

CHAPTER 21

Learning and Pedagogy in Initial Teacher Preparation

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Learning to teach is arguably one of the most cognitively and emotionally challenging efforts that humans attempt. Studies of teaching (e.g., Jackson, 1990; Lampert, 1985; McDonald, 1992) point out the uncertainty, complexity, and immediacy that characterize the practice of teaching. Over the last 25 years scholarly efforts to elevate the standing of teaching to a profession on par with medicine or law have identified both a knowledge base that teachers must understand in order to teach children well and the complex judgments teachers make on a regular basis; however, a contrasting camp has persistently sought to deregulate initial teacher preparation, arguing that the knowledge for teaching is comprised primarily of deep subject-matter knowledge and selected teaching techniques. The current context of public education poses many formidable challenges for teachers: Among them are the public's mandate to ensure that *all* children have deep, flexible knowledge and skills to succeed in an information-based society; teaching shortages in critical areas; the legacy of poverty that some children inherit; increasing ethnic and linguistic diversity that presses us to revisit our understanding and enactment of democratic principles; and increasing calls for accountability in the form of standardized test scores. How best to prepare teacher candidates to teach in this demanding context is a vexing question. Furthermore, it must be answered in a factious policy environment that is deeply divided in its responses to the challenges of designing and carrying out initial teacher preparation (e.g., Feistritzer,

1999; Finn, Kanstoroom, & Petrilli, 1999; National Commission on Teaching and America's Future, 1996).

Rigorous research plays an important role in navigating this contested terrain. The term *rigor* has the potential to be used loosely and rhetorically to imply high standards for research, whether or not they have been met. Cochran-Smith and Fries (2001) have critiqued the "evidentiary warrant" of rigorous, empirical research. Although they recognize that such research may help to resolve persistent problems in teacher education, they also argue that divisive ideological dilemmas in teacher education require additional deliberation. They further suggest that evidence alone will not resolve the normative debates about how best to prepare teachers. Also required, they say, is careful scrutiny and analysis of the "assumptions and motivations that underlie the establishment of different initiatives in the first place as well as the values and political purposes attached to them" (p. 13).

Contrasting this view, Levin and O'Donnell (1999) argued that educational research, in general, has a credibility gap that will only be resolved through the adoption of a research model resembling research in the field of medicine. They press for a four-stage process of educational inquiry that begins with pilot studies, proceeds to a combination of controlled laboratory experiments and classroom-based design experiments, moves next to randomized classroom trials, and culminates with informed classroom practice. Also calling for increased rigor, Wilson, Floden, and Ferrini-Mundy (2001) maintained that the research base in teacher preparation is "relatively thin." They established this claim after surveying research conducted in the last 20 years and identifying few

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studies that met their standards for rigorous, empirical research. They derived their standards using Kennedy's (1996, 1999a) framework of multiple genres of research in teacher education. Kennedy enumerated five genres, which include multiple-regression, follow-up surveys (e.g., to program alumni), comparative population studies (e.g., between credentialed and noncredentialed teachers), experiments and quasi experiments in teacher education, and longitudinal studies (e.g., case studies examining teacher change). Zeichner (1999) developed a similar list, although he includes two different research categories, conceptual/historical and self-study research. When introducing each genre, Kennedy outlined the aspects of teacher preparation examined, the outcomes found, and the logic of the genre's argument. For her, each of these genres has critical limitations, particularly when the goal is to document the impact of teacher preparation. Kennedy argued for methodological pluralism as a means of capturing the entire story, while at the same time expressing a preference for experimental and longitudinal studies. Above all, though, she maintained that research in teacher education must have stronger designs, particularly if teacher educators want to defend themselves from skeptics' challenges.

The precedence for inquiry initiated from multiple genres appears to be well established in teacher preparation (Kennedy, 1999a; Shulman, 1988; Zeichner, 1999). However, given this larger backdrop of persistent challenges to the quality of educational research, in this chapter the term *rigorous research* refers to empirical work that meets the highest standards of research methods. For example, a rigorous study outlines its conceptual framework, its normative assumptions, and its clear relationship to prior studies. Second, a rigorous study provides explicit and detailed description of its design, data, and analysis so that readers may assess the validity of the findings. This chapter focuses on research published in refereed journals because such studies have undergone the process of peer-review. Not all scholarship reviewed in this chapter, however, is empirical; also included is conceptual scholarship that either inspires a substantive body of empirical research or provides critical commentary on empirical work.

Although many disciplines comprise the field of education, educational psychology guides us toward the central role that teacher cognition plays in learning to teach. Giving definition to the discipline, Berliner and Calfee (1996) asserted that "educational psychology is distinctive in its substance: *the systematic study of the individual in context*" (p. 6). The discipline's particular ways of problem construction, theories, and methodologies have yielded insights into the nature and development of teacher beliefs, understanding of subject matter, problem solving, decision making, and reflection.

Scholarship from this vantage point has helped to shape an image of teaching as an intellectual profession that requires its practitioners to synthesize a sizable knowledge base, to deliberate and reason using this knowledge base, and to reconstruct and reflect upon lived experience in order to learn from it.

Handbook chapters, as a scholarly genre, offer selective, focused reviews of the literature. Although teaching and learning to teach have been studied from a range of disciplinary viewpoints, handbooks of educational psychology have typically addressed teaching processes and learning to teach and as such have informed the field in important ways (e.g., Borko & Putnam, 1996; Pressley et al., 2002). Even though the field of research on teacher education is fairly recent (Wilson et al., 2001), three handbooks synthesizing and codifying research in this area have been published since 1990 (Houston, Haberman, & Sikula, 1990; Murray, 1996c; Sikula, Buttery, & Guyton, 1996). Two handbooks of research on teaching have also been published (Biddle, Good, & Goodson, 1997; Richardson, 2001). Within all these handbooks many chapters review research conducted within a cognitive framework (e.g., Borko & Putnam, 1996; Calderhead, 1996; Feiman-Nemser & Remillard, 1996; Putnam & Borko, 1997; Richardson & Placier, 2001). Additionally, since 1996 several significant reviews of the research literature on learning to teach have been published (Ball & Cohen, 1999; Griffith & Early, 1999; Munby, Russell, & Martin, 2001; Putnam & Borko, 2000; Wideen, Mayer-Smith, & Moon, 1998; Wilson et al., 2001). To address the breadth of this field is beyond the scope of this, or any, chapter. Accordingly, this chapter focuses primarily on research conducted within a cognitive psychological framework that examines individual teacher candidate's learning to teach in the context of initial teacher preparation (ITP). In this chapter ITP refers to the bounded set of experiences comprised of the formal study of teaching, learning, and schools that is most typically conducted in both academic courses and field experiences. These experiences are designed to prepare individuals for initial teaching licenses. Such preparation programs may or may not be housed at a university and may be completed at either undergraduate or graduate levels.

The choices of conceptual framework, unit of analysis, and learning context are deliberate. First, they obviously reflect the theme of this volume. Second, they explicitly build on several recent comprehensive reviews within this same framework (e.g., Borko & Putnam, 1996; Putnam & Borko, 1997, 2000). Third, individual teacher candidate's learning is a relentless focus of teacher educators. At the conclusion of ITP institutions must be able to judge whether a particular candidate's knowledge, performance, and dispositions meet the entering standards of the profession. Although new

conceptions of knowledge and learning emphasize the social and distributed nature of cognition, ultimately each individual must demonstrate his or her knowledge and practice. Finally, attention to context ensures that researchers consider the multiple and overlapping contexts in which ITP occurs. Indeed, the interaction between cognition and context is at the forefront of work in many domains of educational psychology.

As with any choice, there are attendant losses. By making the figure of this review cognitively framed studies of new teachers' learning, illustrative and important work that considers veteran teachers' learning in the contexts of professional development is relegated to the background (e.g., Wilson & Berne, 1999). Also left out are studies that reflect other disciplinary or theoretical orientations to the study of new teachers' learning—namely, philosophical, critical, historical, feminist, anthropological, and sociological approaches (Buchmann & Floden, 1993; Cochran-Smith, 1991; King, Hollins, & Hayman, 1997; Lucas, 1997; McWilliam, 1994; Tabachnick & Zeichner, 1991; Zeichner, Melnick, & Gomez, 1996).

Throughout the chapter rigorously conducted research is highlighted. Scholarship of learning to teach, in general, has no shortage of normative arguments for what teacher candidates should learn and how that preparation should be carried out. Indeed, there is speculation that conflicting visions of the purposes of teacher preparation may not be reconciled. A need exists, therefore, for systematically gathered, empirical evidence to study these arguments. The chapter has two major sections: The first synthesizes essential conceptualizations and empirical findings regarding what teacher candidates learn and how they do so; the second reviews promising research from a situative perspective and suggests future directions for research.

REVIEW OF THE REVIEWS: WHAT COLLECTIVE STORY DO THEY TELL?

In the latter part of the 1990s several handbook chapters and reviews of the literature on learning to teach synthesized a burst of cognitively oriented research conducted in the 1980s and early 1990s. That scholarship examined the nature and development of teacher thinking and teacher knowledge. The depth of these chapters suggests that formal inquiry into learning to teach is indeed a subdiscipline within the field of educational psychology (Borko & Putnam, 1996; Calderhead, 1996; Feiman-Nemser & Remillard, 1996; Murray, 1996b; Putnam & Borko, 1997, 2000). Much of the research reviewed reflects broader trends within educational psychology—for example, the establishment of cognitivism

as an overarching paradigm and the rise of constructivism as a theory of learning; a broadening of research methodologies, particularly the inclusion of qualitatively designed studies; and an emphasis on practice (Berliner & Calfee, 1996; Pressley & Roehrig, in press).

The development of a collective story from these reviews and other seminal studies in the area of teacher learning and pedagogy in teacher preparation was guided by the following questions: How has research conducted within a cognitive framework illuminated our understanding of both what new teachers should know and how they learn? How has research within a cognitive framework shaped and informed key dilemmas of ITP (e.g., teaching in ways that are responsive to diverse students, teaching for understanding, issues of transferring knowledge from one setting to another)? What does this literature on teacher learning have to say about best practices in ITP? To answer these questions, this section traces how a cognitive framework has evolved, noting in particular recent emphasis on a situative perspective; describes different approaches to defining a knowledge base for teaching; summarizes key findings from studies of how teachers learn; and reviews scholarly analysis of pedagogy in teacher preparation.

