Understanding How Policy Meets Practice:

Two Takes on Local Response to a State Reform Initiative

An Occasional Paper

by

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Abstract

This paper explores the connections between policy and instructional practice through a close reading of contrasting studies and through an exploration of ways, prompted by the studies, to develop better conceptualizations of policy-practice connections. The two studies each examined the same policy case (the early implementation of the California Mathematics Framework more than a decade ago) from different vantage points—the first paying close attention, from the "inside-out," to the response of a teacher to the state reform policy, and the second focusing, from the "outside-in," on the way the policy's enactment generated changes in local policy implementation and support systems. The contrast between the studies brings to light conceptual blind spots in each research perspective that make it difficult to ascertain whether the studies offer contradictory or complementary understandings of the case and that may lead to under- or over-estimates of policy effects. Further conceptual work suggested by the paper would enable scholars to entertain richer pictures of policy, instruction, and avenues of policy influence on instruction.

Introduction

Ever since the earliest attempts to study the implementation of complex governmental policies (e.g., Wildavsky, 1973), the impulse to trace the connections between reform policies and instructional practice has been strong. Policymakers want to believe that their efforts can and do improve what goes on in classrooms; yet good sense, some data, and the growing body of policy implementation research tell them there are many disjunctures between the policy as formulated and its actual practice in the classrooms. Lacking the hoped-for change in test scores and other ready measures, policymakers (and the public to which they must answer) are often tempted to declare the most recent policy ineffectual and move on to the next. Their response is, first of all, understandable: seen from the vantage point of many policymakers working in a context that demands results, classrooms do seem remarkably impervious to the changes sought by a particular instructional policy, especially in the short term. And from the particular vantage points of, say, those concerned foremost with the wise investment of public resources or the promotion of powerful and equitable learning for the nation's young people, the response is deeply problematic. The lack of apparent effect in the short-term begs questions about the actual changes in practice that, over time, might be attributable to the policy and about the manner in which policies might come to affect practice.

The situation poses a central set of puzzles that researchers are only beginning to solve. Stated most baldly, there are three questions. First, precisely how does policy meet practice—in what forms, under what circumstances, and with what consequences for whom? Second, where should we look, and how, to identify the connections between policy and practice? Third, what framing ideas and lines of investigation would be most helpful in accomplishing this goal?

These questions have been addressed to some extent within an emergent literature on the connections between policy and instructional practice, a scholarly arena that calls for further work. Here, I advance the conversation in two ways. First, to surface conceptual and analytical issues that reside at the intersection of policy and practice, I contrast two early contributions to the literature, each investigating the same phenomenon (local response to the California Mathematics Framework of 1985) but framed from different perspectives. Second, by reconsidering how researchers frame and study instructional practice, policy actions, and the avenues by which the two might influence each other, I explore possibilities for further work in this area.

There is a compelling reason to carry out this kind of analysis. In the current climate of reform, states and school districts are mounting major reform initiatives at a rapid rate. Almost as rapidly, claims are proliferating about both the capacity of these initiatives to shape teaching and learning *and* their many failures to accomplish this end. To inform the development of such initiatives, especially state-wide systems, there is a great deal at stake in appraising accurately and sensitively both the power and the limits of policy influence on classrooms. The dangers of overpromising what instructional reform policies can deliver are obvious; policy is, after all, only one tool of change and not necessarily the most powerful. At the same time, there is a danger of *under*appreciating what policy has to offer the process of instructional renewal. Only careful conceptualization of the roles policy can play in guiding or otherwise shaping practice, accompanied by research that employs such conceptualizations, can help us see what is possible and ultimately inform decisions about what to do with policy initiatives.

A second reason is more subtle: as this paper makes obvious, researchers approach the intersection of policy and practice from a variety of vantage points, employing different frameworks, units of analysis, and methods for exploring it. Given this fact, there is the distinct possibility that researchers will simply talk past one another, offering alternative accounts of this phenomenon based on different premises that never converge on a richer, more integrated set of understandings. It is easy to do so; traditions of research operate comfortably within the silo of a discourse community and only with difficulty find ways to be understood and mutually informing of work in other discourse communities. For both intellectual and practical reasons, we should aspire to more in this area of research.

Two Perspectives on Policy-Practice Connections

Two divergent perspectives have dominated the conversation about improving teaching, the first approaching the matter from the "outside-in", and the latter from the "inside-out". The two highlight a fundamental problem that confronts the understanding of implementation and impact of policies on teaching and teachers. Frameworks that treat the policy as a discrete, traceable set of resources, requirements, and reform intentions emanating from an "outside" source tend to lose sight of the way actors at each level of the system interpret and make use of policy events to achieve their own purposes. Frameworks that focus on the fine detail of teachers' or other professionals' practice "on the inside" tend to underestimate the way larger environmental factors guide, constrain, or permeate teachers' action and thinking or the results of their efforts. To reconcile these tendencies, or at least keep them in productive tension for purposes of analysis, we need to take a closer look at what the two sets of perspectives have to offer, as well as what they lack.

Looking from the "Outside-In"

The first perspective on the improvement of teaching entails a view from outside classrooms and schools. Grounded in the work of political scientists, economists, organizational sociologists, scholars of administration or leadership, this perspective directs attention to issues of incentives, control, accountability, and the setting of expectations for teaching practice. The preoccupation of this perspective is generally with the "macro" system in which teaching and learning take place; it seeks to inform leadership or policy action initiated outside of classrooms. Its starting point is the formulation or enactment of particular policies. Its primary analytic approach is to trace the implementation of these policies, identify interactions between policies and context, and document aggregate impacts, both intended and unintended, at the school and classroom level.

Several lines of research illustrate this perspective at work. The first, a robust line of work on the implementation of policies and programs (e.g., from federal and state sources) has developed a set of understandings about the way educational reform policies traverse the intergovernmental system of education and how they might affect teaching and learning (e.g., McLaughlin, 1987; McDonnell & Elmore, 1991). The starting point for these investigations is the policy or program, initiated some distance from the classroom. Research in this tradition charts the journey that policy ideas make from point of initiation to point of enactment within classrooms; the frameworks and findings of this tradition

highlight the many ways that original reform intentions are changed, adapted, and realized, in response to differing contexts. A subsidiary line of research, branching from the first, brings into view how multiple policies or programs interact, cumulatively reinforcing each other (e.g., Knapp et al., 1991) or interfering with one another (Kimbrough & Hill, 1980). This line of work conceptualizes the convergence of multiple policies in the work of individual teachers as a major contingency with which they must cope. (Knapp, Bamburg, Ferguson, & Hill, 1998).

A line of investigation undertaken during the last decade has considered the effects of multiple policies more comprehensively by addressing questions of alignment among multiple policies, as in the formulation and enactment of "systemic" and "standards-based" reforms (e.g., Fuhrman, 1993; Fuhrman & O'Day, 1996). Seen from the policymakers' vantage point, these policies seek to offer teachers consistency in instructional guidance and support through "coherent" policies (Elmore & Fuhrman, 1994). Insights from these studies into the effects of systemic reforms help us grasp the complexity of the ambitious goals these policies have set for themselves.

We know from these lines of research a good deal about how a particular policy or sets of policies are created, enacted, and implemented. We know that policies are likely to connect with classrooms indirectly and to be substantially altered by the particular contexts in which they are implemented. And we know that the most straightforward policy instruments (mandates) are unlikely to touch the most central features—"what matters most"—in teaching (McLaughlin, 1987). What is missing from these accounts is a more specific sense of the ways the existence of these policies might permeate the thinking, practice, and collegial activity of teachers.

