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Developing Instructional Leaders: Using Mixed Methods to Explore the Black Box of Planned Change in Principals' Professional Practice

Carol A. Barnes,[1] Eric Camburn,[2] Beth R. Sanders,[1] and James Sebastian[3]

Abstract

Purpose: This study examines learning, and both cognitive and behavioral change among a sample of randomly assigned urban principals, half of whom participated in a sustained, district-based professional development program (DPD). **Research Methods:** Latent class analyses of daily log data, qualitative typology development, and case studies of change provide a rich portrait of the learning and change process. **Findings:** Few dramatic transformations of practice. Instead, principals attributed to the DPD a gradual refinement of existing practice through a process that allowed them to "break down" declarative knowledge to better understand its consequences for their work, but also provided knowledge structures, tools, and routines for reintegrating ideas from the program into strategically valuable procedural

[1]University of Michigan, Ann Arbor, USA
[2]University of Wisconsin–Madison, USA
[3]Consortium on Chicago School Research, IL, USA

Corresponding Author:
Carol A. Barnes, University of Michigan, 610 E. University,
Suite 3112 SEB, Ann Arbor, MI 48109-1259
Email: barnescl@umich.edu

knowledge. **Implications:** Results suggest potential for developing principals' competencies within continuing practice communities, but expectation of incremental rather than a dramatic "turn around" in principals' leadership through program interventions.

Keywords

instructional leadership, professional learning, education reform, mixed methods, school improvement

Meeting the challenge of improving instruction and achievement in our nation's schools—especially in urban schools where students are often disadvantaged by economic or other circumstances—will depend, in part, on school leaders who can effectively lead such improvement (Barth, 1986; Leithwood, 1994). But developing principals who can lead teachers and students to a new level of performance is a daunting task. While many argue that instructional leadership is a key strategy for meeting the challenge of helping all students learn (Barth, 1986; Borko et al., 2003; Leithwood, 1994), few principal development programs have focused directly on the problem of instructional improvement (Tucker & Codding, 2002). At the same time, traditional instructional formats typical of many principal training programs often result in limited transfer of learning to the real world of schools where leaders work in a complex context often characterized by time pressure and changing conditions (Bransford, Brown, & Cocking, 2000; Hallinger, Leithwood, & Murphy, 1993; Kelly & Peterson, 2002).

Multiple lenses on this crucial problem of improving professional practitioners' ability to perform in complex domains, from fields such as cognitive science (expert/novice and social learning scholarship), professional education, reform implementation, and knowledge utilization research, converge on several principles for developing expertise in practitioners through planned change. Professional practitioners benefit from actively engaging with coherent content and other members of their organization or professional group, and from sustained opportunities to reflect on and apply new knowledge in their work situation (Argyris & Schön, 1996; Greeno, Collins, & Resnick, 1996; Hallinger, Leithwood, & Murphy, 1993; Hood, 2002; Majone & Wildavsky, 1977; Peterson & Kelley, 2002; Resnick, Levine, & Teasley, 2002; Schön, 1983; Sykes, King, & Patrick, 2002).

The purpose of this study is to examine the interplay of learning, knowledge use, and change in a group of principals in one urban district using this set of ideas, elaborated below in our conceptual frame, about how practitioners gain competence or expertise. An externally designed, research-based

district professional development program (DPD) aimed at transforming principals into instructional leaders, provides a rich context for exploring not only the extent to which principals changed their practice but also the nature of that change and the process by which it occurred. In doing so, we address the following questions:

1. How do the learning experiences of principals develop over the course of the 1st year of a sustained, multi-session, district-based leadership development program?
2. What instructional formats and content of the leadership development program influence principals' learning experiences? How?
3. Do the principals who attended the DPD change their practice in the direction of program goals? How do they differ from principals not assigned to or participating in the program?
4. What is the nature of change—cognitive, conceptual, or behavioral—in principals' practice during the year of the DPD?

A Research-Based, Sustained, District Professional Development Program (DPD)

The DPD in our study aimed to reduce the time and cognition that principals in one urban district put into non-instructional matters. The program focused them instead on content, including research, theory, and "best practices" related more directly to improving instruction and achievement. In doing so, the DPD set challenging and even transformational goals for principals.

The program design incorporated the elements characterizing effective development for practitioners sketched just above. Principals were organized into a treatment cohort and a comparison cohort, each drawn from leaders of primary, middle, and secondary schools. The treatment cohort interacted and remained connected for 1 year, working in teams on common problems and topics. These principals had ample opportunities to apply new knowledge to meaningful problems; for example, principals engaged in "action projects," which addressed local priorities and required them to apply the concepts and strategies that they had learned in the program to that local context. Through a spiraling curriculum and a carefully crafted scope and sequence, program content was integrated, and returned to big ideas and concepts repeatedly over multiple sessions. Importantly, though the program as intended would have been implemented over 2 years, it was truncated to 1 year due to leadership turnover in the district.

A key focus of the leadership curriculum was the strategic drive to improve instruction and raise student achievement. The content presented variations

on this theme across the 1st year with units such as strategic planning for improved instruction, standards-based instructional systems, foundations of effective learning, and coaching for implementing change in schools. But the DPD went well beyond simply providing strategies for principals to use, or even adapt for use, in their schools. Instead, the DPD curriculum made a concerted effort to explicitly teach participants to plan, think, and work strategically. Drawing from methods used for the education of professional practitioners in such wide-ranging fields as medicine, the military, law, the ministry, and engineering, the program's pedagogies are rooted in research and theory characterizing effective learning experiences for adults.