Evolving Conceptual Frameworks to Study Learning to Teach

A conceptual framework feeds a study's design because it shapes the questions posed, the methods used, the researcher's stance, and the settings in which inquiry is conducted. The scholarly team of Borko and Putnam (1996; Putnam & Borko, 1997, 2000) have produced several reviews that synthesize an evolution in conceptual frameworks used to study teachers' thought and learning. This evolution reflects shifts in perspective that have shaped and reshaped the broader field of educational psychology, notably a progression from behaviorist to cognitivist to sociocultural or situative perspectives. With each shift a revised understanding of what constitutes powerful student learning has emerged. In broad strokes there has been a movement from a receptive-accrual view of learning to a cognitive-mediational view (Anderson, 1989). The image of a good teacher has undergone similar changes (Clark, 1995), and thus out of necessity, so have the assumptions for the purposes and outcomes of ITP.

Behaviorist Perspective

Much of the process-product research, conducted in the 1950s through the 1970s, drew on behaviorism as its conceptual framework (Brophy & Good, 1986). Emphasizing the teacher's effective management of learning, process-product

classroom-based studies sought to correlate specific teacher actions and talk with student achievement on standardized tests. It yielded a rather atomistic view of teaching, parsing teaching into specific behaviors or sequences of behaviors that were consistent with a receptive-accrual view of student learning. The image of good teaching that emerged from this research was of an individual who directs the flow of activities and talk so that all students are engaged and progressing in an efficient, orderly manner (Clark, 1995). The implications for ITP meant that teacher candidates were presented with discrete knowledge and practices that had been proven effective in process-product studies. Often these were introduced in teaching laboratories and simulations (Carter & Anders, 1996). Eventually, teacher candidates were expected to assemble separate skills together to execute effective practice.

Cognitive Constructivist Perspectives

In response to a growing sense of inadequacy regarding the findings and methods of process-product research (Calderhead, 1996), during the mid-1970s scholars shifted attention to teachers' cognitions or mental lives. This body of research, which is still thriving, initially reflected an information-processing view of the mind but subsequently adopted a constructivist view of cognition. Studies elaborated the complexity of teacher's intentions, planning, decision making, and problem solving (Clark & Peterson, 1986). Teacher thinking about classroom management, instructional choices, use of class time, and checking for understanding fueled research (Richardson-Koehler, 1987). Empirical evidence highlighting the powerful role that teachers' beliefs played in teachers' thought processes (Calderhead, 1996) began to mount. Images of good teaching were captured in metaphors such as the teacher as diagnostician, as decision maker, and as reflective practitioner (Clark, 1995).

Research on teacher thinking overlapped with studies of teacher knowledge. Shulman and his colleagues in the Knowledge Growth and Teaching Project (e.g., Grossman, Wilson, & Shulman, 1989; Wilson, Shulman, & Richert, 1987; Wilson & Wineburg, 1988) played a central role in shaping this line of research, which characterized the knowledge base that informs teacher's thinking and the dynamic, personalized manner in which each teacher comes to understand this knowledge. Shulman's (1986a) introduction to the third *Handbook of Research on Teaching* identified content as a "missing paradigm" of research on teaching. Shulman and his colleagues fleshed out an enormously generative concept, pedagogical content knowledge, which broadly speaking

refers to the specialized knowledge that teachers have of how to represent content knowledge in multiple ways to learners.

In her landmark study, Grossman (1990) outlined four components of pedagogical content knowledge:

- (1) an overarching conception of what it means to teach a particular subject, (2) knowledge of instructional strategies and representations for teaching particular topics, (3) knowledge of students' understanding and potential misunderstandings of a subject area, and (4) knowledge of curriculum and curricular materials. (as cited in Borko & Putnam, 1996, p. 690)

For example, if a science teacher views teaching biology as a form of inquiry, she might emphasize open-ended lab experiences over lectures and textbook reading. That same biology teacher must have at her fingertips a range of ways to represent key concepts such as photosynthesis or the replication of DNA, and these representations must go beyond equations. She also needs to anticipate students' likely confusion regarding these concepts, particularly those that might arise in the process of completing scientific investigations. Finally, she needs to know the many curricular material resources available to help students grapple with and make sense of these concepts. Bruner's (1960) bold hypothesis "that any subject can be taught effectively in some intellectually honest form to any child at any stage of development" (p. 33), as well as Schwab's (1964) delineation between the substance and syntax of the disciplines, resonates in Shulman's writing.

Propelling the emphasis on teachers' understanding of their subject matter were two other large-scale, standards-based reforms. First, in 1987 the National Board for Professional Teaching Standards (NBPTS) was established, which developed rigorous standards for expert veterans and means of assessing them. Second, most national subject-matter organizations developed standards for what students should know and be able to do at the conclusion of K-12 education. The emerging "reform" vision challenged teachers to "teach for understanding" (Blumenfeld, Marx, Patrick, Krajcik, & Soloway, 1997; Cohen, McLaughlin, & Talbert, 1993; Darling-Hammond, 1997). In general, teaching for understanding emphasizes student's active, cognitive transformation of knowledge; it is typically contrasted with passive, receptive acquisition of knowledge. Several rhetorically loaded terms are also used as synonyms for teaching for understanding, for example, adventurous teaching (Cohen, 1989), reform-minded teaching, and ambitious teaching. Indeed, the term *adventurous* peppers the literature reviews on teacher learning (e.g., Ball & Cohen, 1999; Borko & Putnam, 1996; Feiman-Nemser & Remillard, 1996; Putnam

& Borko, 1997, 2001; Richardson, 1996). Putnam and Borko (1997) provided a thoughtfully concise explanation of this rhetorical term:

[T]he sorts of teaching that are being promoted in most current, scholarly reform movements . . . [are] approaches that emphasize the importance of students' thinking and the development of powerful reasoning and understanding within subject-matter domains. In many cases, reformers are calling for teachers to enhance, and sometimes supplant, the "direct instruction" models of teaching that pervade today's public school classrooms by providing opportunities for students to explore ideas in rich contexts, rather than relying primarily on teacher presentation and student rehearsal. Because teaching for these goals entails thinking of subject-matter content in new ways and being attentive and responsive to the thinking of students, teaching cannot be prescribed in advance as a set of techniques to be carried out in a particular way. Rather, these approaches require teachers to think differently about students, subject matter, and the learning process and to become more "adventurous" in their teaching. (p. 1229)

It should be noted, however, that the concept of teaching for understanding, which is referred to by its proponents as a reform-minded approach, also has its opponents. In many ways, the progressive-traditional battle over both what should be taught and how persists in education. In the contested terrain of education, each side seeks to claim the high ground by claiming its favored approach as the reform-minded one. In this chapter the phrase "teaching for understanding" is preferred.

As the idea of teaching for understanding took hold, the image of the good teacher expanded the notion of a deliberative, or reflective, practitioner to include the image of an academic coach or intellectual guide shepherding communities of learners as they constructed an understanding of major ideas and ways of thinking within each discipline. To fulfill this role, the teacher must also engage as a practical scholar of his or her discipline.

As studies of teachers' knowledge flourished, a number of researchers, strongly influenced by interpretive methods in other disciplines, began to explore how teacher candidates' personal narratives and life histories influence learning to teach (e.g., Carter, 1990; Clandinin & Connelly, 1987; Elbaz, 1983; Kagan, 1992; Louden, 1991; Ross, Cornett, & McCutcheon, 1992; Zeichner, Tabachnick, & Densmore, 1987). Carter and Doyle (1996) synthesized this body of research, which emphasizes the centrality of the teacher candidate's personal construction of personal practical knowledge. They concluded,

From an outside perspective of program policy, becoming a teacher is all too often seen as obtaining credentials and acquiring skills. From a biographical frame, however, becoming a teacher means (a) transforming an identity, (b) adapting personal understandings and ideals to institutional realities, and (c) deciding how to express one's self in classroom activity. . . . [T]his far more complex picture of the essence of the teacher education experience promises to transform fundamentally how teachers are viewed and perhaps even how they are valued (p. 139).

Collectively, studies of teacher thinking and teacher knowledge influenced ITP curriculum and pedagogy in several important ways, and many of these influences still prevail in ITP programs today. Varied approaches have been taken to help teacher candidates make explicit their tacit beliefs (e.g., Feiman-Nemser & Featherstone, 1992). For example, one strategy is the study of images of teaching in popular culture. Another involves providing teacher candidates with early experiences in classrooms where the veteran teacher engages in highly sophisticated teaching for understanding. Such experiences are intended to provoke dissonance and reflection that lead to a revised understanding of what learning might entail. With an emphasis on reflection, teacher educators have sought to engage new teachers in critical examinations of their beliefs about generic teaching strategies, children's learning and development, and the social conditions of schooling and issues of equity and social justice (Clift, Houston, & Pugach, 1990; Zeichner & Tabachnick, 1991). Such examinations have been elicited and structured through many activities, such as journal writing, child studies, and actual investigations into subject-matter concepts. Not surprisingly, teaching within the subject matters garnered much attention. Teacher educators have stressed the teacher candidates' need to recognize how disciplinary understanding differs from school knowledge, to represent complex concepts in multiple ways, to interpret children's naive misconceptions and coach them toward more accurate understandings, and to possess a robust theory of the discipline itself (e.g., its core concepts, rules of evidence, and ways of developing new knowledge; Ball & McDiarmid, 1990; Stengel & Tom, 1996). Finally, teachers are urged to both reconstruct and reflect on their autobiographies and narratives of lived experience as they build understandings of school and classroom events.