Looking from the "Inside-Out"

The second perspective approaches the matter from the inside-out. Rooted in scholarship on teaching and teacher development, cognitive theory, and sociocultural scholarship, among others, this set of lenses is situated in or adjacent to classrooms. From this vantage point, the perspective highlights the multiple demands on teachers' working lives, the way they make sense of these demands, and the conditions under which they try to engage students in learning. This perspective, thus, is more focused on the individual circumstances of particular teachers and schools, paying particular attention to teachers' learning and growth over time. From this starting point, investigations in this tradition trace outward to conditions, including policy actions, that have consequences for, or manifest themselves in, practice.

A different set of research lines go at the matter from the vantage point of the classroom teacher, and they provide a remarkably different picture of the situation. These avenues of investigation build on lines of research regarding teachers' learning (e.g., as summarized in Bransford, Brown, & Cocking, 1999), which are not particularly concerned, in any direct sense, with the policy environment but rather with the individual practitioner's journey through the development of professional identify and competence. The teacher learning literature has thus invested enormous energy in uncovering what teachers do, cognitively and otherwise, in attempting to master the subtleties of instruction. A special focus has been on instruction featuring constructivist notions of learning in particular subject areas.

Alongside these investigations are several lines of research that pertain more directly to the questions driving this article. The first are studies of the context of teaching and teachers' work (e.g., Rosenholtz, 1989; Talbert & McLaughlin, 1993). Framed in more sociological terms, these investigations offer a richer picture of multiple contexts that impinge on teachers' work and suggest how these various "environments" might relate to classroom practice. Adjacent work explores the role of teachers' intellectual communities and networks, defined by subject matter or other factors, and argues or implies that these are central to both teaching practice and, ultimately, any attempts to change it (Nelson & Hammerman, 1996; Grossman, 1996; Lieberman & McLaughlin, 1996). Not all of this work attends explicitly to what policymakers or leaders do, but acknowledges that policy implicitly resides in one or more of the contexts that impinge on teachers' work. A third line (Porter et al., 1988) has looked closely at how teachers make decisions about the content of instruction in a particular subject area (mathematics), tracing outwards from the individual teacher to the surrounding layers of activity relating to curriculum content (school leaders, districts curriculum coordinators, state frameworks).

The work on content determinants was a precursor to other lines of scholarship, situated in classroom practice itself, which have attempted to examine policy-practice connections as manifested in the work of individual classroom teachers (e.g., Educational Evaluation and Policy Analysis, 1990; more recently, Whitford & Jones, 2000). Here, drawing primarily on cognitive traditions of research on teaching in specific subject domains, research has revealed in some detail how reform intentions—particularly those emanating from state curricular or assessment reforms in specific subjects areas—are realized, reinterpreted, reflected, or deflected in daily practice.

These lines of research help us grasp the complexity of the professional learning task, especially as individual teachers might construe or confront it, and trace possible means and mediums through which that learning might happen. At the same time, we learn from such investigations how difficult the task is, and how likely it is that teachers' strongly held beliefs will alter the meaning of reform intentions (rather than the other way around), so that they are realized differently, or not at all, in actual practice. What is missing from this research picture, however, is a more explicit examination of the way different kinds of policies from various levels simultaneously create environments for teachers' learning and work and a more focused examination of how teachers respond to, and are affected by, those environments.

Two Accounts of Local Response to a State Reform Initiative

An example of work framed in each tradition helps to elaborate what these two traditions do and don't tell us about policy-practice connections. What follows is a close reading of two contrasting accounts—one framed with "outside-in" assumptions and the other from the "inside-out"— of local response to the same state instructional reform policy, the California Mathematics Curriculum Framework (California State Department of Education, 1985), during its early years of implementation. Though the case is over 10 years old, the variety of studies done of the Framework, the complexity of the

policy system in which this reform took place, and serendipity of independent investigations considering the same phenomenon from different vantage points make this a useful device for considering how we can understand the intersection and interaction of policy and practice.

The California Mathematics Framework

To appreciate the differences in the way the two accounts portray policy-to-practice connections as well as their common ground, it will help to review briefly the policy case which was the target of their attention. As one of a series of ambitious attempts to bring about reform in the content and instruction of school subjects, the state of California set about creating in the mid 1980's a curricular framework that represented the best current thinking about mathematics education (Cohen & Ball, 1990a; Britton, 1993; O'Day, 1995). Drawing heavily on the ideas presented subsequently in the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics* (1988), the designers of the California Framework took on the task of simultaneously setting forth a vision of mathematical knowledge and outlining an approach that would introduce young learners to this vision. The vision focused heavily on what has been generally described as "teaching for understanding" (Cohen, McLaughlin, & Talbert, 1993; *Educational Leadership*, 1994). In mathematics, this instructional approach de-emphasizes the learning of computational algorithms and their application to routine problems and focuses instead on the learner's grasp of fundamental concepts, mathematical reasoning, and the ability to apply concepts and reasoning to non-routine problems.

The result was a policy that departed significantly from previous state guidelines for the teaching of school subjects. Rather than present an outline or menu of specific topics, the Framework painted a picture of mathematical knowledge and how children acquire it, accompanied by a broad philosophy of teaching that emphasizes understanding, problem solving, and exposure to a broad array of mathematical topics beyond arithmetic. The Framework proposed a series of broad curriculum themes, but left it up to teachers and others at the local level to figure out how to realize these themes in practice. The Framework was created as part of a coordinated series of attempts to improve instruction in California's schools. Alongside other subject area frameworks and related to them were attempts to align the state's textbook adoption cycle, assessment system, school improvement grants, and various teacher development initiatives with the tenets of the Framework (Britton, 1993; O'Day, 1995).

The Two Research Accounts

The two accounts appeared within a year of one another in the early 1990's, each purporting to portray how the Framework initiative was faring at the local level during the first or second year in which districts took formal steps to implement the state policy. One account (Cohen, 1990) captures local response in the form of a case study of a single teacher's efforts to change her mathematics instruction; the case study, one of five such cases published along with interpretive commentary in a special issue of a policy-oriented journal (*Educational Evaluation & Policy Analysis*, 1990), was part of a larger, longer term investigation of curricular policy effects in several states.[1] The second account of the curricular reform initiative (Marsh & Odden, 1991), appearing in book chapter form, analyzed school and district response (including classroom level implementation), based on a multiple-case design.

Rather than present separate case studies of impact on individuals, this chapter summarizes themes and patterns across all cases regarding critical factors in the implementation process, the role of state policy initiatives, and the aggregate impacts of these factors and initiatives on sites.

The accounts derive from studies that examined the implementation and effects of the California Mathematics Framework primarily through qualitative field study in a small number of local sites, though with substantial differences in research strategy. The first (Cohen & Ball, 1990a; Peterson, 1990a) concentrated on capturing and interpreting the stories of individual teachers and others in three districts engaged in responding to state-initiated mathematics reform, while the second (Marsh & Odden, 1991) studied a slightly larger number of districts (and within them, selected schools and classrooms) so as to construct cross-case patterns of local-level implementation and system response to policy. Each drew on different kinds of conceptual frameworks, the first relying heavily on cognitive views of teaching and learning, accompanied by a "bottom-up" view of policy and a teacher- and learner-centered view of classroom practice; the second drew extensively on policy implementation literature and placed greater emphasis on policy system dynamics and policy itself as a "top-down" event.

