education abilities (specific to teacher education students), require candidates to apply their knowledge and skills in realistic contexts. From their very first day at Alverno when they make a videotape of themselves giving a short speech to their peers (a task which will be repeated and reevaluated later) to a much later assessment in which a group is evaluated while they collaboratively plan a lesson together, students are constantly assessed in relation to these abilities (Zeichner, 2000).

Virtually every assignment and assessment begins with reference to the criteria for the performance being developed and ends with an opportunity for candidates to evaluate their own work. The end result, as judged by cooperating teachers, college supervisors, employing principals, and candidate assessments of their preparation, is a set of graduates who are highly self-reflective and practically well prepared for sophisticated practice in the classroom (Zeichner, 2000).

In addition to specific acts of teaching, performance tasks can evaluate planning skills, such as the development of lessons or units in light of key ideas about instructional design (as discussed in Chapters Five and Eight). These kinds of planning activities can also engage student teachers in designing, choosing, implementing, and analyzing formative and summative assessments of student learning, and can evaluate how candidates revise their teaching in light of what they discover about student learning—the kinds of teaching skills that go far beyond the demonstration of specific classroom behaviors that characterized early performance assessments, such as microteaching.

As with other strategies, the benefits of performance assessments are not automatic. They depend on choosing tasks that represent important skills and abilities and on integrating such assessments into a well-developed set of learning experiences. Exhibitions also require a clear and focused set of goals that

adequately reflect the complexities of the tasks to be accomplished and consider their outcomes for teaching and learning. They demand assessors who are themselves expert in the areas of work being developed. Absent these characteristics, exhibitions can be merely performances without standards, unfocused activities that provide little guidance or evaluation for developing high levels of skill. The fate of competency-based teacher education as used by many teacher education programs in the 1970s is one illustration of this potential problem. Although well developed in some institutions (Alverno's ability-based curriculum was, for example, an outgrowth of the competency movement of that time), in others the techniques of specifying and observing performances became disconnected from a well-grounded base of theory and from standards for performance. Consequently, the exhibitions of behavior often became little more than tallies of actions that were not well-assessed in terms of their appropriateness for a particular purpose or context or for their influences on students' learning. Assessments that overcome these difficulties integrate exhibitions with a well-conceptualized set of standards; analysis of teachers' goals, contexts, and intentions; and a view of the larger conceptual picture of teaching and learning for both prospective teachers and their students (Darling-Hammond and Snyder, 2000).

An example of a comprehensive approach to performance assessment for pre-service teachers can be seen in the Performance Assessment for California Teachers (PACT) project's Teaching Event, described in detail in Chapter Eight, which involves student teachers in designing a unit, teaching a set of lessons within the unit, and then completing a series of performance assessments related to this segment of instruction. These include developing an assessment plan for the unit, analyzing work samples from individuals over time and for the class as a whole at one point in time, reflecting on their teaching outcomes, and revising their plans. Early evidence about this assessment, as well as the Connecticut beginning teacher assessment and the National Board for Professional teaching standards portfolio from which it was adapted, suggests that teachers feel they learn a great deal from participating in the process of developing and scoring these kinds of tasks (Athanases, 1994; Tracz, Sienty, and Mata, 1994; Tracz and others, 1995; Pecheone and Chung, 2004; Pecheone and Stansbury, 1996; Sato, 2000). (Although these assessments are called portfolios, we include them here because they require specific performances that are scored according to standardized criteria, rather than allowing for the selection of various kinds of artifacts by a candidate who assembles a more customized collection, like the portfolios we describe in the next section.)

Part of the reason these kinds of performance assessments appear to stimulate learning is that they focus teachers' reflection on professional standards in specific content areas that are used for scoring and that candidates are asked to consider when evaluating their own practice. Thus teaching practices can be

reviewed, revised, and discussed in light of some shared, common language about teaching and learning, which helps ground and focus the work. Furthermore, the standards serve as public criteria by which performances can be measured.

**Teaching Portfolios.** Teaching portfolios represent a special case of performance assessments. Portfolios are typically collections of materials and artifacts from teachers' work, and often include statements about the teacher's educational philosophy; descriptions of the teacher's theories of classroom organization and management; curriculum materials (such as unit and lesson plans, assignments, assessments, and daily logs) and reflections; articles or papers; videotapes and commentary about instruction; and samples of student work (with or without teacher feedback). They can also include photographs, videotapes, or audiotapes of classroom activities ranging from bulletin boards and displays, to taped lessons, to conferences with students (Darling-Hammond, Wise, and Klein, 1999). Some portfolios also include documents that require additional analysis on the part of the teacher, such as teacher logs or journals, detailed descriptions or analyses of lessons or student work, and reflections on the outcomes of teaching activities. Portfolios can include documents that derive from the evaluations of others: notes by an observer of teaching, peer or administrator recommendations, student evaluations, and so on (Bird, 1990; King, 1990; Athanases, 1994; Haertel, 1991).

Proponents suggest that teacher portfolios provide opportunities for robust documentation of practice and for candidate reflection. As an assessment tool, they can provide a comprehensive look at how the various aspects of a teacher's practice—planning, instruction, assessment, curriculum design, and communications with peers and parents—come together. As a tool for learning and reflection, portfolios can alleviate what Lee Shulman (1998) has referred to as "pedagogical amnesia"—a disease endemic to teaching at all levels. Pedagogical amnesia, characterized by the inability to record and recall the fruits of teaching experience, is one symptom of the multidimensional complexity of teaching. So much happens so fast that it is a blur. Portfolios help make teaching stand still long enough to be examined, shared, and learned from. In some teacher education programs, teachers create portfolios on CD-ROMs or DVDs, including short videos of classroom teaching or of their students working together.