Social Constructivist and Situative Perspectives

Amidst this burst of research on how an individual teacher's knowledge and beliefs both develop and shape practice, researchers discovered, or rediscovered, the importance of context in cognition. This unfolded in several ways. First,

teacher educators engaged teacher candidates in reflection about the contexts in which they worked and in which the learners lived (e.g., King et al., 1997; Ladson-Billings, 1999). Second, renewed attention to the situated nature of cognition mirrored the evolution of cognitive constructivism to social constructivism (Nuthall, 1997). Putnam and Borko (2000) synthesized the situative perspective thus:

Situative theorists challenge this assumption of a cognitive core independent of context and intention (Brown, Collins, & Duguid, 1989; Greeno & the Middle School Through Applications Project Group, 1998; Lave & Wenger, 1991). They posit, instead, that the physical and social contexts in which an activity takes place are an integral part of the activity, and that the activity is an integral part of the learning that takes place within it. How a person learns a particular set of knowledge and skills, and the situation in which a person learns, become a fundamental part of what is learned. Further, whereas traditional cognitive perspectives focus on the individual as the basic unit of analysis, situative perspectives focus on interactive systems that include individuals as participants, interacting with each other as well as materials and representational systems (Cobb & Bowers, 1999; Greeno, 1997). (p. 4)

As a learning theory, situated cognition suggests that learning should be rooted in authentic activity; that learning occurs within a community of individuals engaged in inquiry and practice; that more knowledgeable “masters” guide or scaffold the learning of novices; and that expertise is often distributed across individuals, thus allowing the community to accomplish complex tasks that no single person could accomplish alone. In this view of learning, the good teacher is one who orchestrates the flow of information among individuals, as one who assists, rather than controls, the learning of others, as one who “rouses minds to life” (Tharp & Gallimore, 1988).

Scholars of teacher learning see great potential in this conceptual framework (Putnam & Borko, 2000). At the heart of the situative perspective is the issue of transfer of learning from one setting to another; as such, it informs an ongoing dilemma in teacher education regarding the bridge between theory and practice (Dewey, 1977). Finding sturdy ways to negotiate between theory and practice is even more important when the goal of teacher preparation is to ensure that new teachers can teach for understanding. Second, because a situative perspective focuses on interactive systems, it may help teacher educators develop theories of teacher learning that draw attention to the “interrelationship of knowledge and action in the classroom context and develop an understanding that more accurately captures the cognitive, affective, and behavioral aspects of teachers’ work” (Calderhead, 1996,

p. 711). The situative perspective draws attention to settings, talk, and mediational tools. For instance, efforts to expand traditional classroom field experiences into community-based settings or to bring videotapes of exemplary teaching for understanding into university courses are under development. Efforts to create opportunities for authentic conversation and problem solving among teacher candidates and veterans are at the forefront of teacher education design. In addition, sociocognitive tools, such as hypermedia case materials, have been created to provide tasks that are more authentic. The nature of teacher candidates’ learning in these new settings, in these conversations, and with these sociocognitive tools is a focus of research (Putnam & Borko, 1997; Richardson, 1997).

Summary of Conceptual Frameworks

In this overview to conceptual frameworks a chronological tidiness is implied that is not necessarily present in the many studies cited. What is clear, however, is that as cognitive psychologists’ conceptual frameworks modulated, scholars of learning to teach quickly and easily appropriated them to conduct inquiries into learning to teach. As a psychological framework evolved from a behaviorist to a situative perspective, it inspired lines of research that provided broad empirical evidence for the cognitive complexity required to teach, particularly when the educative end is teaching for understanding. In this overview to conceptual frameworks the focus was on those aspects of teacher learning and practice to which each new framework has called attention. For lack of space, what has been left out is a discussion of how methods of inquiry into teaching and teacher learning have also evolved, particularly to include more interpretive studies. Calderhead (1996) offered an efficient review of the broadening of methods to study teacher thinking and learning.

Defining a Knowledge Base for Teaching

Although there have been many efforts to formulate a knowledge base for teaching (Grow-Maienza, 1996), during the 1980s a distinctive body of work sought to specify a knowledge base grounded in the findings emerging from cognitive constructivist studies of teaching. This work was initiated, for the most part, to distinguish teaching as a profession, with a distinct and complex body of knowledge mastered by expert teachers. Landmark publications by Shulman (1986b, 1987), along with *Knowledge Base for the Beginning Teacher* (Reynolds, 1989) and later *The Teacher Educator’s Handbook: Building a Knowledge Base for the Preparation of Teachers* (Murray, 1996c), mapped out the substance of

content that teachers and teacher educators need to know. The notion of a knowledge base, however, is not neutral (Donmoyer, 1996). A brief chronological survey reveals that approaches to formulating a knowledge base reflect the policy context in which a scholar writes, his or her unique authorial purposes and audiences, and differing philosophical traditions of teacher education. Tabachnick and Zeichner (1991) presented four traditions of reflection in teacher education, which they base on Kleibard's (1986) typology of major school reform movements. First, the *academic* tradition focuses on representations of subject matter to students to promote understanding. Second, the *social efficiency* tradition focuses on the intelligent use of generic teaching strategies suggested by research on teaching. Third, the *developmentalist* tradition focuses on the learning, development, and understanding of students. Fourth, the *social reconstructionist* tradition focuses on the social conditions of schooling and issues of equity and justice. These four traditions of reflective teaching have been used by others to describe the general orientation of a teacher preparation program (e.g., Carter & Anders, 1996; Grow-Maienza, 1996).

Overall, the domains of knowledge specified across the different approaches to a knowledge base for teaching are remarkably consistent. Variation, however, exists in terms of the sources consulted to elaborate a domain; furthermore, different scholars, given their philosophical orientation, privilege some domains over others. In general, the knowledge base for teaching has been a compelling metaphor, but this point will be revisited after delineating several state-of-the-art formulations of a knowledge base.

Categories of Knowledge Approach

Shulman's (1987) much-cited article laid out seven categories of teacher knowledge:

If teacher knowledge were to be organized into a handbook, an encyclopedia, or some other format for arraying knowledge, what would the category headings look like? At minimum they would include: content knowledge, general pedagogical knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of learners and their characteristics, knowledge of educational contexts, and knowledge of educational ends, purposes and values. (p. 8)

Shulman's introduction rests on the metaphor of handbook or encyclopedia headings, suggesting that a sizable and codifiable body of information exists. His phrase "at minimum" acknowledges that a knowledge base should not be viewed as exclusive, or even overly prescriptive. Of the seven categories, Shulman discerned pedagogical content knowledge as

the most important, arguing that this body of knowledge is uniquely within the purview of teachers. Shulman also broadened a definition of the sources that give rise to a knowledge base, moving beyond the research findings of process-product studies to include scholarship in the content disciplines, materials, and settings of the institutionalized educational process; research on schooling from multiple disciplines; and the wisdom of practice itself. Finally, Shulman advanced a model of pedagogical reasoning and action by describing how teachers make proper judgments using the knowledge base.

Shulman's seminal argument reflects the policy environment to which he spoke. Much of Shulman's work has served to elevate teaching to a profession resembling, in particular, medicine or law. He wrote at a time when policy makers had simplified the findings of process-product studies to a list of desired teacher behaviors. In many states and school districts, mandated observation protocols reduced teacher evaluation to specific observable behaviors (e.g., listing lesson objectives on the board), regardless of whether the targeted teacher actions were educative in a particular moment in time. Shulman (1987) wrote that

teachers cannot be adequately assessed by observing their teaching performance without reference to the content being taught. The conception of pedagogical reasoning places emphasis upon the intellectual basis for teaching performance rather than on the behavior alone. . . . The currently incomplete and trivial definitions of teaching held by the policy community comprise a far greater danger to good education than does a more serious attempt to formulate the knowledge base. (p. 20)

As a result of Shulman's emphasis on subject matter, some have placed him in an academic tradition of practice in teacher education. However, if one merely considers the list of headings, it is clear that the knowledge domains that Shulman outlines are consistent with any of the traditions.

Confirmed Knowledge Approach

Feiman-Nemser and Remillard (1996) provided a thoughtful analysis of three state-of-the-art approaches to conceptualize this base. The three they selected examine respectively what a teacher knows, does, and values. They began with a review of *Knowledge Base for the Beginning Teacher* (KBBT in the following extract; M. C. Reynolds, 1989), which was commissioned by the American Association of Colleges of Teacher Education (AACTE). Here is their summary:

The project organizers identified domains with which, in their judgment, every beginning teacher should be familiar. Then they invited experts associated with each domain to write a chapter

outlining "confirmed knowledge" appropriate for "professional responsible beginning teachers." The table of contents reveals topics that are part of the emerging work on professional knowledge for teaching (Shulman, 1987; Grossman, 1990): classroom organization and management, learners and learning, classroom instruction, the developmental needs of pupils, subject matter knowledge for teaching, subject specific pedagogy, knowledge about reading and writing, students with special needs, the social organization of classes and schools, the school district, ethical dimensions of teaching, to name about half of the chapter titles. KBBT reflects the range and richness of professional knowledge that bears on teachers' work, but it leaves open the question of what it means to know and use such knowledge in teaching. (Feiman-Nemser & Remillard, 1996, pp. 72-73)

The AACTE commissioned this monograph as one of its efforts to professionalize teaching; in that sense it is consistent with Shulman's purposes. Although on the one hand this might be viewed as self-serving, on the other hand, as Feiman-Nemser and Remillard pointed out, the result was a rich range of knowledge. As their summary suggests, M. C. Reynolds and his project colleagues produced a work that was consistent with the purposes of Shulman's (1987) categorization of teacher knowledge. If Shulman's categories were a minimum list of encyclopedia headings, then M. C. Reynolds's was the comprehensive version. M. C. Reynolds's emphasis on confirmed knowledge, however, differs substantively from Shulman's more broadly construed delineation of sources for the knowledge base. Referring again to Tabachnick and Zeichner's (1991) traditions of practice in teacher education, M. C. Reynolds's monograph is difficult to place because the sheer breadth of domains outlined touches on all four traditions. His criterion of confirmed knowledge, however, suggests some philosophical agreement with the social efficiency tradition.