Neither of the "accounts" of research on which this paper concentrates is a full statement of all that was learned in the two studies, but each account is a selective representation of findings designed to communicate what the authors saw as important facets of the phenomenon under study. This is particularly true of the EPPS case account, which makes no pretense at speaking for a larger and ongoing body of research; it was explicitly part of an initial exploratory look at a story of policy implementation and effects that would unfold over many years. Nonetheless, the case account on which this article concentrates has an integrity as one representation of early policy effects, one which can stand alone for the way it presents a clear, important message about policy-to-practice connections in the California case.[2] As an exemplar of its kind of investigation, the EPPS study deserves to be examined closely for what it says about the topic at hand.

An "Inside-Out" Account: A Case Study of One Teacher's Response

The first representation of local response to the state's reform is embodied in a closely examined analysis of mathematics teaching in the third-grade classroom of Mrs. Oublier (pseudonym), hereafter referred to as Mrs. O. Her case dramatizes central tensions in the process and outcomes of curricular reform: this teacher, thought to be a good mathematics teacher by her peers, believes she has made major changes—a "revolution"—in her teaching in response to the state's initiative. At a deeper level, however, she has not understood or realized much of what the curricular reform intended, nor has the way in which policy was implemented helped her to do so.

This case account emerged from a larger, long-term investigation, the Educational Policy and Practice Study (EPPS), designed, in part, to explore the relationship between large-scale curricular reforms and teaching and learning through a multi-level research design. The EPPS as a whole addressed both mathematics and literacy in three state contexts and pursued the phenomenon of policy-to-practice connections over a span of years. The phase of this research from which Mrs. O's case

account emerges was undertaken in the early years (1988-89) following the introduction of the Framework in California (Peterson, 1990a); Mrs. O was one of 24 teachers in three districts chosen for study within that state. The research team collected intensive qualitative data about teaching and the impact of reforms on it, from two districts selected because of their reputation for valuing innovation generally and, more specifically, for emphasizing teaching for understanding in mathematics education. A third district representing "average" approaches to mathematics education was included for contrast. Within these districts, the study team chose two schools with student populations that contrasted on socioeconomic status and, within the schools, four teachers at two different grade levels. The study team drew together information from various sources: document collection and interviews with administrators at the state, district, and school level; and interviews with teachers combined with observations of their teaching at two different times in the year.

An "Outside-In" Account: An Analysis of Local System Response

Also in the early years of the Framework's implementation, an unrelated investigation of the implementation and impact of this policy, the Mathematics and Science Curriculum Implementation Study (MSCIS), was undertaken with a design that resembled the EPPS study in various ways. The second study also sought to understand policy implementation and impact through a qualitative research strategy in a relatively small number of districts and schools (14 schools in all), chosen as sites that had been active in implementing the Framework. Within these sites a sample of teachers were interviewed and observed (eight per school), and this information was combined with interviews of others (e.g., district-level officials), documentary evidence, and a background questionnaire administered to teachers.

There were important differences between this study design and that of the EPPS investigation, however. For one thing, the purposes of the studies were not identical: while the EPPS team sought to "examine the effects of state education reform on ...teaching and learning" (Peterson, 1990a, p. 241), the MSCIS team aimed to explore "the generic issue of whether state policies can enhance local curricular reform" (Marsh & Odden, 1991, p. 223). Moreover, by comparison with its counterpart study, the second investigation traded off some degree of depth for breadth: it studied many more teachers in all (more than 100 as compared with the two dozen teachers in the EPPS investigation) and spent less time gathering data from each one. In particular, the second team of investigators interviewed each teacher in depth once and observed once in their classrooms, as compared with the three days of observation (at two times during the year) and multiple interviews with the teachers in the EPPS study. Furthermore, the MSCIS research team took as its primary units of analysis the "site's" response to curricular reform policy and the cross-site patterns of implementation and impact. The EPPS team, in contrast, invested much more in capturing individual teachers' response to policy (the primary unit of analysis). Both investigations paid attention to the context surrounding classrooms; but to the MSCIS team this context, particularly the local context, occupied the foreground of their work, unlike the EPPS team which appeared to collect data from individuals at various levels (e.g., state-level people involved in creating the Framework, professional association representatives, district-level individuals with subject-area responsibility) to provide interpretive background for making sense of each teacher's practices.

Furthermore, the EPPS case studies approached policy from the perspective of the *individual* teacher, not from that of the collective body of teachers who comprise a school or district staff. Finally, the MSCIS investigation had a more limited goal of capturing policy implementation at one stage in the initiative's history; there was no longitudinal dimension to the design, nor the inclusion of other contrasting states.

A Close Reading of the Two Accounts of Local Response to State Instructional Policy

What follows is an attempt to bring the frameworks, assumptions, and selected findings of these two studies into "dialogue" with one another through a critical reading of the published accounts referred to above. The goal of analysis is to understand how the two investigations approach policy-to-practice linkages and to develop conceptual frameworks and designs for studying these linkages.

Contrasting Conclusions

The two accounts offer remarkably different pictures of policy effects on schools and classroom practice. The case study of Mrs. O presents a story of ambitious policy intentions exerting weak or nonexistent influence (in the short term) over classroom practices that, despite changes, continue to reflect the teacher's limited knowledge of mathematics, as well as her long-standing views of learning and instruction. The teacher's initial response to the policy reflected substantial changes in practice, as seen from the teacher's perspective. Yet from the perspective of policy intentions these changes fell far short of the vision of classroom practice that guided the Framework. The MSCIS study, in contrast, paints a picture of more unmitigated policy success—of ambitious policy intentions realizing substantial changes in district, school, and classroom practices across a relatively short time. Rather than attending to forces and conditions in individual teachers' lives that frustrate reform intentions, the study identifies a series of factors surrounding classrooms that appear to enhance the successful implementation and impact of a major curricular reform policy.

These differences in study conclusions stem from at least two sources:

(1) the researchers' respective pictures of teaching, learning, and subject matter; and (2) their conceptions of policy and policy influence. An examination of each offers insights into the nature of policy-to-practice linkages.

Contrasting Pictures of Teaching, Learning, and Subject Matter

The striking differences in the way teaching, learning, and subject matter are portrayed in the two studies provides a ready explanation of why the accounts might have come to such different conclusions. Put simply, the EPPS case presents a rich portrait of instructional practice in a particular classroom, while the MSCIS investigation offers a limited, mostly implicit view of classroom practice.

This contrast flows naturally from the differences in design and analytic purpose noted earlier as well as from the conceptualizations the respective research teams held of the target of policy. To begin with, to construct the case study of Mrs. O, a researcher visited her classroom on several occasions in one

school year and recorded what he saw in a way that preserved the detail of interactions between teacher and student. More to the point, the researcher approached the task with a complex view of teaching, learning, and subject matter, rooted in constructivist assumptions about learning and notions of mathematical knowledge as fluid and complex. While the case account does not present a formal conceptual framework guiding data collection (nor do any of the pieces appearing in the EEPA journal), it is immediately apparent that the researchers approached each classroom with a well developed set of conceptual categories and relationships to which they should pay attention, among them, the number and variety of ways teachers represented "big" ideas, the connections teachers tried to forge between the representations and the ideas, the cognitive complexity of academic tasks, and the opportunities for children to offer alternative interpretations or solutions and discuss their ideas. Take, for example, the way the case account presents a portion of Mrs. O's attempts to teach place value with manipulatives:

> ... Mrs. O led off again: "When you get a cat's eye (10 beans in the one's cup, thus equaling 1 bean in the ten's cup), put all the beans in a paper cup, and move them over." She clapped her hands for a cat's eye, and then led the following chant: "Put the beans in the cup and move them over."