A growing number of teacher education programs are using portfolios to aid students toward three central purposes: in reflecting upon their growth and learning, in demonstrating their learning and development, and in seeking employment after graduation. For example, portfolios are often used to help prospective teachers document and demonstrate their growth as new teachers. To that end,

prospective teachers are asked to select pieces of work that represent their learning, their growth, and their reflections about their teaching and their learning. In some cases, portfolios are also used to help new teachers demonstrate to their instructors (or others) that they are ready to teach and to demonstrate how they have met certain standards. For example, the "goal and evidence" portfolio required in the University of Southern Maine's ETEP program (described in Chapter Eight, Assessment) requires student teachers to organize their final portfolios around the five "Gorham Outcomes," and each student teacher presents evidence of the outcomes in his or her teaching practice (Whitford and others, 2000).

Some research illustrates how portfolios organized around specific goals and standards can support teachers' development of a conceptual framework about teaching, as well as the refinement of practices, by providing structured opportunities for teachers to document and describe their teaching and their learning; to articulate and demonstrate their professional knowledge and expertise; and to reflect upon what, how, and why they teach (Bird, 1990; King, 1990; Lyons, 1998). Advocates argue that the portfolio provides a structure for teachers to pull together important materials, and to reflect upon their meaning and their own learning. For instance, Richert found that the use of portfolios at Mills College, when developed and discussed with peers, helped student teachers recall classroom experiences more fully and accurately, and helped center their reflections on the context and content-specific aspects of their teaching (Richert, 1990). Lichtenstein, Rubin, and Grant (1992) found that portfolios designed to connect theory and practice enabled teachers systematically to examine and gather information about their classroom practices, students, and schools and helped connect their research-based professional coursework with the demands of the classroom.

In a study of teacher candidates who had constructed teaching portfolios as the central assignment in their master's degree program, Borko and others (1997) found that participants identified multiple benefits for the portfolio process. The most frequently cited benefit was that it enabled them to identify their strengths and limitations as new teachers, and to identify ways to improve. Some students felt that the portfolio helped them reflect upon individual students and ways to support their learning. These candidates, too, noted that the portfolio prompted them to make connections between the theories in their coursework and their classroom practices. Other researchers have found that candidates feel they learn from the process of constructing a portfolio, but that the benefits vary depending on the guidance and feedback they receive from instructors or supervisors (Borko and others, 1997; Wade and Yarbrough, 1996).

It is likely that the benefits of portfolios depend on the design of the portfolio and the learning context within which it is used. It is reasonable to expect that the benefits described earlier would not be experienced for portfolios that are

just collections of random work created without standards, structured expectations, or guided opportunities for reflection. An additional challenge in using portfolios is that the three common purposes of portfolios (sharing growth and reflection; demonstrating professional competency; and seeking employment) are not always complementary, and, in many programs, one portfolio is used to serve all three purposes. However, the different purposes can create tensions for student teachers, as they imply different audiences and different criteria for selecting materials (Mosenthal, Daniels, and Hull, 1993). Furthermore, lack of clarity about purposes can also result in a portfolio that is merely a collection of everything a student teacher completed in his or her program. Such a portfolio tells evaluators "everything and nothing at the same time" about what a student teacher has learned and understood (L. Shulman, personal communication). Developing a portfolio that is rich and meaningful for both the teacher who assembles it and the assessors who review it requires careful honing of purpose, criteria, and implementation.

### ANALYSIS OF TEACHING AND LEARNING

The performance assessments described earlier provide, among other things, opportunities for candidates to analyze and reflect on examples of teaching and products of student learning. Such analyses can provide structured, systematic means for closely examining the process and outcomes of teaching and learning using real classroom artifacts—student work samples, videotapes of classroom practice (and other multimedia approaches to capturing learning and teaching), video "cases," and curriculum materials. The use of these materials enables student teachers and teacher educators to jointly examine and analyze a "common text" to which all have access. The conception of a common text is a key idea that unites analyses of videotapes of teaching, analyses of student work samples, and analyses of portfolio or performance assessment entries. Typically, teacher educators engage students in examining both texts produced by *other* teachers and in analyzing and exploring their *own* materials—samples of work from learners in their own classrooms, curriculum they are developing, and videotapes of lessons, and other records of their evolving practice as new teachers.

#### Analysis of Teaching

During this past decade, a number of researchers and organizations have been engaged in efforts to document teaching in richer and more dynamic ways, and many of these efforts have involved the use of videotape and multimedia. These include videotapes of mathematics teaching and associated artifacts of student work; teacher plans and reflections mounted in a hypermedia platform by Deborah Ball and colleagues at the University of Michigan (Lampert and Ball, 1998); the

Can  
tice  
arou  
org/  
Jam  
Such  
be a  
stud  
Te  
and  
enab  
pract  
ing t  
ers a  
langu  
and C  
Fu  
pract  
in the  
focus  
pace .  
(Ball  
video  
tors to  
fine-g  
a chai  
appre  
may n  
sharec  
ferent  
discus  
of the  
teache  
uate te  
video,  
Seco  
shifting  
of prac  
or that  
layerec  
teacher  
and to



Carnegie Foundation's Knowledge Media Lab that documents the teaching practice of accomplished teachers through Web-based collections of materials organized around their classroom strategies and inquiries (<http://www.carnegiefoundation.org/KML/index.htm>); and the videotapes and analyses of teaching developed by James Stigler and colleagues as part of the TIMMS study (Stigler and Hiebert, 1999). Such efforts to document teaching have led to sets of rich materials that can now be accessed by teacher educators for joint viewing, reviewing, and analysis by students and their peers.