Performance Tasks Approach

The second approach to a knowledge base for teaching that Feiman-Nemser and Remillard selected is A. Reynolds's (1992) enumeration of essential tasks that a beginning teacher should be able to do. They present it in the following way:

A second approach . . . begins with the question, "What should teachers be able to do?" and reasons backward to the knowledge and skills required for performing these tasks. This is the tack taken by the Educational Testing Service in its recent efforts to design new performance assessments for beginning teachers. . . . These tasks [A. Reynolds] argues, fit any teaching situation regardless of the teacher's philosophy, subject matter, or students. Having an adequate knowledge base means being able to do the following: (1) plan lessons that enable students to relate

new learning to prior understanding and experience, (2) develop rapport and personal interactions with students, (3) establish and maintain rules and routines that are fair and appropriate to students, (4) arrange the physical and social conditions of the classroom in ways that are conducive to learning and that fit the academic task, (5) represent the subject matter in ways that enable students to relate new learning to prior learning and that help students develop metacognitive strategies, (6) assess student learning using a variety of measurement tools and adapt instruction according to results, and (7) reflect on their own actions and students' responses in order to improve their teaching. (Feiman-Nemser & Remillard, 1996, pp. 74-75)

A. Reynolds's approach was intended to inform the development of a standardized assessment for teacher licensure; as such, it frames teaching tasks as generic and separate from a normative vision of the means and ends of education. The list seems, in some ways, a throwback to teacher behavior lists of the process-product studies, for there is little effort to explain what assumptions about the character of good teaching undergird the performance of these tasks. A cognitive constructivist theory of learning is implied, however, particularly in points 1, 5, and 7. A. Reynolds's knowledge base seems to be in keeping with the social efficiency tradition of teacher preparation.

Values and Dispositions Approach

The third approach that Feiman-Nemser and Remillard (1996) provided is one developed by the NBPTS:

As a first step in defining professional standards, the board adopted a policy statement entitled "What Teachers Should Know and Be Able to Do" (National Board for Professional Teaching Standards, 1990). The statement set out five core propositions that reflect what the board values in teaching and serve as a foundation for its work. (1) Teachers are committed to students and their learning. (2) Teachers know the subjects they teach and how to teach those subjects to students. (3) Teachers are responsible for managing and monitoring student learning. (4) Teachers think systematically about their practice and learn from experience. (5) Teachers are members of learning communities.

The policy statement underscores the value and limits of formal knowledge in teaching. In relation to the first proposition, for example, we are told that highly accomplished teachers base their practice on prevailing theories of cognition and intelligence as well as on "observation and knowledge of their students' interests, abilities, skills, knowledge, family circumstances and peer relationships." We are also told that "teaching ultimately requires judgment, improvisation, and conversation about ends and means" (p. 13). (p. 77)

This approach to a knowledge base for teaching is couched in terms of a teacher's professional obligations. It rests on the assumption that teachers, as scholars of their practice, will synthesize ideas from multiple sources (e.g., content material, educational research, wisdom of practice) to make appropriate judgments that support all children's learning. The distinguishing feature of a professional is the ability to exercise wise and proper judgment. From this approach to a knowledge base, teacher educators emphasize how to critically evaluate and learn from academic scholarship and lived experience. In this sense it bears a strong resemblance to the developmental or personalistic tradition in teacher preparation.

Knowledge of Diversity Approach

Hollins, King, and Hayman (1994), Ladson-Billings (1999), and Zeichner (1996) identified several key domains of knowledge that teacher candidates must develop in order to be culturally inclusive in their classroom. Zeichner summarizes these knowledge domains as (a) sociocultural knowledge about child development, second-language acquisition, and the influences that socioeconomic, linguistic, and cultural characteristics have on students' performance in schools; (b) specific knowledge of their particular students' culture and background and how to apply this knowledge to foster student learning; and (c) a clear sense of their own ethnic and cultural identities. An approach to a knowledge base for teaching that emphasizes diversity is important because the demographic imperative suggests that in the future, a teaching force comprised of primarily White, middle-class women will teach an increasingly ethnically, racially, linguistically, and economically diverse student population. The track record for educating poor children of color is in all respects a failure; therefore, unless the teaching force becomes radically better educated about the lives and needs of these children, the system will serve increasingly more students in wholly inadequate ways. Thus, in many ways scholars who have elaborated these domains work within the social reconstructionist tradition.

Learning Profession Approach

In perhaps the most recent formulation of a knowledge base for teaching, Ball and Cohen (1999) framed the knowledge base as an answer to the question, "What do teachers need to know?" They asserted that a teacher must understand subject matter, know about children, become acquainted with cultural differences, develop and expand their ideas about learning, and know pedagogy. The five domains that they present elegantly synthesize previous articulations. Ball and Cohen

further stated that this professional knowledge must be developed in and from a teacher's practice; that is, learning must arise from genuine inquiry into the artifacts and actions of classroom practice. Ball and Cohen's formulation was part of a lead chapter in a policy volume devoted to the establishment of teaching as the "learning profession" (Darling-Hammond & Sykes, 1999). The premise of their volume is that unless and until teachers have, and avail themselves of, well-structured opportunities to develop the professional knowledge articulated in this formulation of the knowledge base, the kinds of complex learning advocated in most reform visions will never be realized. This approach integrates the academic, developmentalist, and social reconstructionist traditions of teacher preparation, for it rests on the assumption that the radically equitable goal of education today is to ensure that all children achieve high levels of academic understanding. To do so will require teachers to understand subject matter and child development in highly sophisticated ways.

Summary of Approaches to a Knowledge Base for Teaching

What may be concluded from these six different approaches to a knowledge base for teaching? First, all six show remarkable consistency in terms of the domains; moreover, these domains show a heavy influence from the field of educational psychology. For example, many common chapter titles in educational psychology textbooks—learning theories, motivation, child/adolescent development, exceptionality, and assessment/measurement—are reflected in the domains just mentioned. Second, the idea of a knowledge base contributes to efforts to establish teaching as a profession; thus, all six approaches are forms of political argument, for each scholar seeks to convince a suspicious audience that teaching is more than an intuitively learned endeavor. When viewed chronologically, they reveal subtle shifts in how specific knowledge distinguishes teaching as a profession. For instance, M. C. Reynolds pointed out the sheer volume of ideas and concepts that teachers draw upon, whereas the NBPTS emphasized the complex judgment that teachers use to navigate this breadth of information. Meanwhile, Ball and Cohen emphasized that professional knowledge is situated within the practice itself. Third, what is perhaps most critical in distinguishing the different approaches are the sources consulted to fill the different domains. M. C. Reynolds relies on confirmed knowledge, defining this as knowledge that derives from empirically designed studies. In this sense, M. C. Reynolds fits most closely with a positivist tradition of research and knowledge generation. Shulman and the others take a broader approach, valuing this knowledge but also valuing subject matter and the

wisdom of practice. In this sense their approaches articulate with interpretive traditions or with traditions of social critique (Calderhead, 1996; Wideen et al., 1998).

This brings up an unfinished point: What are the connotations associated with the metaphor of a knowledge base? First, the image connotes construction, perhaps a building's foundation or perhaps a roughly framed building, but such an image leaves open the finishing of the structure, and these are potentially matters of taste or economic means. The approaches just described imply, with varying degrees of specificity, images of good teaching. The point is, however, that without a normative vision of good teaching practice, a knowledge base is an unfinished construction. In the current policy climate, competing, and indeed contradictory, normative visions of good teaching are promoted. Second, although a knowledge base connotes richness and depth of what should be known, it tends to underscore the interconnections among domains when engaging in teaching practice. More important, it does not acknowledge the political nature of knowledge and the different ways in which judgment may be exercised (Cochran-Smith, 2000; Donmoyer, 1996). In other words, a knowledge base may highlight relevant information, but it does not necessarily suggest how to use it in particular situations. One could argue that the knowledge base is not actually knowledge per se, but rather a characterization or description of the curriculum for learning to teach. Finally, descriptions of a knowledge base do not necessarily characterize the mental structures by which this knowledge is actually held. For instance, is the knowledge base a collection of propositions, a set of beliefs, stories, event structures, images or metaphors, or relational tags to what others in a community of practice know? Fenstermacher (1994) offered a probing analysis of these epistemological concerns. Cognitively oriented studies of learning to teach shed some light on how individuals actively construct a personal knowledge base that guides their everyday classroom judgments and decisions.

How Teacher Candidates Learn to Teach

The heart of learning to teach is the development of judgment, which involves the development and orchestration of various forms and domains of knowledge. The knowledge base for teaching enumerates approaches to the content or substance of ITP. Nevertheless, it sidesteps grander questions: What counts as teacher learning and growth? Who decides what counts? Judgment, after all, must be considered in a normative fashion. For example, does or must teacher learning involve altered beliefs or conceptual change, and if so, which beliefs, and in what ways are they altered? Does or must teacher learning involve the elicitation and reconstruction of

practical arguments, which are the post hoc examinations and justifications of actions (Fenstermacher & Richardson, 1993)? Or is teacher learning the ability to perform or enact certain complex skills or practices, such as a guided reading or writers' workshops? If so, who decides which practices? Or is teacher learning the development of pedagogical content knowledge—that is, building a conception of the discipline, of how to represent key concepts, of how and when students will likely stumble, of how to select appropriate curricular resources? Or has learning occurred when an individual has been enculturated into a community's ways of thinking (Putnam & Borko, 1997)? For instance, Montessori teachers and schools enact a particular curriculum and pedagogy that is based on a philosophy of child development; teacher learning might mean coming to participate in the classroom and school. Legitimate participation comes with understanding how that philosophy is instantiated in the classroom and teacher communities. If learning involves enculturation, how does one respond to the multiple communities that characterize educators? Finally, if one considers the notion of distributed cognition, has learning occurred when a community of educators knows where expertise lies and how to find and elicit that expertise in the service of resolving a dilemma of practice? For instance, when seeking to support a struggling reader, the necessary expertise may reside in the child's former teachers, parents, and the district's reading specialist. When considering the question of what kind of learning counts, for many teacher educators the likely answer is "all of the above," although, of course, not all teacher educators would agree, and others involved in setting policy for ITP tend to be more constrained in their response, focusing on enactment of predetermined specific skills or content knowledge.