"Now let's read what we have." The chant rolled on, "one cat's eye and zero." A puzzled undercurrent of "one cat's eye and one" went unattended. She then led the class through a series of claps and chants, leading up to two cat's eyes. And the claps and chants went on with methodical monotony, up to five cat's eyes and five. The whole series took about 15 minutes, and throughout the exercise she repeatedly reminded students to "read" the materials with their hands, to feel the beans and move their arms. By the time they got to five cat's eyes and five, her claps had grown more perfunctory, and many of the kids had gotten the fidgets, but Mrs. O gave no ground. She seemed to see this chanting and bean-handling as the high road to mathematical understanding and tenaciously drove her team on. (p. 316).

This kind of careful observation, guided by a conception of what it might take to give a mathematical idea meaning to young learners, enabled the researcher to pinpoint the teacher's assumption that repeated physical experiences of this sort would automatically lead the class to an understanding of place value.

In contrast, the MSCIS study account offers few specifics about what takes place inside classrooms. We are told only that curricular themes advanced by the Framework were "used" in the classroom (Marsh & Odden, 1991, p. 236). The conceptual framework guiding classroom observation or teacher interviews is left implicit and we have no clues from which to infer it. To be sure, the researchers acknowledged their shortcomings in this respect and credited the EPPS effort with attempting to explore the "depth of implementation" within the classroom in ways that were beyond the reach, resources, or purpose of the MSCIS team.

The differences in view are nowhere more clearly seen than in the studies' treatment of instructional materials and their capacity to embody what the state reforms sought. Consider these comments from the MSCIS study about the role that instructional materials might have played in preparing the way for the introduction of the Framework:

> In the antecedent phase (before the Framework was introduced), all schools were using "program pieces" such as, for example, *Math Their Way*, a popular and effective manipulative-based mathematics program for primary grade students. These pieces were "plump" in that they:

> (1) were closely congruent to the new goals found in the mathematics and science curriculum Frameworks; (2) included many dimensions of classroom practice such as integrating teaching strategies, instructional materials, and new content; and (3) allowed teachers to develop conceptual clarity about the vision..." (Marsh & Odden, 1991, p. 227).

Contrast the implicit assumptions here regarding the "effectiveness" of this program piece with the detailed critique of *Math Their Way* contained in the EPPS case study. In the view of the MSCIS account, this program assumes that physical representations of mathematical ideas and activities that maximize children's experience with these representations will build a strong foundation for understanding and make children's subsequent attempts to deal with abstractions effortless (Cohen, 1990). The critique carries on:

> In fact, the appeal (of *Math Their Way*) owes something to its combination of great promises and easy methods. It offers teachers a kind of pedagogical special, a two-for-the-price-of-one deal: Students will "understand" math without any need to open up questions about the nature of mathematical knowledge. The curriculum promises mathematical understanding, but it does not challenge or even discuss the common views of mathematics as a fixed body of material—in which knowledge consists of right answers—that so many teachers have inherited from their own schooling. The manual does occasionally note that teachers might discuss problems and their solutions with students, but this encouragement is quite modestly and intermittently scattered throughout a curriculum guide that chiefly focuses on the teaching potential of concrete materials and physical activities. (p. 317)

Indeed, the critique itself rests on assumptions about mathematics education that, though they may be debatable, are at least made explicit and hence left open to inspection, thus clarifying the researcher's grounds for deciding whether a program is effective or not. The MSCIS account does not make clear what its assumptions about the value of the materials are; it merely asserts that the materials are "effective."

From these contrasts in the way each study team attended to subject matter and pedagogy, a first explanation of the differences in study results emerges: the EPPS case study found a story of mixed effects because it looked more closely at teaching than the other study. In other words, this case study research was able to look beneath the surface of changes in practice that may have been apparent to MSCIS researchers only to find a more complex picture of partial growth in teachers' understanding of what they were doing and, therefore, a limited or even negligible short-term change in what the policy formally set out to accomplish. The published accounts do not give us enough information to assess this possibility fully, but it is clearly a plausible explanation.

Contrasting Conceptions of Policy and Policy Influence

It is tempting to stop here, but doing so would leave unexamined another important element of policy-to-practice linkages—the policy itself and how it and its potential for influencing practice are conceived. Here, the roles of the two studies are reversed. The EPPS case account offers a relatively limited picture of the curricular policy and the mechanisms by which it might have reached the classroom (though clearly a number of mechanisms were considered in this research), while the MSCIS account paints a richly detailed portrait of an unfolding, evolving course of policy action and associated forces which carried the message of the Framework to districts, schools, and teachers. This contrast between the two studies offers another explanation for the differences in conclusions.

Understandably, the EPPS case study presents and comments on policy as it might have presented itself to the classroom teacher. In specific terms, the curricular policy makes its appearance in this case study as a document (which Mrs. O was not sure she had read), the subject or inspiration for a workshop or two (which stimulated Mrs. O to consider changes in her teaching of mathematics), and a set of exhortations from the state level that indirectly encouraged teachers like Mrs. O and the administrators who supervised her to embark on a new direction for teaching (Cohen, 1990). The case account does not discuss in any great detail the links in the chain between these exhortations and instruction, although the researcher considers various possibilities, among them, incentives or sanctions built into policy, various resources for teacher learning, and the manner in which state-level actors conveyed the messages of the reform policy to the local level. Generally the case account finds these elements missing or unaccounted for, at least in the corner of the state in which Mrs. O teaches. Consider the following summary of state-level influences:

> . . . From Mrs. O's perspective, the state has not acted as though it recognized the problems of teachers' learning. Mrs. O certainly was not taught about the new mathematics in a way that took these difficulties into account. Instead the state department of education taught her about the new math with the very pedagogy that it criticized in the old math. She was told to do something, like students in many traditional math classrooms. She was told that it was important. Brief explanations were offered, and a synopsis of what she was to learn was provided in a text . . . New goals were articulated, and exhortations to pursue them were issued. Some new materials were provided. Although the state exhorted teachers to devise a new pedagogy for their classes, it did so with an old pedagogy. (Cohen, 1990, p. 343)

The state and what it did to promote a new form of mathematics teaching is represented very simply here—the state (referred to in the study as a monolithic entity) "told" the teacher to do something, and did so in a didactic fashion. Though rhetorically useful and probably reflective of this particular teacher's frame of reference, this characterization of the state-level policy fails to capture or consider the various actions, reverberations, amplifications, and other dynamics which can be involved in a state agency "telling" teachers what to teach.

A very different picture of what the state did emerges from the MSCIS analysis. For example:

> . . . State policy initiatives influenced all phases of the local change process, and at the appropriate organizational level (site vs. district). During the antecedent phase, staff development in the regional networks and the use of [state school improvement program] funds to implement the plump program pieces were critical to developing site and district capacity for implementing the curriculum Frameworks. Other state policy initiatives, especially the curriculum cycle, the Frameworks themselves, and the textbook adoption process strongly influenced the creation of new district visions of mathematics and science and the coalescing of the dominant coalition (of district-based educators) to promote it in the adoption phase. Many of the state policy initiatives helped during the implementation phase, but in a rather haphazard and uncoordinated way.
>
> The Frameworks themselves helped in many ways. They served as an opportunity for a new content vision, provided an outline that could be expanded, gave access to the best of "good practice", confirmed that certain ideas and people were "on the right track", consolidated and integrated previous plump pieces, and became a source of momentum. . . (Marsh & Odden, 1991, pp. 235-236).