Teacher educators who are developing pedagogies for the analysis of teaching and learning contend that analyzing teaching artifacts has three advantages: it enables new teachers time for reflection while still using the real materials of practice; it provides new teachers with experience thinking about and approaching the complexity of the classroom; and in some cases, it can help new teachers and teacher educators develop a shared understanding and common language about teaching (Ball and Cohen, 1999; Lampert and Ball, 1998; Friel and Carboni, 2000).

First, although learning to teach must be situated within the real materials of practice, learning to teach does not necessarily need to occur solely in real time in the "crucible of the classroom." These classroom-based experiences not only focus learning upon that particular classroom but also—because of the rapid pace and complex nature of teaching—make reflection and deliberation difficult (Ball and Cohen, 1999). However, using classroom-based materials (lesson plans, videos of teaching, student and teacher work samples) enables teacher educators to represent true problems of practice under circumstances that allow for fine-grained analysis. Through repeated viewings or readings, candidates have a chance to debate, discuss, and revise initial conceptions. They address the apprenticeship of observation by providing examples of practices that candidates may not themselves have experienced and may have a hard time imagining. A shared text can also elicit different perspectives (student teachers may notice different things and interpret events in different ways), ultimately supporting discussion, argument, and reflection that can facilitate deeper understandings of the teaching and learning process. Using materials in this way helps new teachers develop skills of careful and reasoned analysis, and the ability to evaluate teaching and learning. Another use of these materials, whether print or video, is as demonstration or illustration of key ideas or principles of practice.

Second, these materials capture more of the complexity and the constantly shifting, nonroutine nature of the classroom. Because these materials are records of practice from real classrooms—either the student teachers' own classrooms or that of other teachers—they embody many of the challenges and the multi-layered nature of classroom teaching and learning. In essence, because new teachers need to understand what is occurring in a classroom on multiple levels, and to make decisions based upon information from numerous sources,

analyzing these artifacts gives them opportunities to evaluate teaching and learning in ways that represent and reflect its complexity. They learn to make sense of situations from a variety of perspectives—to be able to analyze an incident from a developmental point of view, an instructional point of view, a curricular point of view, and so on. Using multimedia examples and other classroom artifacts can support that kind of thoughtful and complex analysis.

Finally, using materials from real classrooms in teacher education courses provides more opportunities for prospective teachers and teacher educators to develop a common language and shared understanding about what they are examining. One key challenge teacher educators face is that sometimes language, theory, and concepts used in teacher education are understood by their students in quite different ways (as discussed in Chapter Ten; see also Kennedy, 1999). Using classroom artifacts can help give concrete instances that enable new teachers and teacher educators to point out particular and specific instances that they feel instantiate ideas or theories, and to debate, deliberate, and discuss these with common images in mind. Rather than using language and theory divorced from “real practice”—they can explore and analyze student and teacher actions in ways that surface implicit assumptions and make ideas more open to examination and probing. In this way, teacher educators can have a better understanding of what new teachers are thinking—enabling them to address the problems of misconceptions about teaching and of enactment. (See “Using Video Analysis to Reflect On and Improve Teaching,” below, for an example of how video and computers are helping support such connections in a teacher education program at Northwestern University.)

#### **Using Video Analysis to Reflect On and Improve Teaching**

In NU-TEACH (Northwestern University’s Alternative Certification Program), coordination between university faculty and mentor teachers in the support of new teachers is an important goal. Toward this end, interns complete a series of video-based assignments that draw on explicit feedback from mentor teachers, university faculty, and program peers. In the context of these assignments, video excerpts from the interns’ summer teaching placements literally cycle between the school and the university, becoming a resource for learning about and reflecting upon teaching and for constructing multiple interpretations of classroom practices. In this way, the video technology provides an important media through which participants in teacher education become better connected, and better prepared for creating a professional discourse about teaching and learning. The NU-TEACH community uses video and computers to support analyses of teaching and to create strong connections between university and school-based experiences.

*Source:* Gomez, Sherin, Griesdom, and Finn (2003).

Although the more elaborated, multimedia versions of these approaches are fairly new, research over many years has found that prospective teachers learn more

about particular teaching strategies (Carlson and Falk, 1990; Overbaugh, 1995) and are more able to implement these specific strategies with students after they have seen them modeled by other teachers via videotape (Goldman and Barron, 1990; Wagner, 1973), especially when these observations are supported with discussions, readings, and frameworks to guide their analyses. Thus these new technologies offer promise for supporting both teachers' metacognitive learning about teaching and their actual practice.

### Analysis of Learning

The analysis of learning is an even more recent pedagogy in teacher education than the analysis of teaching. Analysis of learning can be focused upon numerous issues that arise in the teaching and learning process, from challenges of student engagement, student understanding, and assessment to questions about the framing of subject matter curriculum. A student teacher involved in a class focused upon classroom management or teaching strategies might be asked to examine a videotape of a teachers' classroom and focus upon the ways that the teacher does and does not engage students, connect the subject matter to her students' interests and assess learning; and perhaps to make note of the students' responses to the "moves" the teacher makes to support, deepen, and develop understanding about the particular topic at hand. A student teacher involved in a course on learning or development might compare and contrast the work samples of two students, examining the work of both to ascertain the degree of understanding the students display; the misunderstandings or misconceptions; and to propose supports that might be provided to help the students develop their understandings further. Candidates might also analyze and compare and contrast the work of particular students—for instance, English language learners and native English speakers; late adolescents and preadolescents; different students with special needs—to help them focus upon the needs and strengths of different children as well as the challenges involved in each child's learning.