One of the essential questions all teachers must answer is, "Am I primarily a transmitter or transformer of my society's values?" (Grant & Murray, 1999, p. 57). Most teacher educators resonate with the transformative side of the question. For them, the purpose of ITP is to prepare teacher candidates to teach for understanding and to do so with increasingly diverse students. Several recent reviews of the literature on learning to teach were consulted to synthesize what is known about learning to teach for understanding (Bell & Cohen, 1999; Borko & Putnam, 1996; Calderhead, 1996; Feiman-Nemser & Remillard, 1996; Kennedy, 1999b; Putnam & Borko, 1997; Richardson, 1996; Wideen et al., 1998; Wilson et al., 2001). One obvious conclusion reached by many teacher educators is that learning to teach for understanding will not be achieved by the provision of propositional knowledge (Wideen et al., 1998). In other words, both cognitive and social constructivist theories of learning have taken firm hold.

leading researchers to view teacher candidates as active, social learners who must learn to perceive, interpret, and act with increasing sophistication (Resnick, 1991); however, the precise nature and content of that sophistication varies depending on one's normative or philosophical perspectives regarding the purposes of education. Thus, on the one hand, many of these scholars acknowledge that our understanding about learning to teach is fragmented, contradictory, and incomplete; on the other hand, some findings have coalesced around the respective roles that prior beliefs, content knowledge, mentors and colleagues, and setting play in learning to teach.

Role of Prior Beliefs

One of the most fertile areas of cognitively oriented research has addressed the role of prior beliefs and knowledge in learning to teach. Several reviews summarize this body of work (e.g., Calderhead, 1996; Nespor, 1987; Pajares, 1992; Putnam & Borko, 1997; Richardson, 1996). The term *belief* has a certain definitional slipperiness associated with it. Calderhead (1996) pointed out the range of terms used to refer to beliefs.

The term *beliefs* has been used in research in numerous ways. As Pajares (1992) points out, such terms as beliefs, values, attitudes, judgments, opinions, ideologies, perceptions, conceptions, conceptual systems, preconceptions, dispositions, implicit theories, personal theories, and perspectives have frequently been used almost interchangeably, and it is sometimes difficult to identify the distinguishing features of beliefs and how they are to be separated from knowledge. (p. 719)

Drawing on philosopher's distinctions, Richardson (1996) argued that "the term *belief* . . . describes a proposition that is accepted as generally true by the individual holding the belief. It is a psychological concept and differs from knowledge, which implies epistemic warrant" (p. 104). That is, knowledge, unlike beliefs, must meet standards of evidence and does not have varying degrees of conviction. Perhaps the slipperiness in defining this term results from the fact that many teachers treat beliefs as knowledge (Kansanen et al., 2000).

A common starting point for research into the role of prior beliefs on learning to teach has been the recognition that teacher candidates arrive in teacher preparation settings having experienced 12 to 16 or more years of formal education; Lortie (1975) called this period the *apprenticeship of observation*. During this apprenticeship, individuals form robust schemas that shape interpretations and evaluations of later experiences in schools and classrooms. Other sources for frames of reference include cultural-media archetypes, other

personal experience that informs a worldview, and experience with formal knowledge (Richardson, 1996; Wideen et al., 1998). Often, these schemas support traditional notions of direct instruction and receptive-accrual learning; as such, they guide new teachers to teach in manners consistent with how they were taught, rather than in ambitious ways. Kennedy argued, "Reformers can change teaching practices only by changing the way teachers interpret particular situations and decide how to respond to them" (Kennedy, 1999b, p. 56). However, teacher candidates' entering beliefs have proven remarkably resilient. Thus, these schemas or beliefs are both filters of learning as well as targets of change (Borko & Putnam, 1996; Putnam & Borko, 1997; Richardson, 1996).

Scholars' inquiries into teacher beliefs have examined the characteristics of beliefs on a wide array of domains. Calderhead (1996) categorized teachers' beliefs into the following areas: beliefs about learners and learning, teaching, subject, learning to teach, and the self and the teaching role. Borko and Putnam do not separate knowledge and beliefs, and they organize their two published reviews into a teacher candidate's knowledge and beliefs about general pedagogy (which includes beliefs about teaching, conceptions of the self and teaching, learners and learning, and classroom management), subject matter, and pedagogical subject matter. Although providing a content analysis of beliefs is helpful, far more critical in this area of research is inquiry into how beliefs function as filters or frames of reference, why they are so resilient, and what relationship beliefs have with actual practice.

Studies that show how beliefs serve to filter teacher candidate learning have often been conducted in the context of programs whose purpose is to prepare teacher candidates so that they understand constructivist theories of learning and will engage in practices consistent with those theories. In general, researchers have reasoned that when teacher candidates do not embrace learner-centered theories and practices, their initial beliefs about teachers and learning serve as barriers to understanding knowledge-based theories that run counter to their beliefs. Beliefs filter teachers' perceptions, interpretations, and decisions about how to respond to particular classroom events. Most of these studies have used interpretive research designs and have tended to involve small participant populations. A few general findings follow.

Hollingsworth (1989) found that prior beliefs influenced both how teacher candidates interacted with information presented in the ITP program and, more important, with the depth of conceptual change. Hollingsworth conducted baseline interviews and observations to develop background profiles. Multiple data sources were collected, including audiotapes of teacher education courses, completed assignments and journals, systematic interviews, and observations

of the teacher candidates' classroom teaching. Taxonomies of cognitive processing (e.g., Rumelhart and Norman's, 1976, categories of accretion, fine-tuning, and restructuring) were used to code the data and to determine cognitive change. Data were reduced into a case study of each participant. Cross-case analysis allowed Hollingsworth to show how beliefs about general classroom management, the teaching of reading, and of the academic task changed over in response to experiences in the teacher preparation program. Using inductive methods, Britzman (1991) conducted extensive interviews and observations of two individuals to show that beliefs have a high level of specificity. The Teacher Education and Learning to Teach (TELT) study found that belief systems, or frames of reference, depended on a particular situation. Indeed, in this study of writing instruction, the closer the teachers moved to actual practice, the more their frame of reference reflected a traditional view of writing instruction (Kennedy, 1999b).

A number of scholars have speculated about why teacher candidates' initial beliefs have proven to be so resilient. Frequently cited, Weinstein's (1989, 1990) studies involving questionnaires, interviews, and self-rating scales found that teacher candidates were unrealistically optimistic about the difficulties that teaching would pose for them. Weinstein speculated that such a stance may have given teacher candidates little motivation to engage in concepts introduced by teacher educators. Kennedy (1998) argued that most teachers' beliefs fall into the difficult-to-change category (e.g., formed early in life, containing an affective component, related to self-concept, and interconnected with other beliefs). Many have commented on the apparent disconnect between the agenda of teacher educators and that of teacher candidates (e.g., McDiarmid, 1990; Zeichner & Gore, 1990). That is, teacher candidates enter teaching with a strong belief that the teacher's role is to present knowledge to students; meanwhile, teacher educators seek to prepare them to view teaching as guiding students to construct understanding. Wideen et al. (1998) pressed teacher educators to question this fundamental tension by engaging in a critical examination of teacher educators' beliefs and normative views regarding the purposes of teacher education. Accompanying such an examination would be efforts on the part of teacher educators to understand, from the teacher candidates' perspectives, why teacher candidates' ideas about teaching make sense to them. Such inquiry might parallel studies like Ball and Wilson (1996) conducted in examining young children's misconceptions regarding core concepts in math and social studies; rather than view the children's thinking as errors, Ball and Wilson took their students' ideas seriously and viewed their misconceptions as genuine attempts to make sense of new ideas.

Wideen et al. (1998) reviewed a number of short- and long-term interventions designed to promote changes in beliefs, or conceptual change. Short-term interventions include specific courses, such as introductory seminars or content area methods courses, whereas long-term interventions spanned at least a full year and tended to reflect program-level orientations. Across these studies, a range of specific beliefs was examined, including beliefs about diverse students, conceptions of the subject matter, the role of the teacher, and so on. Many of the findings were based on inductive analyses of extensive interview data, artifact analysis, and observation in both university courses and field settings. Wideen et al. claimed that no conclusive findings emerged from this set of studies. One general trend is that studies seeking to document noticeable change within the context of one course have more often been less effective than longer-term interventions (Richardson, 1996; Wideen et al., 1998), thus suggesting that beliefs that have been constructed over long periods of time may not be so easily reconstructed in one experience within an ITP program. Wideen et al. (1998) concluded that those ITP programs that "build upon the beliefs of preservice teachers and feature systematic and consistent long-term support in a collaborative setting" are more successful in promoting genuine conceptual change (p. 130). Feiman-Nemser and Remillard (1996) named several basic conditions for bringing about conceptual change: opportunities to evaluate positively new practices when compared to traditional ones; opportunities to see examples of new practices in authentic settings, if possible; and direct experiences, as learners, when these approaches are enacted.

More longitudinal studies that carefully examine the arc of teacher learning from ITP through induction may be needed to understand fully changing belief systems and, by extension, teaching practices. Wideen et al. (1998) suggested that the "fixed nature of prospective teachers' beliefs should remain an open question rather than an accepted assumption until the impact of the more robust programs of teacher education has been fully analyzed" (p. 144). Robust, in this case, implies those programs that meet the conditions suggested in the previous paragraph. In many of these interpretive studies, there is no common metric for change even though researchers characterize the nature and degree of conceptual change. Thus, the ambiguous results of preservice teacher change may well reflect the researchers' normative biases regarding how much change counts as significant growth or development. One way researchers can respond is by providing detailed descriptions of data analysis. Adams and Krockover (1997) suggested an exemplar to guide future study designs.

Continued attention to beliefs will prevail as long as beliefs are psychologically found to interact with practice.

Although Calderhead (1996) held that relationships between beliefs and classroom practice are contestable, Richardson's (1996) review concluded that the relationship between beliefs and action is indeed complex and reciprocal; that is, not only do beliefs drive action, but also reflection upon action may change beliefs. The two "operate together in praxis" (Richardson, 1996, p. 105). What is still unclear, at least empirically, is whether changed beliefs will necessarily lead to changes in practice. Findings from the TELT study suggest that what a teacher espouses generally about her teaching practice is not necessarily consistent with how she decides to respond to a particular teaching situation (Kennedy, 1998). Wilcox, Schram, Lappan, and Lanier (1991) found that although experiences in a constructivist teacher education program led elementary teacher candidates to change beliefs about how they, as adults, learned math, their beliefs about how children learn mathematics did not change, remaining consistent with traditional, prescriptive views of math instruction. The methods used in the TELT study suggest that beliefs must be determined in the context of particular tasks, thus reflecting a situative perspective. The context plays a role not only in the teacher candidate's ability to change her beliefs, but also in her ability to have her practices align with her beliefs. In the mathematics example just provided, the researchers speculated that some reasons for the discrepancy between beliefs about personal learning and beliefs about children's learning may be the result of the heavy reinforcement of traditional pedagogy during student teaching and the initial years of teaching.