The case study of Mrs. O's teaching is mute about these kinds of events because they weren't taking place in her district or else weren't very apparent from the vantage point of this individual. The EPPS case account tells us primarily about what was visible to the individual teacher; understandably, the study has little to say about the various, less visible policy forces converging on classrooms (and

possibly on Mrs. O's classroom, in ways she wasn't aware of) on which the MSCIS account concentrated. The latter study thus keeps in view more of the operative "policy"—that is, the purposeful course of action meant to bring about the reform of mathematics teaching. We learn that the policy includes a collection of coordinated policy initiatives, of which the Framework was one, and subsumes a series of actions designed to pressure districts to implement the policy, assist them with this process, and monitor their efforts to do so. In addition, the process of local response is more visible, as implementation proceeds from an "antecedent" phase preceding the formal initiation and adoption of the policy at the district and school level through a subsequent phase involving more full-scale implementation in classrooms. Moreover, in tracking the way these forces converged, the MSCIS research charts the shifting dynamics at the local level as each district and school site positioned itself to consider and adopt the new Framework. For example, the study account documents the way within-district coalitions of people with "professional" expertise (related to curriculum and classroom teaching) joined forces with others who held "bureaucratic" expertise (related to the creation and maintenance of organizational structures that support teaching). Key players in this process included:

> . . . teachers, site administrators, and some district leaders who understood the curriculum, as well as the district coordination structures. These people brought considerable knowledge built up over at least several years—knowledge often based on successful use of "plump" program pieces in their own classrooms, involvement in regional networks, and extensive inservice education. These people often had experience in providing help to others but had been blocked in getting other teachers to use the new programs. Their goal in district-level participation was to build structures/policies that would foster wider implementation. (Marsh & Odden, 1991, p. 229).

The activities of these coalitions at this and subsequent stages of the local implementation process were clearly attributable to the course of policy action set in motion at the state level (though not solely attributable to that force). In turn, the coalitions had the capacity to put in place a variety of supports for teachers, including in some districts "core groups of teachers. . . who were skilled in mathematics education and wanted to see the program in place," who put pressure on their colleagues to try new approaches to teaching (p. 232). These coalitions and teachers' groups represent potentially important links in the chain of influences connecting policy intentions to the classroom.

Yet we see little evidence of such activity in the EPPS case account. In Mrs. O's vicinity, we are told, no one was worrying much about how to support teachers' learning of the new approach to mathematics or how to teach it, beyond identifying a few mentors to whom Mrs. O could turn if she chose (Cohen, 1990, p. 328). The account leaves us with more questions than answers about the opportunities potentially or actually available to her over time for learning more mathematics, gaining new ideas about mathematics teaching, or becoming more familiar with the specific intents of the reform policy, whether or not she consciously attributed her new knowledge to this source. Was the kind of activity Marsh and Odden describe present in Mrs. O's district? If so, did it reach out to her in various ways that weren't readily apparent to her or to the EPPS researcher, given the design and focus of this study? Might these networks reach out over time in ways that would support Mrs. O's continued learning? If not, did she simply have the misfortune to inhabit a different kind of district than the ones studied by the MSCIS team? Set together, the two published accounts simply do not tell us enough to resolve these questions.

These questions prompt several other possible explanations for the differences in the studies' results. First, it is possible that by focusing on a single teacher, the EPPS case account doesn't reveal the many ways that the curricular reform might have prompted change in practice in Mrs. O's vicinity or elsewhere.[3] Or, by the same line of reasoning, Mrs. O's district or the other two in which EPPS researchers carried out their investigation may have been among those that paid less attention to the substance of the reforms, for whatever reason. By this argument, the MSCIS account might have reported success because it paid attention to a larger number and range of districts, schools, and teachers, and was, in effect, aggregating inferences about policy impact across diverse settings many of which were more responsive to the state policy than Mrs. O's school or district. Second, it is also possible that the EPPS case study found a more mixed response to policy in part because it focused relatively little attention on the full course of action that constituted the "policy," ostensibly restricting its attention to external influences that were most evident to the teacher. Conversely, by attending more carefully to the various aspects of the unfolding course of policy action, the MSCIS study was able to document more clearly a story of "success," though limited to the creation of district support structures, alteration of local curriculum guidelines and expectations, engagement of large numbers of teachers in attempts to teach the new curriculum, and active "use" (whatever that means) of the Framework's themes in classrooms.

To be sure, the differences just noted are in part a matter of conceptualization and unit of analysis. The EPPS account conceptualized the effect of curricular reform in terms of the individual teacher's knowledge base and demonstrated capacity to translate that knowledge base into classroom practice. The MSCIS study looked for effects in more systemic and organizational terms, as change in the capacity and will of sites (schools and districts) to engage in new ways of approaching mathematics education, the structuring of curriculum and organizational supports to encourage those approaches, and in the active engagement of a substantial portion of the teaching force in these attempts. But given the way schooling is organized and conducted, much of what happens in district central offices or in support networks is unlikely to become apparent to teachers and therefore would not appear on the radar screen of research that conceived of policy effects in terms that teachers apprehend and articulate.

Reconciling the Two Accounts

It is entirely possible that the contrasting conclusions of the two research accounts are more complementary than they appear at first reading. Taken together, they may tell the following story: the state's instructional reform policy was successful during its early years in activating a large number of actors in regional networks, districts, and schools on behalf of an ambitious mathematics education reform. Various factors, both those related to the policy and those embedded in local contexts, converged in "ripe" districts (those with sufficient capacity and will to undertake this reform) to encourage large numbers of teachers to pay attention to the policy and attempt to realize it in the classroom. There, the policy met with more mixed success—at least in the early year or two of local implementation. Teachers' initial efforts to put the policy into practice succeeded in changing the more easily altered aspects of practice but were limited by the teachers' grasp of, and beliefs about, mathematical knowledge itself, their capacity to visualize how a new conception of knowledge translates into teaching, and by the momentum of teaching traditions. These same limitations apply in

varying degrees to the people who were in a position to support the teachers' efforts, including mentor teachers, school and district administrators, curriculum coordinators, and others—the kinds of people activated by the reform policy—not to mention the policy framers themselves, whose purposeful course of action lacked a compelling strategy for aiding the teachers' learning.

While such a joint story is plausible, these two research accounts, by themselves, do not permit one to resolve the matter. And because each pursues a somewhat different purpose with different units of analysis, framing ideas, and even questions, it is perhaps unfair to force them into dialogue in this way. But audiences looking for the insights that studies such as this reveal, will continue to ask what the "real" story is and will long for a single, integrated account.

Looking at the Intersection of Policy and Instructional Practice

The contrast between the two research accounts surfaces, in microcosm, some fundamental differences between the research traditions and thereby leaves us with the question of whether there are constructive ways for each perspective to engage the other more fully and directly, leading to a fuller, more informing picture of policy-practice connections.