Because the close analysis of teaching and learning did not become widespread until the 1990s, research on the effects of this pedagogy upon teachers' learning is still in the early stages. However, there are a set of studies underway that are documenting what teachers learn from analyzing and exploring video "cases" (Sherin, 2001; Sherin and Han, 2002) and that explore what teachers learn from using multimedia (Lampert and Ball, 1998). For example, Sherin and Han (2002) examined the discourse topics of practicing mathematics teachers who were participating in a "video club" in which teachers met once monthly to discuss videotapes of the teacher members, and found changes in both *what* the teachers discussed as well as *how* they discussed it. They found that over a period of ten months, teachers became increasingly focused upon examining student thinking (as opposed to their own teaching and their own pedagogy);

and by the seventh meeting, discussions of students' conceptions of mathematics accounted for 86 percent of the time as compared to less than 15 percent in the first several meetings. Furthermore, they found that the nature of the teachers' discussion of student thinking changed over time. Participating teachers' discussions of student thinking developed from simply stating what the student said (which characterized the discussions of student thinking in the early meetings) to examining the meaning of students' comments and methods and beginning to synthesize and generalize comments about the nature of the students' learning. Finally, teachers also shifted from offering alternative teaching strategies to achieve fairly general ends that were independent of students' learning (for example, get the students to talk more) to suggesting teaching moves or strategies that would push students' understanding further.

### Case Methods

Many professions, including law, medicine, and business, help candidates bridge the gap between theory and practice—as well as to develop skills of reflection and close analysis—by engaging them in the reading and writing of cases. Proponents of case methods argue that cases offer a unique form of learning that supports both systematic learning from particular contexts as well as from more generalized theory about teaching and learning. Cases can allow for the exploration of theories and dilemmas as they occur in real classrooms (Colberg, Trimble, and Desberg, 1996). Shulman (1996), for example, has argued that case pedagogies are particularly important in that they enable new teachers to connect theory with practice:

*“What is this a case of?”* is a locution whose purpose is to stimulate students to initiate the intellectual work that makes cases powerful tools for professional learning. They must learn to move up and down, back and forth, between the memorable particularities of cases and the powerful generalizations and simplifications of principles and theories. Principles are powerful but cases are memorable. Only in the continued interaction between principles and cases can practitioners and their mentors avoid the inherent limitations of theory-without-practice or the equally serious restrictions of vivid practice without the mirror of principle. (1996, p. 201)

Students' case writing efforts can motivate their own learning, serve as instructional material for others, and provide “antidotes to the dangers of overgeneralization” (Shulman, 1992, p. 3).

Typically, cases are accounts of teaching and learning that pose dilemmas, provide careful descriptions of contexts, and share evidence or data about outcomes of classroom situations. In teacher education programs, student teachers can *read and analyze* cases, discerning and reasoning through dilemmas, and propose strategies to respond to problems. Students can also *write* cases, learning to represent their experiences, and analyze them through the lens of theory,

so that they and others can learn from them. There are a number of perspectives that cases may take: some begin with a focus upon subject matter, probing how teachers design instruction to help students master content; some focus upon students, developing teachers' ability to observe and analyze evidence of learning and development; and still others focus upon culture, assisting teachers in examining students' lives, backgrounds, and contexts, helping prepare teachers to understand the challenges inherent in teaching students from diverse backgrounds and communities (Darling-Hammond and Snyder, 2000).

As illustrated in the chapters on Development (Chapter Three) and Teaching Diverse Learners (Chapter Seven), case studies of children and adolescents can engage new teachers in collecting and analyzing data in order to better understand student learning, developmental progress, special needs, and the influences of particular contexts. Cases can be used not only to study teaching and learning at the level of classrooms, but also at the level of the school and community. For example, case studies of children or adolescents can involve teachers in shadowing students throughout their school day, illuminating how many aspects of the school's organization, assignment policies, social context, and teaching practices affect the student. These strategies can help prospective teachers understand the broader school environment and how its policies and practices can create or undermine opportunities, or differentially meet students' needs. These kinds of cases can also involve home visits, parent interviews, and neighborhood visits to place the student in the context of the family and community, thus helping the prospective teacher gain a more holistic view of the student's experience and the ways in which many variables affect him or her (Roeser, 2002; Darling-Hammond and Snyder, 2000).

As we described in Chapter Five, Educational Goals and Purposes, case analyses of curriculum and teaching can focus upon the development of instruction and the dilemmas or "breakdowns" that can occur in teaching a particular concept or idea. These analyses can examine teachers' intentions, students' learning, and the relationship (or sometimes disconnect) between the two. Dilemma cases, such as those used by Kleinfeld at the University of Alaska (1998) (described in Chapter Seven, Teaching Diverse Learners), Levin at the University of North Carolina (2002), and Whitcomb at the University of Denver (2002), are often used to illustrate long-time teaching challenges—such as moral dilemmas, interpersonal difficulties, or cultural differences—and to engage teachers in deliberating, problem solving, and analyzing these challenges. They are also used to prepare teachers for the uncertainty and complexity of teaching in diverse classrooms.

Many gaps in the research on the case method still exist (Grossman, in press; Merseth, 1999). However, research has provided some initial evidence that cases can help students develop reasoning skills, allowing prospective teachers to more accurately identify important issues and to more thoughtfully analyze an

educational dilemma (Harrington, 1995; Kleinfeld, 1992). By analyzing and coding the first and last of four case drafts for twenty-six elementary education students, Harrington found, for instance, that student teachers' pedagogical reasoning about dilemmas deepened through reading and interpreting cases about teaching; they grew more capable of framing problems, drew lessons beyond their immediate setting, and reflected upon their work from multiple perspectives. She concluded that "case-based pedagogy can be used to gain access to students' professional reasoning and may, as well, foster that reasoning" (Harrington, 1995, p. 212).