The resounding conclusion is that prior beliefs do shape teacher candidate's learning, serving variously as filters, frames, barriers, or perhaps gatekeepers to understanding knowledge-based, learner-centered theories and practices. Furthermore, because they are so salient, many teacher educators view them as targets of change, and thus an important objective of ITP is to shift teacher candidates' frames of reference toward reform-minded views of teaching and learning. Unfortunately, many teacher candidates do not expect that teacher preparation will involve changing frames of reference. Rather, they expect that teacher preparation will show them how to teach (i.e., provide them with the procedures of traditional practice); hence, they resist the ideas of teacher educators. There is, then, a normative tug-of-war between teacher candidates' expectations and teacher educators' objectives in ITP. Cognitive psychology might help resolve this clash by providing more nuanced understandings of the exact mechanisms by which these filters or frames operate. Although some studies indicate that the characteristics of the individual do indeed matter (e.g., traditional vs. nontraditional teacher candidates; see Richardson, 1996), less well

understood is how the substance of the belief itself shapes interpretation. For instance, do beliefs about racial or class matters work differently than those about subject matter? What emotions are associated with the beliefs and with the experience of dissonance, and how do those emotions shape the learning or unlearning experience? Motivation theory may contribute insights into how individuals choose to mediate significant dissonance. How do relationships among teacher educators and candidates and among teacher candidates themselves shape the process of conceptual change? Findings in the chapters by Pintrich and by Pianta in this volume may also inform teacher educators' practice and research. Finally, a situative perspective holds great promise, for empirical evidence suggests that belief systems, or frames of reference, are highly dependent on specific task situations and contexts.

Role of Subject Matter Knowledge and Pedagogical Content Knowledge

Shulman's identification of content as the missing paradigm launched a number of studies into how teacher candidate's prior understanding of subject matter shapes learning to teach. Some of this research falls within the larger framework of research on teacher beliefs; that is, studies examined how teacher candidates' conceptions of the subject matter, both as an academic discipline and as a school subject, play a role in learning how to teach. Other studies explored the relationship between the teacher candidates' formal knowledge of the subject matter and learning to teach specific content and concepts. Schwab's (1964) distinction between the substance and syntax of a discipline often appears in discussions of teachers' subject-matter content knowledge. Researchers have analyzed teachers' knowledge in terms of what they know about how the core concepts, ideas, and facts of a discipline are organized and relate to one another (substance), as well as what they know about the system of evidence by which inquiry is conducted within the discipline and by which new knowledge is added (syntax). As it turns out, what a teacher candidate knows shapes both the content and methods of a teacher's practice (Borko & Putnam, 1996). A number of in-depth research reviews have yielded several core findings (Putnam & Borko, 1997; Richardson, 1996; Wilson et al., 2001).

First, with regard to the substance of teacher candidates' subject-matter content knowledge, teacher candidates have often "mastered basic skills, but they lack the deeper conceptual understanding that is necessary when responding to student questions and extending lessons beyond the basics" (Wilson et al., 2001, p. 9). This finding stretches across all the

academic disciplines and has been documented at the level of specific substantive, core subject matter concepts (e.g., understanding place value and fractions in mathematics; Ball, 1990). Teacher candidates' syntactic knowledge has been shown to have great variation (Grossman et al., 1989). For those interested in novice teachers' understanding of math and science, the evidence suggests that most teacher candidates do not have a deep grasp of the discipline's epistemology (Borko & Putnam, 1996). It should be noted, however, that teacher candidates may not be dramatically different from the general college-educated population. In one study examining career paths of 10,000 college graduates nationwide, secondary teacher candidates had comparable academic records to the group as a whole, although elementary candidates did have lower standardized test scores and weaker academic records, at least as measured by number of remedial classes and level of courses taken (Henke, Geis, Giambattista, & Knepper, 1996).

Second, those teachers who "have richer understanding of subject matter tend to emphasize conceptual, problem-solving, and inquiry aspects of their subjects, whereas less knowledgeable teachers tend to emphasize facts and procedures" (Putnam & Borko, 1997, p. 1232). These findings are significant because teachers without this robust understanding of substance and syntax of the discipline are more likely to teach uncritically those lesson plans taken from textbooks and colleagues and to miss opportunities to clarify and extend students' understandings of subject-matter knowledge.

Third, the empirical evidence is mixed regarding whether teacher candidates can develop deeper understandings of a discipline or beliefs about the nature of the discipline during ITP. It appears that when teacher candidates have opportunities to engage in solving real problems, to work in small groups, and to talk about their learning, they are more likely to improve their substantive content knowledge (Borko & Putnam, 1996). Given that many teacher candidates complete an academic undergraduate major (rather than a major in education), recent policy efforts have also sought to address how undergraduate programs of study influence potential teacher's substantive and syntactic understandings of the disciplines (American Council on Education, 1999; Murray & Porter, 1996). If these policy recommendations are enacted, their impact will need to be studied with rigor.

Finally, a number of studies were reviewed by Wilson and colleagues (2001) to examine the relationship between subject-matter knowledge and student learning. An interesting finding is that they identified no rigorous research that examined these two factors directly; rather, most studies used proxies for subject-matter knowledge (e.g., specific courses or academic majors). Indicators of student learning were often

reduced to standardized test scores, which many argue are inadequate for assessing the kind of understanding promoted in many of the reforms. The few studies meeting their criteria reveal inconclusively how, specifically, teachers' subject-matter knowledge matters in shaping children's learning.

Related to inquiries into the role of subject-matter content knowledge in learning to teach have been numerous studies about how the teacher candidates develop pedagogical content knowledge. This form of knowledge has received much attention because it is, arguably, unique to teaching; furthermore, because few teacher candidates have well-developed pedagogical content knowledge when they begin teacher preparation programs, this domain of teacher knowledge must be developed within the purview of teacher preparation or during the induction phase of learning to teach. Most research reviews cite Grossman's (1990) landmark study when defining the key components of pedagogical content knowledge (see the previous section on cognitive constructivist perspectives, where these components were outlined).

Borko and Putnam (1996; Putnam & Borko, 1997) provided a thorough synthesis of research into all four components of Grossman's conceptualization. Several key findings emerge from the studies that they review. First, the teacher candidate's conception of the discipline directly influences instructional choices, resulting in dramatically different classroom experiences for learners even when the basic content is the same. For example, Grossman (1990) showed that two high school teachers' conceptions of teaching English dramatically shaped the way they taught *Hamlet*. One teacher emphasized close textual reading of the entire play, whereas another used film versions as the text. These different emphases stemmed, in part, from the teacher's different views about the purpose of high school English. One sought to introduce her students to the norms of literary criticism practiced in university English departments, whereas the other viewed high school English as an opportunity for students to forge personal connections between cultural works of merit and their lived experience. These conceptions of subject matter function much like beliefs do and thus are not easily changed. However, several rigorous studies have demonstrated that teacher preparation courses can help teacher candidates reconstruct their subject-matter knowledge into a conception of the discipline that is better suited for student learners. For example, Gess-Newsome and Lederman (1993) worked with preservice biology teachers. Initially, these teachers were only able to generate discrete topical lists of core biology topics; however, over the science methods course, the teachers were able to transform this topical list into one that established interconnections among topics. Thus, this experience influenced the organization of their knowledge of

biology as a school subject matter. A second finding is that if a teacher candidate's subject-matter content knowledge is weak, then his or her pedagogical content knowledge will also be weak. This has interesting implications for the design of baccalaureate teacher preparation programs in particular, where the likelihood of working more closely with liberal arts and science faculty is higher than in postbaccalaureate programs. It raises the question of whether it is possible to develop simultaneously subject-matter content knowledge and pedagogical content knowledge. A third finding is that one of the great challenges for teacher candidates is to learn when children are likely to encounter confusion and difficulty in learning content. Much of the research has pointed out what teacher candidates do not know about students' understanding. Putnam and Borko (1997) called for more research to describe the processes by which teacher candidates develop this specific aspect of pedagogical content knowledge. Such knowledge is particularly important with a student population that is becoming increasingly more diverse.

Role of Mentors and Colleagues

Social constructivism has advanced, from a theoretical perspective, the importance of cognitive apprenticeship (Brown et al., 1989) and assisted performance (Tharp & Gallimore, 1988). As such, the theory directs researchers' attention to the critical role that dialogue with others plays in the process of learning to teach. Teacher educators and teacher candidates both recognize that conversations with mentors—both cooperating teachers and university supervisors—and with colleagues are a means for teacher candidates to mediate their understanding of the knowledge base for teaching and to refine their judgments and decisions (Cochran-Smith & Lytle, 1999). Talk with parents is also a potentially rich source of learning for teacher candidates. Potentially educative conversations occur both formally (e.g., through planning or evaluation conferences and through class activities and assignments) and informally (e.g., through voluntary associations, cohort groups, and in communities of practice such as those found in professional development schools, etc.). Many of the studies cited earlier in this chapter regarding conceptual change or changing content knowledge did in fact involve interventions that placed teacher candidates in small problem-solving groups.

To date, the research regarding the nature of the learning that occurs through these conversations has not been studied with the same depth and rigor as the research on prior beliefs and subject knowledge. These studies have tended to be focused more on how talk is a medium through which individuals become socialized into the norms of the discourse

community of teachers (McLaughlin & Talbert, 1993; Zeichner & Gore, 1990) than on the specific and substantive learning that occurs within the conversations and dialogue. Wilson and Berne (1999) reviewed a number of studies of projects in which experienced teachers engaged in talk about subject matter, learning, or teaching. Many of these studies analyzed the discourse, using analytic tools from psycho- and sociolinguistics, and made claims about knowledge gained in these settings. As such, this review is a helpful starting point for researchers interested in studying this phenomenon. If talk is both the medium for and an indicator of learning, it needs to be better understood; furthermore, because talk is by its nature evanescent, relationships between talk and practice must also be more clearly elaborated.