Perhaps the line of least resistance is to leave well enough alone. Assume that different perspectives capture distinct aspects of a complex phenomenon and, that in some fundamental sense, never the twain shall meet. If so, a sensible next step is then to proceed with research programs that empirically link investigations that explore the questions left out by any single research account. The EPPS program, for example, carried on from where initial accounts of Ms. O and other teachers left off to study some of the same teachers at a later time period, thereby getting at slower, longer term effects of policy that might not show up in the first year or show up unevenly in some settings and not in others (e.g., Grant et al., 1996). The research program also used a large-sample survey to get at the connections between policy, professional development participation, and changes in classroom practice (Cohen & Hill, 2000). But these continuing investigations, varied and informative as they are, have been carried out within a frame of reference dominated by one set of perspectives that does not fully engage the other.

This way of proceeding leaves relatively unexplored the interface between system and individual—which becomes a black box begging for examination. Not only do scholars, but the actors in the system under study want to know: how precisely did the system of which Ms. O was a part "teach" (her or others like her) about the new Framework? What kind of reform coalitions, if any, formed around her and how did they interact with her colleagues, her school, or other schools in her district?

Some possibilities for gaining greater insight into this black box lie in conceptual and analytical work, which by drawing on multiple research traditions develops richer conceptions of instructional practice, policy, and the interactions between them. Getting a deeper understanding of these interactions will mean exploring the way structures, processes, and events that lie *between* policy and practice are likely to mediate their influence on each other, at the same time showing how policy and practice reside *within* each other. In each of these areas, particular topics and theoretical frames seem ripe for investigation and further work.

(Re)Conceptualizing Instructional Practice as the Target of Reform Policy

Because it proceeds from the inside out, it is not surprising that the EPPS research account offers productive starting points for conceptualizing the targets of instructional policy. This closely observed rendering of teaching in Ms. O's classroom captures a great deal about the interaction between this teacher and her students and the assumptions each was making about the subject matter on which the lessons focused. Subsequent theoretical work has refined these ideas by conceptualizing instructional practice as the interaction among teachers, learners, and content (Cohen, Ball, & Raudenbusch, 2000). As such, the notion of "instructional practice" contains within it what teachers bring to the interaction (e.g., beliefs about learning and schooling, subject matter knowledge, pedagogical expertise, and commitments to their work); what students bring (e.g., prior knowledge, beliefs about learning and schooling, aspirations for their participation in school, and a cultural/linguistic background); and the nature of the content with which they interact (i.e., what is assumed about knowledge and the subject in materials, academic tasks, assessments, and other representations of content in the classroom). The construct also subsumes virtually everything that goes on in classrooms, including "interactive, often tacit sociocultural processes" (Page, 1995).

This formulation of instructional practice thus moves beyond instruction as what teachers *do*—or what teachers and learners *do*—to instruction as informed and situated action, reflecting the beliefs, values, and cumulated knowledge of the participants, which they have developed, for the most part, outside the classroom. In this way, an interactive and situated conception of instructional practice brings multiple environments *into* instruction itself, in so doing, marrying macro and micro features of the phenomenon. There are many relevant environments or contexts for teachers' work (Talbert & McLaughlin, 1993), but among them, the following are both central and intimately linked to instructional policies: the *professional* environment (which defines good practice, shapes preparation and support for professional work, etc.), the *community* environment (which is a source of preferences and resources, not to mention the student population itself), and the school and district *organizational environment* (which builds structures and organizational cultures surrounding professional work).

Such an enriched conception of instructional practice is easy to keep in view close to the classroom, and hence figures naturally in inside-out analyses of response to policy. How, though, might it inform outside-in analyses? Frameworks focused on the system as a whole, rather than on the individual classroom, can draw on such conceptualizations in several ways. First, they can assume that underlying all system-level actions aimed at instructional improvement are assumptions, usually implicit, about instructional practice—that is, about teaching, learning, and subject matter—and can help outside-in analysts and policymakers be more aware about what reform structures, supports, incentives, and the like mean for instructional practice. Second, outside-in frameworks can feature multiple dimensions of instructional practice that might be susceptible to policy influence, for example:

- How learners are grouped and who is assigned to teach them.
- What is taught and how.
- How students engage with learning tasks and with each other.
- How instruction is designed and planned.
- What is learned and how learning is demonstrated.

The key here is for policymakers and system-level analysts to work with a rich enough set of descriptors of instruction, as it would be "seen" from a distance, so that they can imagine—and appropriately support—what is happening in instructional interactions which are generally invisible to them.

(Re)Conceptualizing Policy as a Course of Action Offering Instructional Ideas, Supports, and Expectations

The working conception of "policy" can also be expanded to include a more varied set of actions and actors and explicit attention to the way these actors convey instructional messages. To begin with, it helps to locate the working definition of policy midway between two extremes that are commonly found in writings about policy. The first treats policy as authoritative declarations made by individuals or groups at the "top" of the system. In this view, policy takes the form of a law, mandate, or rules and regulations issued by a government agency (see Elmore & Sykes, 1992). This view of policy focuses on intentions, often as expressed in written public statements—for example, text in the *Federal Register*, pages in a policy handbook, or declarations by a school board. At the other end of the continuum, policy conceptions emphasize what makes its way into actual practice. In this view, evident in work on "street-level" policy implementation (e.g., Weatherly & Lipsky, 1977; Lipsky, 1980), policy becomes the dominant pattern of practice, which reflects individual interpretations of intentions stated at "higher" levels of the policy system. Accordingly, street-level actors become, in effect, policymakers. This conception claims to focus on the "real" policy, which is "made," in effect, by the way front-line professionals carry out the tasks targeted by formal policy statements from on high.

While useful, both conceptions have a critical weakness in rendering a satisfactory account of the interaction between policy and instructional practice. The former treats policy as static or fixed and places greatest emphasis on formal declarations of intention, without sufficient attention to hidden meanings, unstated intentions, or concomitant actions that are taken on behalf of policy at its inception or later on. The latter all but ignores original intentions (in fact, assumes that these may have little influence on what transpires in classrooms) and blurs distinctions between "policy" and everything else that takes place at the classroom level.

A compromise conception resolves these difficulties by treating policy as a "purposeful course of action by individuals at higher levels of the system, to guide, direct, and support actions at lower levels of the system across settings and across time" (Knapp, 1997, p. 233).[4] Analytically, this conception helps to focus on what policymakers, as distinct from individuals working within the classroom, do over time. The course of action includes attempts to both direct and support activities in the classroom made by actors at various levels of the system, and hence, much of what occurs in conventional discussions of policy implementation counts as part of the "policy" in question.

But even such a conception of policy can be enlarged further to illuminate its intersection with instructional practice. First, by featuring policymakers' assumptions, beliefs, and theories of action, it can move beyond actions themselves to subsume how those who carry out the "purposeful course of action" *understand* what they are doing. And second, as part of that understanding, it can feature explicitly the assumptions that policymakers hold about instructional practice and demonstrate how these assumptions shape actions. For example, some recent research has convincingly demonstrated

how district leaders' beliefs about learning and teaching, in interaction with the structure of their typical relationships with school people, shape how they interpret and transmit reform messages (Spillane, in press). Third, policy itself can be treated as a series of instructional events and supports, as those involved in the purposeful course of action "teach" others about reform ideas (Cohen & Barnes, 1993)—and often with an outmoded "pedagogy", as the Ms. O case suggests.