In a similar study, Hammerness and others (2002) conducted a content analysis of twenty-one curriculum cases written by student teachers, looking for the development of what Berliner (1994) has defined as "expert" thinking about teaching and learning. They found that in all cases examined, over the course of multiple drafts, students increasingly displayed a number of expert characteristics: they grew more able to generate multiple hypotheses and to look more systematically at the different influences on learning; they offered multiple connections between theory and others' practices, elaborated and expanded upon theory and research, often in relation to their own practice, understood contingencies and offered qualifications about their observations and generalizations, provided specific details about learners and learning, and analyzed evidence of student learning. Even the weaker cases demonstrated evidence of these "expert" moves by the final drafts. In addition, their analysis of multiple drafts demonstrated that students moved from an initially simplistic explanation of their case to more sophisticated, theory-based explanations of their experiences.

These and other studies suggest that learning from case writing may be a promising means to help teachers build theoretical and practical connections; to move teachers beyond simple or lay conceptions of teaching, children, and schooling; and to appreciate the complex nature of teaching (Goodwin, 2002; Kleinfeld, 1992; Levin, 1995, 2002; Roeser, 2002). However, emerging research also suggests that this kind of learning from cases does not happen without carefully designed curriculum that links research and theory about learning and teaching to the candidates' process of analysis. Some studies found disappointing progress for students writing cases without substantial connections to literature and ongoing feedback from instructors (Anderson and Bird, 1995; Copeland and Decker, 1996; Levin, 1995). They identify at least two kinds of challenges for teacher educators that case writing may not be able to overcome if the pedagogy is not fully developed. First, a case writer's limited knowledge or more narrow frame of reference may lead to a misunderstanding of the nature of the situation; a failure to appreciate all the important variables; or a lack of sufficient strategies to deal with the experience. Second, a case writer may not be able to connect the particular, personal experience related in his or her case with a broader set of principles for interpretation (Darling-Hammond and Snyder, 2000).

A few studies have described the ways in which specific teaching strategies appear to enhance stronger outcomes of case writing for students. For example, the study described earlier by Hammerness and colleagues (2002) outlines in some detail the course process used to work with cases. Students read cases written by others (education scholars, experienced teachers, as well as past teacher education students), which were paired with theoretical readings about learning and teaching. While exploring these readings and accompanying cases, students wrote several drafts analyzing a case of their own teaching in which they examined what students learned and what aspects of the context and their teaching appeared to explain what was learned. On each draft, they received extensive feedback from an instructor and a peer, based upon a publicly shared and edited rubric. Students were also paired with a partner who read the case and provided feedback, including alternative perspectives drawn from the literature and their own experiences. Finally, students participated in two "case conferences" in which they presented their case orally to a small group of classmates and a facilitator who helped them consider theories and concepts that might shed light upon the case.

In teaching with cases, it appears to be critical to help students link theoretical principles to the contextualized events they read or write about. In a sense, students need to learn cases within the "schema of the field" with a chance to see how cases represent and relate to knowledge about teaching, learning, and development, in order to make using the cases an effective and rich learning experience. Student teachers need to be supported in moving between the case and the principles. Indeed, when doctors read cases, they cannot make sense of a clinical case without considerable scientific knowledge (for example, of physiology, chemistry, and biology and of treatments and possible outcomes) that must be connected to the knowledge of particular cases of particular patients with their own medical histories. So, too, do teachers need to go "back and forth" between cases and principles, as well as have opportunities to consider "what is this a case of?" (Shulman, 1996).

Looking across several studies documenting more and less successful use of case writing in teacher education, Darling-Hammond and Hammerness (2002) identify some features of instruction that appear to help case writers overcome potential pitfalls and seem to support the learning associated with writing cases. These include:

- Connections to readings and discussion on learning, development, and teaching that provide the opportunity to link theory and practice;
- Guidance for data collection and analysis (e.g., observation and interview protocols in child cases, analytic memos, logs, and rubrics that guide analysis);
- Multiple drafts written against standards that encourage the development of important case features (e.g., details about students and context, analysis of learning as well as teaching, inclusion of multiple perspectives);

- Specific, concrete feedback that calls attention to principles of development, learning, teaching choices, moral questions, context variables, and other concerns;
- Time and timing—enough time to allow reflections on the case to unfold at a time when candidates are ready and able to consider the questions being posed. (p. 133)

As these authors point out: "Without learning opportunities that develop insights, raise other perspectives into view, and create bridges between theory and practice, cases may add up to interesting but uninformative teaching stories that reinforce idiosyncratic or uninformed views of teaching. A key lesson . . . is that cases do not teach themselves" (p. 132).

### Autobiography

As we have noted, student teachers bring very powerful lay theories about teaching and learning—many of which are based in their own personal educational histories (Crow, 1987; Holt-Reynolds, 1992). These lay theories, or beliefs developed without formal instruction (Vygotsky, 1978), often have been developed over long periods of participating in and observing classrooms (Lortie, 1975; Measor, 1985) as well as in informal experiences of teaching and learning in schools, homes, and the community (Measor, 1985). Indeed, much research has demonstrated the impact that teachers' personal educational biographies have upon their teaching, their thinking about their teaching, and their understandings about learning (Britzman, 1986, 1991; Clandinin, 1985; Cole and Knowles, 1993; Crow, 1987; Holt-Reynolds, 1992, 1994; Kagan, 1992; Knowles, 1992).

For instance, Holt-Reynolds (1992) conducted an extensive interview-based study with teacher education students in a reading class. Her findings demonstrated not only the tenacity of these teachers' personal understandings about teaching and learning, but also the ways in which they shaped how the teachers responded to, agreed with, or accepted what they were learning about in their class. Their grounds for agreeing or disagreeing were not based upon educational theory or research, professional consensus, or experiences as teachers. Instead their views were firmly rooted in their own experiences in schools as students, experiences which often were atypical. Research also demonstrates that when these firmly held personal beliefs about teaching meet with the field, difficulties can arise (Cole and Knowles, 1993).