Some of the work in this area has characterized the discourse occurring in innovative communities of experienced teachers (Wilson & Berne, 1999). Other descriptive analyses have provided existence proofs of such communities (e.g., Goldenberg & Gallimore, 1991; Grossman, Wineberg, & Woolworth, 2001; Sherin, 2000). Fortunately, both Grossman and colleagues and Sherin collected systematic data; thus, we can look forward to their subsequent analyses and insights into how the talk fostered learning. As scholars turn to study the role that talk plays in teacher learning during initial preparation, they may well refer to this scholarship, particularly in designing tasks and settings that are more likely to promote educative discourse. Although it is still too early to draw generalizations from this area of research, some conceptual and synthetic scholarship suggests that if the goal of ITP is to prepare teacher candidates to teach for understanding, then unless teacher candidates are working in reform-oriented settings, their conversations with veteran and novice colleagues may serve to reinforce, rather than to reinvent, traditional or conventional practice (Richardson, 1997; Sykes & Bird, 1992). Whether a community has an inquiry stance may play a role in the substance and depth of learning (Cochran-Smith & Lytle, 1999). The role that conflict plays in the learning process is potentially an important variable. For example, conflict is often perceived as something to avoid, when in fact the dissonance may well be essential for deep learning (Achinstein, 2002; Sapon-Shevin & Chandler-Olcott, 2001). Teacher candidates may need to learn how to engage in constructive argument, a practice that runs counter to the norms of privacy, politeness, and nonjudgmental interactions found in the faculty communities of most schools (Wilson & Berne, 1999). This seems especially important if teachers are going to discuss the genuine challenges associated with understanding how matters of ethnicity, class, and gender shape children's learning. Focusing the talk on artifacts of teaching (e.g., student work or videotapes of classroom events) seems

to lead to more focused interactions where participants wrestle with the learner's understanding (Allen, 1998; Sherin, 2000). Factors that may influence the quality of talk and, by extension, learning include an individual's role and authority within the group (group refers to two or more participants), the purposes and protocols for conversation, the length of time that the group has existed, the stability of membership in the group, the presence or absence of a facilitator who scaffolds discussion, and the rewards for participation in the group. Studies of the talk that occurs between mentors and teacher candidates and among colleagues has great potential to enhance our understanding of learning to teach.

Role of Settings for Learning

As a situative perspective takes hold, it has framed settings, or contexts, as central to the learning process. But as Putnam and Borko (2000) asked, "Where should teachers' learning be situated?" (p. 5). They suggested that well-designed experiences that link university courses and field experiences are one possible response, citing Wolf, Carey, and Mieras (1996) as an exemplar. Many teacher candidates and practicing teachers hold that field experiences are the sine qua non of settings in which teacher candidates learn to teach; however, Wilson et al. (2001) summarized research enumerating many well-recognized flaws of these experiences (e.g., disconnected from other components of teacher preparation, focused narrowly on mechanical aspects of teaching, reinforcing the status quo of traditional teaching, and overwhelming thus leading teacher candidates to teach in ways they were taught). Much of the conceptualization of professional development schools seeks to overcome these flaws (Darling-Hammond, Wise, & Klein, 1999; Sirotnik & Goodlad, 1988). Gallego (2001) described a novel blending of field experiences completed in both classroom and community-based settings in order to foster understanding of the complex relationships that support teaching and learning. For example, the field experiences in two settings provided a productive contrast so that the teacher candidates were able to recognize and critically reflect on the role that physical environment plays in ownership of learning. Others recognize that such structural changes will be slowly realized; therefore, teacher education programs must promote an inquiry orientation as a means to provide teacher candidates with "opportunities to engage in ongoing examination of self as teacher within the contexts of classrooms, schools, and the broader professional community" (Knowles & Cole, 1996, p. 665). At this time, a body of rigorous research elaborating what and how teachers learn in these structurally innovative settings is still in its formative stages.

Summary of Learning to Teach

What emerges from this cursory summary of studies of learning to teach is that if the central goal of ITP is to ensure that those teachers entering the profession are able to teach for understanding, then teacher educators must support new teacher candidates to develop new frames of reference and behavioral enactments that are consistent with these ideas (Kennedy, 1998, 1999b). This has proven difficult to accomplish on a widespread basis. The set of beliefs about general pedagogy and learning that candidates have constructed over many years as learners in classrooms proves to be quite resilient and serves to filter interpretations of experiences in ITP. For many teacher candidates, ITP aims to create occasions to develop a wholly new, and often contradictory, view of good teaching and good teaching practices. For new teachers to enact these reform-minded practices requires not only new beliefs about teaching and learning but also the ability to transform substantive content knowledge into pedagogical content knowledge. Like changing beliefs, this has also proven difficult. Rigorous studies that have been conducted yield contradictory results. Feiman-Nemser and Remillard (1996) observed rather sanguinely, "We know even less about the processes of learning to teach than we do about the content" (p. 78). Fortunately, theoretically driven models of professional development and reform in the settings in which teacher candidates learn to teach have led to powerful arguments for redesigning the experiences, tasks, and settings through which teacher candidates learn to teach. For example, researchers' attention to talk in the learning process and to the influence of context in the learning process has potential to illuminate some vexing dilemmas of learning to teach. Scholars in this field are just beginning to understand and evaluate the nature of learning that occurs in these newer frameworks.

Best Practices in Initial Teacher Preparation

Much of the above research has both obvious and subtle implications for pedagogy in ITP. The forms of teaching most desired by teacher educators, captured in the umbrella term *teaching for understanding*, often run counter to both teacher candidates' prior beliefs about teaching and the culture and core practices of many schools. ITP, then, must offer a strong intervention in order to bring about robust learning (or unlearning?). Many see teacher preparation as a relatively weak intervention poised between these far more enduring learning experiences (Richardson, 1996). Nevertheless, to decide what are *best* practices depends largely on what "one thinks the enterprise of teacher education is about and how it works" (Carter & Anders, 1996, p. 557).

The oft-heard expression “practice what you teach” refers to the normative proposition that teacher educators should model practices that promote teacher candidates’ active and social construction of teaching and learning (Lauer, 1999; Richardson, 1997; see also chapter by McComb in this volume). There is no shortage of proposed practices, including case methods, simulations, observation guides, modeling, cognitive coaching, teacher research or action research or child studies, student work protocols, video clubs, problem-based learning, discourse communities, and narrative methods. Indeed, many of these practices have been recommended and described in work cited earlier in this chapter; researchers have also attempted to account for teacher candidate learning within these pedagogical activities.

What is known empirically about sound pedagogy in ITP? Carter and Anders (1996) offered a review that focuses exclusively on the pedagogy of teacher education. They broke down their review into three categories of pedagogy: teaching laboratories and simulations; field-based pedagogies, including observation guides, structured assignments, opportunities to write about teaching, and seminars and conversations; and cases and case methods. They located each of these pedagogical approaches within a framework for teacher education (i.e., practical/craft, technological, personal, academic, and critical social); then they reviewed the empirical base for each of these approaches. With regard to teaching laboratories and simulations, they concluded that this set of practices, which emerged in the 1970s and early 1980s, tended to highlight discrete teaching skills. Although teacher candidates could demonstrate or perform these skills in laboratory settings, such performances did not always transfer to genuine classrooms. They suggested that a reformulation of these practices to involve more deliberation and problem solving has potential. With regard to field-based pedagogies, they found “little solid evidence concerning the impact of field experience in general or of specific strategies” (p. 575). They cited findings from other studies that suggest that field experiences may engender a survival orientation and reinforce stereotypes, particularly of diverse learners. They argued that the selection and coordination of sites and the character of the supervisor’s or mentor’s feedback are important qualities in the framing of field experiences. With regard to case-based pedagogies, they summarized different approaches to case methods but acknowledged the need for more study of actual teacher candidate learning.

Carter and Anders (1996) ended their review with the observation that “research on program pedagogy is not a highly developed area” (p. 584). They expressed concern, however, that research conducted in the spirit of effectiveness studies that compare one pedagogical approach with another

will lead to inconclusive results. Nonetheless, it seems evident that more systematic approaches to studying the nature, variation, and impact of teacher preparation pedagogy are sorely needed to guide the design of ITP. Levin and O’Donnell (1999) provided a stage model for how such inquiries might be conducted. Many of the important studies mentioned in this review as well as the current interest in self-study research (Zeichner, 1999) fall into Levin and O’Donnell’s first stage. They offered the field an important starting point of hypotheses, preliminary ideas, and observations. But also needed are integrated studies linking design experiments in ITP with controlled laboratory experiments of teacher candidate learning, which are then followed by randomized program trial studies. Many in teacher education will find this proposal too rooted in a scientific or positivistic paradigm of educational research. However, without a more rigorous research base, teacher educators will continue to clash with a highly suspicious public over the importance of developing professional knowledge and judgment.

What Collective Story Do the Reviews Tell?

This cursory review of the flourishing field of cognitively oriented studies of learning to teach has underscored the intellectual complexity of teaching. New directions in cognitive psychology show promise in responding to ongoing questions and dilemmas about how teacher candidates learn to teach and how ITP programs can best foster such learning. Thus far, scholarship in the area of learning to teach has provided several approaches to a knowledge base for teaching. This knowledge base has in turn shaped the substance of ITP curriculum. However, constructivist theories of learning posit the “idea that teacher learning ought not to be bound and *delivered* but rather *activated*. This positions the ‘what’ of teacher knowledge in a much different place” (Wilson & Berne, 1999, p. 194). Given that teaching involves, at its core, professional judgment, emphasis on helping new teachers perceive, interpret, and respond wisely to classroom events has garnered the attention of teacher educators. Much research has been conducted examining how a teacher candidate’s prior beliefs, life history, and subject-matter knowledge shape interpretations of events and decisions for action. Significant emphasis has gone in to finding ways to facilitate meaningful conceptual change, with the hope that this will in turn lead to reform-minded teaching practice. The track record has been uneven. Some well-structured interventions have shown modest success at facilitating conceptual change and at fostering critical reflection, but much of this research has not necessarily connected changes in teacher thinking with desired teacher actions. It appears, however, that as the

situative perspective takes hold in cognitive studies, new and critical variables are emerging that may help researchers to develop more robust theories of learning to teach. Ball and Cohen (1999) suggested that the field lacks “carefully constructed and empirically validated theories of teacher learning that could inform teacher education, in roughly the same way that cognitive psychology has begun to inform the education of schoolchildren” (p. 4).