From the teachers' perspective, much of what is subsumed within the policy course of action is likely to be remote and invisible, but its invisibility does not mean it is any less likely to touch many aspects of their working lives. In this regard, the MSCIS study helps pinpoint the features of policy that increase its likely connections with instructional practice. First, the breadth of the policy's scope affected many aspects of instructional practice (as conceived above). Second, the policy's relationship to the needs of implementing districts and connection to prevailing professional trends predisposed the policy to be taken seriously by the kinds of districts that were studied. Third, the policy's design left more or less room for local discretion and interpretation by not specifying a fixed sequence of required topics and units of study but rather by challenging teachers to figure out how to realize broad curricular themes in their daily work. (In this sense the policy was notable for what it did not tell teachers to do.) Fourth, the course of policy action included various forms of assistance aimed at building local capacity, which was not sufficiently developed at the outset to support teachers' efforts to teach mathematics for understanding. The policy thus can both activate and supplement local efforts (by individuals as well as by organizations) to expand professional development opportunities.

(Re)Imagining the Avenues that Connect Policy and Practice with Each Other

Armed with more fully developed and intersecting conceptions of policy and instructional practice, outside-in and inside-out analyses are in a position to imagine conceptually what kinds of connections might exist between them—that is, the actual *avenues of influence*, the channels which convey policy messages to teachers (at the same time amplifying or altering these messages) and the transactions taking place within these channels by which teachers are prodded or inspired to start reconsidering their practice, expanding their repertoires, and reconstructing their practice.

Furthermore, we can conceptualize possible avenues that connect policy and practice by working backwards from the target of reform (the interaction of teachers, students, and content) to the features of their working environment that nourish and guide activity in the classroom. Take, for example, the way the workplace (school and district) exposes teachers to the content they are expected to teach. It does so, first, in formal statements of expected topics to be covered in particular grades and by the selection of course materials; second, through the assignment and sorting of teachers into groups with varying interests and expertise, by signaling through broad symbols (e.g., mission statements, program titles) what is worth teaching, through periodic gatherings of teachers or other means that highlight particular ideas (e.g., in formal professional development contexts, informal organizationally-supported conversations); and, finally, through informal networks of peer relationships that wax and wane over time as individuals find (or lose) connections with the collegial community surrounding them. All of these elements of the teachers' environment "speak" to them about what to teach and how. Over time,

teachers respond either reactively or proactively by engaging in various forms of conversation with others and themselves about what they are teaching and by planning the content of instruction accordingly.

In principle, various strands of policy can touch these aspects of the teachers' working environment, by highlighting ideas, selecting ones that are likely to be taken seriously, encouraging productive groupings of teachers, underwriting formal professional development activities, and so on. Ongoing work by the EPPS study team and more recently by members of the Center for the Study of Teaching & Policy (CTP, 1998) has begun to give conceptual coherence to these avenues of influence. Teachers engage in new learning regarding their teaching in proportion to the learning opportunities afforded them (Goertz, Floden, & O'Day, 1995), the various "resources" supporting these opportunities—including personal, institutional, and societal resources—and their own will to take advantage of opportunities (Ball & Cohen, 1995). The collective array of resources can be thought of as a form of "social capital":

> We construe "learning opportunities" to be those experiences, kinds of work, and interactions that create images and insight, that generate disequilibrium and curiosity, that offer the possibility of change and growth. Their quality is shaped by many factors: the time allotted to them, the engagement they engender, the possibilities for collaborative work or thought they offer, and the worth the participants believe they have. Examples may include courses, workshops, conversations, reading, using a new curriculum, teaching experiences. We think of these in connection with social capital because they all contain relations that enhance capabilities for action—in this case, educative action. (Ball & Cohen, 1995, p. 21).

The environments in which teachers work vary in terms of their social capital, that is, their capacity to create and sustain opportunities for teachers to engage in learning about their teaching.

In principle, the purposeful course of action that constitutes policy can touch all of these environments and can do so in many ways. Tracing the way policies *create* avenues of influence, *mobilize* actors within them, or *propel* ideas, expectations, requirements, and resources along these avenues is painstaking work that resembles the meticulous observation of classroom teaching carried out in Mrs. O's classroom. It is a different kind of research task, one that does not show in either of the research accounts on which this article has focused. But the task is of critical importance if we are to do a good job of attributing effects in the classroom to their various causes, among them, policy actions. The ongoing EPPS investigation has attempted at least some of this work, for example, by repeatedly interviewing district- or state-level administrators involved in the policy implementation process (see Peterson, Prawat, & Grant, 1994; Wilson, Peterson, Ball, & Cohen, 1996). These studies offer insights into the learning process in which individual officials have engaged over time as they have tried to put the Framework initiatives into practice, for example:

> The cases of [Superintendent] Todd Elliott and Assistant Superintendent Raymond Anthony are interwoven stories of district leaders who take seriously the notion that they must learn and develop a deep enough understanding of the language arts reforms so that they can model what the reforms mean for others, including principals in the schools. For the superintendent, Elliott, the pedagogical dilemma involves both how to assess what his learners (i.e., principals) know about language arts and how to facilitate their learning in the process. . . . (Peterson et al., 1994, p. 31)

This kind of research is a good start in the direction I am advocating, but there is still something missing from the account just cited: an attempt to trace more concretely how these individuals' learning connects with what particular teachers are thinking, learning, and doing in the classroom. One way of

doing so is to pay close attention to the content and pedagogy of these learning opportunities, both the formal ones and the informal ones, and relate these educative features to individual teachers' learning, as has been done for several teachers who work in the district noted above (Grant, Peterson, & Shojgreen-Downer, 1996). But it is just as important to capture, independent of particular individuals, how activity in the multiple environments noted above embeds new "learning" within its organizational routines, thereby altering the organization's capacity to support reform, as noted in other recent research on systemic reform in California:[5]

> There was strong sentiment among the teachers that their own ability to carry out instructional changes in mathematics and English language arts was influenced by the organizational context in which they worked. That is, the capacity of the individuals interacted with and was enhanced by the capacity of the school as a unit—including its organizational structure, the history of collaboration, the presence of a common vision. Teachers in every site spoke of the importance of having a critical mass of teachers who were open to change and focused on instructional improvement. (O'Day, 1995, p. 30).

As the conception of avenues of influence implies, there are numerous structures, events, and processes that intervene between purposeful courses of action undertaken by a policymaking group and those directly engaged in instruction. In principle, policy meets practice within and through these mediating forces and conditions. Examining these forces should take us a long way toward understanding how policies connect with learning and teaching. As recent research suggests, at least the following mediating forces are worth a closer look:

- Professional communities within school and district (McLaughlin & Talbert, 2001; Coburn, 2001; Gallucci, 2002).
- The organization and enactment of instructional resources in the school (Miles & Darling-Hammond, 1998).
- The exercise of instructional leadership in schools and districts (Glickman, 2002; Peterson, 1999).
- Teacher demography and labor markets (Ingersoll, 2000).
- The design and implementation of professional development experiences (Cohen & Hill, 2001).
- Creation of subject-specific channels of influence on teaching practice (Grossman, Thompson, & Valencia, 2001).

In examining the transactions between instructional practice and policies, as they are transmitted through these mediating conditions, scholars will come face to face with fundamental questions about how and what professionals learn about their practice. How do professionals search for, sort among, and internalize (or reject) ideas about good teaching, student learning, or the content they are teaching? How do they apply these ideas to their daily working lives? What is it about the ideas themselves, the environments in which practitioners are exposed to them, or the nature of their engagement with these ideas that makes it more or less likely that the ideas will become used and useful to them?