Often teacher educators seek to confront the apprenticeship of observation and to stimulate reflection on teaching and learning through the use of autobiography. Autobiographies are nonfiction, first-person accounts of personal experiences. In teacher education programs, students can write autobiographies that focus upon the events of their education or schooling, and which may focus upon particularly formative incidents, people, or contexts that shaped them as people (and teachers) and informed the way they think about teaching and learning.

Over the years, many teacher educators have suggested that engaging preservice teachers in writing about and analyzing their own educational experiences is a fruitful pedagogy for helping address the problem of unexamined



personal experience that can be overgeneralized without an opportunity for analysis and perspective (Bullough and Gitlin, 1995; Carter and Doyle, 1996; Cole and Knowles, 1993; Holt-Reynolds, 1992; Knowles and Holt-Reynolds, 1991; Baumgartner and others, 2002; Rust, 1999). Their belief is that, through autobiography, student teachers are able not only to become aware of and to articulate their own knowledge about teaching—knowledge that is often tacit and unexamined (Barclay and Wellman, 1986)—but also to bring it to the surface for examination, reflection, and even challenge (Bullough and Gitlin, 1995). In turn, making this kind of personal historical knowledge about education explicit then enables teacher educators to build upon and work with this important prior knowledge that their students bring to their coursework. The argument for autobiography rests upon psychological theory that narrative provides an important form of knowledge (Bruner, 1990) and that guided self-reflection can stimulate greater insight and perspective, especially if narratives are shared.

Autobiographies can take a variety of starting points. Some focus upon the author's past educational experiences—both formal and informal—describing in detail important educational incidents in their lives, such as key experiences of learning as well as not learning; of puzzlement or challenge; of the relationship of school and culture; and of inequities (Hoffman, 1989). These autobiographies may describe particularly influential teachers, coaches, or other influential adults in candidates' lives, or even peers from whom they learned. Sometimes these narratives also focus upon the context of the school, the peer group or a classroom, or the relationship between school and one's own culture (Chamoiseau, 1997). Yet another type of narrative may emphasize the author's school or life experiences as these relate to race, gender, ethnicity, sexual orientation, or religion, in order to discuss key formative experiences as children or young adults (Beals, 1994; Fricke, 1995; Santiago, 1993; Walker, 1991).

#### **Autobiography at New York University**

At New York University, student teachers write several autobiographical papers. As part of a strand of courses that involve students in learning about key concepts in teaching and learning called "Inquiries I, II" on the undergraduate level and "Inquiries III" on the master's level, students create a "Learning Autobiography." The Learning Autobiography takes the form of a timeline in which students identify key incidents in their experiences as learners. Students then write two separate narratives, one in which they write extensively about a selected incident in their learning, and another in which they describe a teacher who made a significant impression upon them. When they analyze their experiences with that individual or in other learning incidents, they are able to articulate what guides them as a teacher and examine their goals, motives, and models more closely.

There are two ways teacher educators tend to use autobiographies—first, in engaging students in the writing of their own autobiographies, and second, in engaging them in the reading and discussion of autobiographies of others

(which sometimes also involves students in analyzing them in a reading group or other group of readers). Teacher educators frequently involve student teachers in writing autobiographies in order to explore their past and current educational experiences. (See *Autobiography at New York University* for a description of this practice at New York University and Chapter Seven for a description of how this practice can be embedded in a course on Multicultural Education.) Often, students are asked to construct a narrative that provides detailed descriptions of their past educational experiences—both formal and informal (Bullough and Gitlin, 1995). In other cases, they create autobiographical narratives that focus upon the exploration of a key metaphor, theme, or central image from their educational experiences—images that they may want to build upon in future teaching, such as “teaching as building community” or “creating a home” (Clandinin, 1986).

A few teacher educators have recently begun to document in small-scale studies the impact that these strategies appear to have on student teachers' thinking (Bullough and Stokes, 1994; Clarke and Medina, 2000; Florio-Ruane, 2001; Rust, 1999). They stress the insights prospective teachers report about their own learning and experiences in relation to each other and their students, broadening their perspectives and highlighting awareness that their assumptions require greater evaluation. Baumgartner and others (2002) found that autobiographical stories “provide critical insights into teachers' thinking that work to enable the group not only to understand the speaker's actions but also to provide professional support” for further growth (p. 86). The authors note that these aspects of student thinking rarely emerge in the context of most teacher education programs where the formal interactions between professors and students are not sufficient for students' stories to emerge and thus become available for them to examine. With opportunities to write and then discuss autobiographical experiences, student teachers have a chance to explore those places where their implicit theories about teaching rub up against those of other teachers or standards of practice.

Teacher educators also acknowledge some important challenges related to this pedagogy. First, autobiographical narratives can be created but remain undeveloped and unchallenged—without opportunities to revisit, explore, and compare new understandings with past understandings. Student teachers need carefully scaffolded experiences with different forms of teaching, schooling, and culture in order to productively challenge, question, and wrestle with deeply held beliefs and past experiences. In addition, if these narratives are not shared, there is no way to get a perspective on the range of experiences, learning and teaching possibilities, and school contexts that exist. Some teacher educators suggest that sharing autobiographies and revisiting personal narratives over time, in the light of new experiences of alternative practices, are particularly important.

Second, writers and readers of autobiography may come to overemphasize the role of the teacher, seeing her as a solitary actor—as both the source of

and the only solution to the problems of teaching (Cazden, cited in Ballenger, 1999; and Florio-Ruane, 2001). Florio-Ruane argues that one way to avoid the solitary nature of these stories is to read them "in the company of colleagues" thus bringing multiple perspectives to bear upon the work and illustrating the importance of a community of professionals—and the knowledge located in such a community—for understanding and making sense of the challenges embedded in them.