ONCE AND FUTURE RESEARCH

Given the genre conventions of a handbook chapter, readers expect, at this point, an argument regarding future research in this field. Two brief responses follow, one highlighting promising lines of research, the other commenting on potential questions and methodological approaches for future research. It is a given that the goal of such research is to inform the field regarding how best to prepare new teachers to engage and teach diverse students to understand content in deep, flexible ways so that they are, in turn, able to respond to complex issues and problems of the world in which we live. This is, without qualification, a tall order. It is one that the traditional grammar of schooling is unlikely to fulfill; hence, models of learning to teach for understanding are called for.

Promising Research from a Situative Perspective

In Berliner and Calfee’s conclusion to the *Handbook of Educational Psychology* (1996), they predicted that “research flowing from situationist perspectives, concepts of distributed cognition, the development of new technologies, and methodologies such as design experiments, should keep educational psychologists quite busy as we enter the twenty-first century” (p. 1021). Putnam and Borko (2000) picked up on this foreshadowing, as they argued that a situative perspective brings important conceptual tools to bear on the process of learning to teach. This perspective radically reconsiders what it means to learn to teach, for it breaks down the conventional notion of first understanding a principle and then applying it in practice. Instead, a situative perspective suggests that professional knowledge, which often fuses principles and practices, is intimately connected to the contexts and settings in which individuals encounter principles and practices. Scholars of learning to teach already see the explanatory power of this perspective and also its potential to guide cycles of design and research in ITP. Studies of learning to teach writing and of case methods illustrate this point.

Learning to Teach Writing

Learning to teach writing is, arguably, a challenging task. First, writing is a complex cognitive tool that is not easily mastered. Second, writing instruction in school has traditionally been prescriptive and emphasized the acquisition of conventions (e.g., grammar, punctuation, and usage); in contrast, reformers see writing as an activity for making meaning, and they advocate writing instruction that guides students to become strategic, purposeful writers. Third, preparing teacher candidates to embrace this vision of the purpose of writing instruction is challenging because most teacher candidates have little experience as writers; their prior beliefs about writing in school coupled with the persistent presence of traditional writing instruction present challenges to teacher educators. In response, the TELT study (Kennedy, 1998, 1999b) examined how teacher preparation programs influenced adoption of reform ideas in writing instruction. Grossman and colleagues (Grossman, Smagorinsky, & Valencia, 1999; Grossman, Thompson, & Valencia, 2001; Grossman et al., 2000) studied how beginning teachers appropriated a set of pedagogical tools for teaching writing. Taken together, these studies are already making important contributions on empirical, methodological, and theoretical levels.

Empirically, a number of critical findings from TELT have already been mentioned. For example, Kennedy found that teacher candidates’ espoused beliefs did not necessarily match the beliefs implicit in their immediate responses to particular teaching tasks or situations. More significantly, she found that teacher candidates had a set of interlocking, mutually reinforcing ideas about the nature of writing and writing instruction to which they were personally attached. These beliefs influenced how they responded to representative teaching situations, often in ways that maintained the status quo of traditional writing instruction. Equally important, using a carefully defined standard of evaluating pre- and postinterviews, she was able to show that ITP programs influence teacher learning through enrollment and through their substantive orientations. Grossman et al. (2000) found that during ITP courses, teacher candidates were introduced to conceptual tools (e.g., concepts of scaffolding and ownership in writing instruction). However, their appropriation of these tools during their first year of teaching varied depending on whether they received accompanying practical tools and on the activity settings in which they taught. An interesting finding was that the teacher candidates often attempted pedagogical practices in their second year that were much more consistent with reform ideas, thus suggesting that the impact of ITP may not be realized until after the first year

of teaching. The teacher candidates appeared to have constructed powerful and guiding visions that took more than one year to be activated. The researchers also found that the district's policies, practices of support, and curriculum materials and assessments played an important role in how the first- and second-year teachers were able to construct understandings of what it means to teach in general, and language arts in particular (Grossman et al., 2001).

Methodologically, these two studies had much in common, and each represents the kind of rigorous research that is sorely needed in this field. First, both are longitudinal case studies of teacher candidates who were prepared in a range of ITP programs. Second, they offer detailed contextual information about these different ITP programs, which varied in both structure and substantive orientation. Third, they used repeated interviews and observations to gather data. Kennedy used the same pre- and postprogram interview protocol. Her measures merit significant attention: In addition to open-ended, biographical questions, she also asked each participant to respond to representative teaching situations (e.g., respond to a particular piece of writing, a student's statement of boredom, a particular question of English language usage). Finally, both are well grounded theoretically. Grossman and colleagues adopted the theoretical framework of activity theory, as have others in the field (e.g., Newell, Gingrich, & Johnson, 2001). The use of activity theory bears attention because this framework appears to have both broad explanatory power and the potential to shape ITP practice.

Case Methods in Initial Teacher Preparation

Case methods have both a long and short history in ITP. The use of cases or vignettes extends back for many years, but Shulman's (1986b) presidential address to the American Educational Research Association renewed teacher educators' attention. By the early 1990s the case idea was well established (Sykes & Bird, 1992), and by the mid-1990s there was sufficient activity with this pedagogy to warrant a complete chapter in the second edition of the *Handbook of Research on Teacher Education* (Merseth, 1996). Both Putnam and Borko (2000) and Carter and Anders (1996) feature case methods as a central pedagogy in ITP. One reason case methods took hold so quickly is that they are a relatively low-tech pedagogy. Although the development of casebooks is labor intensive (e.g., Shulman, Lotan, & Whitcomb, 1998) and the art of facilitating case discussions or case writing requires time to develop, weaving case methods into traditional university courses is a relatively simple addition. That the most recent edition of almost every standard educational psychology

textbook includes cases suggests that this practice is widespread. A far more compelling reason is that case methods are consistent with the situative perspective because they allow teacher candidates to have vicarious experiences. Well-crafted cases preserve the complexity of teaching, but at the same time, they allow teacher candidates to slow down their perception, interpretation, and analysis of the details. Although case methods are frequently promoted and appear to be widespread as an ITP pedagogy, calls for empirical support for this practice began to mount (Merseth, 1996; Sykes & Bird, 1992).

This call was met in 1999 with a full-length monograph on the research base for teaching and learning with cases (Lundeberg, Levin, & Harrington, 1999). The sections of the book review learning fostered through case-based pedagogy, structuring the learning environment with cases, and rethinking the concept of a case. In the foreword Merseth cited several reasons for the slow development of an empirical base for case methods. First, she observed that good research designs hinge on clearly targeted goals. Because cases have been employed for a variety of pedagogical purposes (e.g., to present the complexity of teaching, to teach teacher candidates how to problem solve, or to foster deeper reflection), it is sometimes difficult to make comparisons across studies because the pedagogical aims differ. Second, it is difficult to account for the many factors, or variables, that affect learning using case-based methods. Merseth's general critique of the empirical base for case methods suggests the need for the kind of rigorous designs that Levin and O'Donnell (1999) outlined. The range of research designs reflected in this collection of studies, however, is rather eclectic. As such, it provides the first stage of research in Levin and O'Donnell's approach. The studies reported provide strong initial hypotheses for understanding teacher candidate learning through experiences with cases. More multisite studies that richly capture the contextual variety of programs, group dynamics, and even instructor effects and at the same time employ common measures of learning may help the field strengthen the initial empirical claims.

Thoughts on Future Research

This concluding section offers a brief reflection on questions worth asking and on rigorous methods. It goes without saying that ITP will continue to engender high levels of suspicion and aspersion from an increasingly vocal group of individuals who believe that ITP is both unnecessary and quite possibly an impediment to a quality teaching force. The studies reviewed in this chapter provide some evidence that it does

matter, but the answers are not unequivocal. Regarding the following few domains in need of more sustained inquiry, it should be noted that Cochran-Smith (2000, 2001), Putnam and Borko (2000), and Wilson et al. (2001) have framed well the sorts of questions that matter and research agendas that will move the field forward. The suggestions that follow embellish, rather than replace, their suggestions.

First, much more remains to be understood about how teacher candidates' beliefs shape learning to teach for understanding and to teach children whose backgrounds differ substantially from the teacher's. Similarly, we need to understand better the many well-considered interventions that teacher educators are developing to promote conceptual change and to enhance the impact of ITP on a teacher candidate's knowledge and beliefs. We need to understand much more clearly the "outcomes" matters (i.e., the relationships among a teacher candidate's knowledge and beliefs, her emerging practice, and the learning of her students). Studies conducted within a situative perspective, by changing the unit of analysis from the individual to the activity setting, may provide a new view on these dilemmas. The increasing emphasis on performance assessments and accountability within teacher preparation will likely add to the intensity and stress levels associated with participating in an ITP program. Gold (1999) suggested ways in which universities might be more attentive to teacher candidates' psychological maturity. The field will benefit from enhanced understanding of how the teacher candidates' emotional states affect learning to teach. To respond to these persistently unresolved questions research must be conducted using more rigorous methods. Many have argued for methodological pluralism (Kennedy, 1999a; Sleeter, 2001; Zeichner, 1999); that pluralism will be needed to establish a system of generating credible knowledge from education research (Levin & O'Donnell, 1999). Unfortunately, in the area of research on learning to teach, the field seems to get what it pays for. The works that appears to show the greatest promise (e.g., longitudinal, multi-site studies that use well-defined and well-designed measures of teacher learning) are some of the few adequately funded research projects. More large-scale design and research efforts are needed.

In closing, the body of research on learning to teach, though still relatively new, has led to understandings of the knowledge base for teaching, the critical role that prior beliefs play in teacher learning, and the powerful role that talk and settings play in the process of learning to teach. Given the ambitious goal that many reformers have of ensuring that every child has a teacher capable of fostering deep, flexible understanding of content, scholars of learning to teach have considerable work to do. Fortunately, as we move into the twenty-first century, the field appears to be armed with promising conceptual tools that

have the potential to provide important theoretical models of teacher learning. With well-supported, rigorous research, those models will be developed in concert with best practices for ITP.

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