A parallel set of questions arises at the level of the organization as a whole. How does it "learn" about its performance and develop new routines or repertoires? How do members of the organization come to view their work as part of a whole and find ways to inspect or reconsider their collective work? How do reform ideas, embedded in policy or in other aspects of policy action, inform this reconsideration?

Conclusion: Studying the Interaction of Individuals and Systems Over Time

What I have done in the preceding analysis is to look carefully at two accounts of a complex policy initiative in its early stages—one approaching the matter from the "inside-out" and other from the "outside-in"—with an eye to detecting what each does and doesn't say about early local responses to policy. Taken together, these accounts collectively illuminate the teacher's inner world and the fine detail of classroom work—which helps us see how reforms have affected the teacher's thinking, learning, and approach to instruction—and they do a similar thing for the local policy system, by showing how a complex policy initiative engages various aspects of the local system. What the published accounts don't tell us so clearly is how teacher, classroom, and policy system are connected (if at all), and in what manner, although there are intimations of the nature of connections, or lack thereof. Given this lack of attention to a central feature of local response, I have also tried to speculate how both might more productively address the topic, either separately or in some more hybrid design for research.

Capturing influence by tracing the exchanges and connections between individual actors and their workplace environment means studying the interface between individuals and systems. This is not easy to do, and for understandable reasons, research studies tend to concentrate on one or the other. Implicitly, there are at least two units of analysis that matter, and they matter equally: (1) individual sensemaking and response (either reactive or proactive) to environmental contingencies, and (2) the construction (or evolution) of the environmental contingencies themselves, especially those contingencies that are traceable to external policy action. Not everyone accepts that the latter exists independent of the former; after all, one may assume that the teacher's environment lies in the eye of the beholder. But on the premise that school cultures, policy systems, and the like exist independent of any given teacher, and that these group-level phenomena impinge on teachers' lives, then they, too, deserve the researcher's attention.

Understandably, in the early years of a complex policy initiative, these connections between individuals and policy systems are likely to be fragile, tentative, and emergent, or simply nonexistent. (The same may also be true later in the life cycle of the policy, but the early years of implementation are especially prone to this state of affairs.) So research that tries to capture policy impact at this early stage has a difficult interpretive task. Accounts constructed at this stage risk two kinds of misinterpretation, which underestimate and overestimate, respectively, what a curricular reform can accomplish.

On the one hand, the early returns from a major reform may indicate that lofty goals are unrealized, leading some to a pessimistic appraisal of the policy's potential. The EPPS case study permits this kind of interpretation and therefore, though the study explicitly cautions readers in this regard, may encourage some to underestimate the potential of the Framework to activate and support new teacher learning in elementary mathematics over the long term. The case account supports such an underestimate by highlighting a series of factors which are likely to limit the policy's impact over the long term: the inherent difficulty of teaching for understanding, Mrs. O's apparent satisfaction with the substantial changes she has made already, her superior's reported approval of her performance, and the absence of individuals "in her vicinity" who are asking hard questions about how to support teachers' learning of new content and pedagogy. To be sure, the interpretive commentary acknowledges the

limitations of this case study research for understanding the future course of events (Cohen & Ball, 1990b) and the continuing line of EPPS research does much to pursue the actual pattern of longer term effects.

On the other hand, it is easy to overestimate a policy's prospects for success at an early stage in the policy's life cycle, and the MSCIS account may well support this possibility. This account clearly views the Framework's potential more positively, based on the rapidity and pervasiveness of the changes made in the early years of the policy. But this kind of interpretation is likely to focus on changes that are more visible and readily made. In part, the optimism apparent in the MSCIS study rests on the fact that this investigation did not examine nor fully appreciate what it would take to engage and alter the "deep structure" of elementary mathematics teaching.

What I have suggested about studying the interaction of individuals with systems, and clarifying the avenues of influence that connect them, may be a tall order for any one piece of research, and consequently I may be calling for programs of research more than a single study. Different studies can productively address these matters, provided that the studies are designed and reported in ways that make it easy for each to "speak" to the other.

But whether we seek insight into major policy reforms through programmatic research, individual studies, or intelligent synthesis of disparate work, these reform policies deserve the best efforts of policy researchers. There is an ongoing set of questions provoked by the two studies both separately and together that deserves attention. If we are to make good sense of the California Mathematics Framework over time, we need to know, for example, how Mrs. O's learning trajectory continued over years following the initial EPPS case account. Did her learning reach a plateau, as implied by the case account, or did it continue to reach new levels of understanding as her experience, insights, and inner doubts accumulated? And if her learning did continue, what catalysts, resources, and ideas or other supports sustained that learning? We also need to know how the policy environment surrounding her and other teachers, both those like her and those quite different from her, "spoke" about what should be taught and how it could be taught. EPPS has constructed and carried out longitudinal data gathering that will help to answer these questions, and as such it will offer (and already has offered in various ways) some of the most revealing insights into the complex processes that link policy and classroom practice. But there is more to know about local responses to reform initiatives than this one program of investigation, far-reaching as it is, will provide, such as whether the early coalition formation around policy goals alluded to in the MSCIS account persisted in ways that provided sustained support and set in place long-lasting structures or norms, or whether these coalitions dissipated and re-formed around other pursuits unrelated to teaching for understanding. By looking further at the many ways in which policy actions can stimulate local systems and motivate or support individuals' actions, we will be able to generate compelling analyses regarding the often indirect, though potentially powerful, influences policy may have on professional work.

ENDNOTES

1 This body of research, now quite substantial, comprises the multi-year Educational Policy and Practice Study (EPPS), conducted by a team from Michigan State University and the University of Michigan. This multi-faceted study has followed systemic reforms in mathematics and literacy in three states (California, South Carolina, and Michigan). Reports from that research program are too numerous to list in toto here; I note instead those that are particularly helpful in providing a data-based picture of California's reform efforts in mathematics: Peterson, 1990a, 1990b; Ball, 1990; Wilson, 1990; Cohen, 1990; Wiemers, 1990; Cohen & Ball, 1990a, 1990b; Darling-Hammond, 1990; Sykes, 1990; Peterson, Prawat, & Grant, 1994; Grant, Peterson, & Shojgreen-Downer, 1996; Wilson, Peterson, Ball, & Cohen, 1996. These pieces are joined by numerous other conference presentations, articles, or chapters reporting findings from other states, and by interpretive and conceptual writing of various kinds. Where relevant, these other pieces have also been referenced in the discussion which follows.

2 In fact, the case account of Mrs. O's response to the California Mathematics Framework has been reprinted in book chapter form (Cohen, 1991) independent of the other cases and interpretive pieces in the EEPA journal issue.

3 To be fair to the case account, it would have reported such activities if they had been taking place in Mrs. O's district (they weren't, according to the EPPS team) and Mrs. O had been aware of them. The case account focused its attention on what was salient and visible to Mrs. O in her environment.

4 I am indebted to Betty Malen, University of Maryland, who helped develop the argument concerning policy as a purposeful course of action, as part of a course we co-taught on educational policymaking.

5 The EPPS case study design does not preclude paying attention to such features of the organizational environment, and EPPS team members indicate that they did look for such things (Cohen, personal communication). The capacity of such a design to see such features is, of course, constrained by the individual teacher's relationship to the school as a whole, awareness of what is going on within it, and ability to articulate often subtle interactions between individual and collective.

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