Finally, teacher educators who work with autobiography draw attention to the deeply personal nature of this pedagogy, and to the necessity for care and respect for the intimate revelations that may emerge from writing and reading autobiography. Others have called attention to the ethics involved in asking students to disclose private, sensitive thoughts, feelings, and experiences—sometimes for public scrutiny—and sometimes for the purpose of changing and revising teachers' beliefs and conceptions about teaching (Carter and Doyle, 1996). When using such a personal form of writing, teacher educators need to think through potential problems (particularly regarding appropriate assessment of and response to personal writing) and pay special attention to the creation of a classroom atmosphere that is respectful, safe, and appropriate for personal revelations of this nature.

### Inquiry and Action Research

Finally, as we noted earlier, preparing teachers to learn from teaching throughout their careers requires a set of tools that develop the skills and practices of systematic, purposeful inquiry and critical reflection. Many teacher educators have focused on developing these abilities by engaging student teachers in systematic research in their classrooms and schools (Gore and Zeichner, 1991; Price, 2001). Such experiences not only help teachers deal with the complexity of practice but also help them overcome some of the limitations of their apprenticeships of observation. Definitions and conceptions of such teacher-directed research differ considerably (Gore and Zeichner, 1991; Rearick and Feldman, 1999); and even the terms used—*teacher research*, *action research*, *practitioner research*, and *the scholarship of teaching*—come out of different intellectual traditions and carry with them different assumptions about teaching and research.<sup>1</sup> However, Cochran-Smith and Lytle's (1993) description of action research as "intentional, systematic and rigorous inquiry" provides a useful description of the character and nature of practitioner research in teacher education. Although not directly examining the work of preservice teachers, Cochran-Smith and Lytle (1993) have examined the impact of specific types of such research upon the knowledge base of teaching, learning, and schooling. For instance, they have demonstrated how

---

<sup>1</sup>See Gore and Zeichner (1991) for a discussion and critique of the breadth of definitions of practitioner inquiry, and for their argument of the necessity for conducting action research within a framework of a clearly developed educational and social philosophy.

“classroom studies” (a fairly typical genre in action research) can promote a systematic and intellectual critique of the assumptions, goals, and approaches being used in a classroom, which can lead the teacher-researchers not only to reframe questions but to revise pedagogical approaches.

The process of practitioner inquiry includes all aspects of a research or inquiry process: identifying questions of compelling interest (these may focus upon issues of teaching and learning; schooling and society; or education and social issues, such as gender, race, or equity); pursuing those questions through the collection of data (which may include observations of children, class or other observational field notes, or interviews with children, parents, or other teachers); and reflecting upon the questions through written work (journal entries, conceptual research memos) and oral discussion with peers, instructors, and master teachers. Practitioner research is not always as linear, however, as this suggests. Students often begin at different points in this process and follow a spiral of “plan-act-observe-and-reflect” (Zeichner and Noffke, 2001). Frequently these projects culminate in the writing of a formal research report that describes the nature of the inquiry, discusses the analysis, summarizes the findings, and sometimes includes reflection upon the results of the research for one’s teaching—as well as discussion of the impact of the inquiry process upon the teacher’s conception of teaching. However, some teacher educators note that they emphasize the inquiry process, and the development of skills of conducting classroom-based research, rather than the finished research product (Zeichner, 2003). “Action Research at the University of Maryland,” below, describes one professor’s pedagogy using action research.

#### **Action Research at the University of Maryland**

Jeremy Price (2001) actually begins his semester-long spring course on action research in the fall, when he introduces his students to concepts of research on teaching. In the spring, the students develop a research question that they pursue in their classrooms. Concurrently, he engages students in analyzing classroom data (such as written vignettes or videotapes of teaching) and in examining the research process by reading research articles, books, or pieces by other teacher-researchers. Students form small “research groups” to give feedback and intellectual support on one another’s projects. Each teacher also keeps a research journal that becomes a source of evidence for his or her paper. Particular assignments help the students analyze and develop their research. For example, students have to describe an “engaging assignment” and to describe in detail conversations and interactions with students. This assignment is designed to encourage analysis of particular aspects of lessons and to help candidates learn to provide evidence for claims.

In research on the consequences of these practices, Price drew upon a variety of qualitative data from the course (transcripts of classroom conversations; questionnaires at the beginning and end of class; action research journals; preservice teachers’ and their learners’ writing; videotapes of classroom work; and informal interviews with student teachers) to examine the learning of eleven

teacher— candidates, examining the process of their research, the impact on their learning, and "how they saw the relationship between classroom inquiry, teaching and educational change" (p. 43). Price found that his students were able to develop and reflect upon pedagogies that were responsive to the needs and strengths of their particular students; to better understand and evaluate the learning represented in students' work; and to appreciate teaching as not only planning and organizing instruction, but also as focusing on the learning of students. Price also found that the research project gave all eleven students an opportunity to take some risks in the classroom, and they all chose to test ideas and practices that focused upon the learning and engagement of their students—an important finding that contradicts the pervasive belief that student teachers are not developmentally ready to focus upon student learning. He concluded that the research process seemed "to be a powerful influence upon how they constructed their role as teachers and imagined their work as teachers" (p. 70).

Advocates of practitioner research build their argument upon a definition of teaching as reflective practice (Schön, 1983), contending that student teachers need to learn critical dispositions and skills that undergird reflection; the dispositions toward an open mind; a sense of responsibility and commitment; and care and respect for children, along with the skills of careful observation and reasoned analysis (Zeichner and Liston, 1987). However, the goals for practitioner research vary considerably—in part, depending upon the definition. Some teacher educators focus upon the benefit for individual teachers in helping them become more reflective and analytic about their own classroom practice and promote their individual growth as teachers (Webb, 1990). Those who emphasize the professional development that may arise from such research often focus upon the importance of teachers engaging in constructing knowledge about teaching and learning themselves, and in using this understanding to guide their practice and their future learning (see, for example, Cochran-Smith and Lytle, 1993; Hollingsworth and Sockett, 1994).

Finally, some emphasize the political insights and understandings that practitioner research may promote in teachers, by enabling them to better understand the social conditions of schooling and work toward more democratic, emancipatory education for all students through school reform and political action (Gore and Zeichner, 1991; Kemmis, 1993; Noffke and Stevenson, 1995; Price, 2001; Zeichner, 1993b). As Villegas and Lucas (2002a) note:

By studying schools, prospective teachers can learn about the nature of the school as an institutional culture, exploring ways in which the context outside the classroom influences the lives of students and teachers. They can see the ways in which school policies and practices both support and hinder teachers' efforts to be culturally responsive. They can get a sense of the individual and frequently isolating nature of teachers' work, on the one hand, and the need and potential of collaboration, on the other. If they study schools where equity and social justice are priorities, they might learn about ways that teachers

can work collectively to bring about changes in their schools that will increase access to knowledge for all students. This can give them a sense of the possibility for teachers to play leadership roles outside the classroom. (p. 145)

Across the literature there is a view that practitioner research can support teachers in developing a disposition toward reflective, inquiry-based, and analytic thinking (what Cochran-Smith and Lytle [1999] term an *inquiry stance*) along with the important skills of data collection, observation, analysis, and reflection.

Although some researchers and educators have examined the products of teachers' inquiries (Beyer, 1996; Bissex and Bullock, 1987; Cochran-Smith and Lytle, 1993), the research on the outcomes of practitioner research for participants is quite exploratory. A small number of researchers and teacher educators have studied the learning of preservice teacher education students in action research courses (see, for example, Gore and Zeichner, 1991; Price, 2001; Tabachnik and Zeichner, 1999; Valli, 2000), often as a form of practitioner research on their own teaching and the learning of their students. As noted, Price (2001) found that the process raised candidates' confidence and caused them to pursue changes in their classrooms, which they hoped to continue as new teachers. However, this study, like others (for example, Gore and Zeichner, 1991; Valli, 2000), found that although the work candidates did in action research increased their awareness of particular classroom issues and helped them to be more student focused, relatively few were able to translate their findings into school-level considerations or organizational improvement strategies.

Highlighting some of the possibilities and challenges of this pedagogy, Gore and Zeichner (1991) analyzed the written reports of the research projects conducted by eighteen of their student teachers, and evaluated the self-assessments of learning by these students. Their students reported that the research process enabled them to become more thoughtful and purposeful about their teaching; that it helped them become more aware of their own practices and of the gaps between their beliefs and their practices; and that it helped them become aware of their learners' thinking and learning. However, these authors also expressed concerns that they found that only a small number of students emerged with a concern for moral and political issues, and few made connections between their specific topic of investigation and the larger issues or contexts within which their specific inquiry took place.

They argue that this pedagogy may be helped by some self-inquiry through autobiographies by student teachers, in order to better prepare them to later make more critical inquiry into schools and schooling, as well as to encourage more involvement of the student teachers in a "community of teachers" who are all engaged in teacher research together. There is some other evidence that placing student teachers with more experienced teacher-researchers can help prospective teachers more easily develop a perspective on teaching that is inquiry oriented (see, for example, Clift, Veal, Johnson, and Holland, 1990;

Cochran-Smith, 1991; Nath and Tellez, 1995). This work reinforces the argument that pedagogies such as practitioner research and autobiography may be most powerful and effective if combined—and also calls attention to the fact that all these pedagogies may be strengthened when supported by clinical placements and experiences that reflect and reinforce concepts, ideas, and approaches from the university coursework.

These kinds of studies, although still limited, provide some indications of the kind of learning that can emerge from practitioner research. Such inquiry can help new teachers focus upon student learning and student work, critically examine their own teaching practices in relation to their beliefs and commitments, and develop the skills of data collection, analysis, and reflection.

## CONCLUSION

The pedagogies of teacher education we have described—student teaching, performance assessments and portfolios, analyses of teaching and learning, case methods, autobiography, and practitioner inquiry—are intended to support teachers' abilities to learn *in* and *from* practice. Each intends, in different ways, to build the visions, tools, practices, dispositions, and understandings of new teachers in ways that develop and make habitual the ability to reflect and the skills of close analysis. However, the interrelationship of these pedagogies to one another is also important. It is possible that these pedagogies may work more powerfully in relationship to one another, and some pedagogies (such as autobiography) may be particularly useful early on in programs whereas others (such as practitioner inquiry) may be best engaged once student teachers have had opportunities to critically examine their own experiences of schooling.

For these reasons and others, developing and enacting these pedagogies is no easy task. Teaching teachers is certainly among the most demanding kinds of professional preparation: teacher educators must constantly model practices; construct powerful learning experiences; thoughtfully support progress, understanding, and practice; carefully assess students' progress and understandings; and help link theory and practice. Skillfully enacting this kind of teaching of teachers takes time, effort, and, most important, institutional support—and cannot be easily undertaken in a context that is unsupportive or conflicting. In our final chapter, Chapter Twelve, we move to a discussion of the key factors that influence the ability of institutions to transform their practice and to teach teachers well. These broader concerns of policy and organizational change are key elements in determining how well teacher education will be able to prepare candidates who, in turn, support *their* students toward productive lives and careers.