Conceptual Frame

Broadly speaking, our framework posits that the development of professional practice is a process in which learners become increasingly more competent *performers* in their complex working conditions and that professional performances include a cognitive, as well as a behavioral, dimension. The perspectives we use identify "sense-making" and "knowledge use" in practice as key activities through which professionals innovate and change (Argyris & Schön, 1996; Cohen & Weiss, 1977; Ericsson, Krampe, & Tesch-Romer, 1993; Feltovich, Ford, & Hoffman, 1997; Hood, 2002; Huberman, 1983, 1987; Putman & Borko, 2000; Schön, 1983; Spillane, Reiser, & Reimer, 2002; Spiro et al., 1988). From this view, the practicing professional learner is "not a spectator but an actor who stands within a situation of action, seeking actively to understand and change it. When inquiry results in a learning outcome, it yields both thought and action . . . in some degree new" (Argyris & Schön, 1996, p. 31).

Thus, scholars from a variety of perspectives argue that professional practitioners attempting to improve their competence need opportunities to actively wrestle with actual problems embedded in work. Those who study the acquisition of expertise typically classify expert knowledge as either "declarative," for example, concepts and facts, or "procedural," that is, knowledge about "how to" successfully accomplish something in a particular context (Bransford, Brown, & Cocking, 2000; Ohde & Murphy, 1993; Yekovich, 1993). The two kinds of knowledge are closely related; as a practitioner applies new declarative knowledge in the work context, he or she develops procedural knowledge, which in turn can refine his or her understanding of declarative knowledge. From this perspective, effective development programs would aim for more than transmitting domain-specific declarative knowledge; such programs would also teach problem

solving in the work context so that professionals could develop procedural knowledge (Bransford, 1993). This is especially important in the case of principals whose work context is often replete with uncertainty and exigencies.

The perspectives in our framework also hold that communities of practice play a central role in practitioner development. Such communities include practitioners who pool their skills and thinking to jointly learn, develop new knowledge, and solve common problems across and within the boundaries of the team (Argyris & Schön, 1996; Rogoff, 1996; Wegner, McDermott, & Snyder, 2002; Wertsch, 1996). Scholarship on expertise, professional education, and practitioner learning shows the merits of orchestrating instructional transactions (social interaction around content with knowledgeable others and peers) for developing "scaffolding" for learning through guided practice, peer teaching, shared language, and reflection on similar experiences (Bridges & Hallinger, 1993; Feltovich, Ford, & Hoffman, 1997; Hallinger, Leithwood, & Murphy, 1993; Hart & Pounder, 1999; Kelley & Peterson, 2002; Patel, Kaufman, & Magder, 1996; Resnick, Levine, & Teasley, 2002; Sykes, King, & Patrick, 2002).

Variations on these themes are also emerging in knowledge utilization studies. In that field, research and more recent theory have resulted in a paradigm shift from ideas about the transmission of codified stable knowledge toward a more complex view of change as a process involving not only the content but also the "knowledge user," the context, social transactions, and activity (Hood, 2002). As Fuhrman (1994, cited in Hood, 2002) wrote,

> The research on utilization is quite clear: the meaning of research [knowledge] is constructed by the user . . . making sense of new knowledge in the context of daily activities. . . . It is research on learning that is the foundation of understanding knowledge utilization. (p. 13)

During the process of acquiring new declarative knowledge, applying it in context, then reflecting on it within a community of practice, practitioners can learn to *change what they do* and *the way they think*. This kind of experience can actually change leaders' perceptions and thought processes (Ohde & Murphy, 1993; Yekovich, 1993). For example, novices or less competent thinkers can develop more effective cognitive structures for summarizing and connecting multiple practice-based situations.

Studies show that experts have a well-organized knowledge base (Berliner, 1986) that allows them to classify problems rather than become stymied by

the surface details of a situation as novice practitioners often are (Bransford, Brown, & Cocking, 2000; Chi, Glaser, & Rees, 1982; Ohde & Murphy, 1993). Thus, a key advantage that experts have is their ability to see patterns and relationships and to organize their thinking around overarching knowledge structures (Yekovich, 1993).

This point is closely related to strategic thinking and planning, a key feature of the DPD curriculum. A Far West Laboratory study, for example, found that more effective principals were able to connect "the routine activities and decisions made within the school" to a larger strategy (Dwyer et al., 1983, cited in Kerchner, 1993, p. 16). "Finding the strategic potential" (p. 18) in daily actions allowed leaders to connect such actions to a larger, focused set of goals. Moreover, in summarizing research on principal effectiveness, Hallinger and Heck (1996) found that the extent to which principals set goals and sustained a school-wide focus on student learning was consistently and positively associated with stronger academic outcomes.

Framed by the ideas in this review, we examine the nature of the principals' learning experiences as well as change in their habits of mind and behaviors—that is, in their professional performances—at the beginning, during, and at the end, or shortly after, the delivery of a major professional development initiative to nearly half the principals in the district.

Research Design

The results reported here are based on data from a longitudinal study that was conducted in a mid-sized urban school district in the Southeastern United States. The heart of the research design is a randomized experiment in which half of the 48 principals in the district were assigned to participate in the DPD and half were assigned to the control group. The study design employed a mixed method strategy to investigate the influence of the program on principals' knowledge and practice. Below, we describe more about the design components that were used for this article.

Mixed Methods and Data

Evidence on principals' professional development experiences comes from complementary mixed method analyses (Camburn & Barnes, 2004; Tashakkori & Teddlie, 1998). Our data came from "shadowing" principals, observations of program implementation, cognitive and post observation interview data, principals' responses to video or written scenarios simulating practice, and principals' daily practice logs.

We employed concurrent analyses of principal log data using qualitative typology development and quantitative latent class analysis (LCA) to group principals with peers whose practice was similar and to analyze changes in principal practice (Tashakkori & Teddlie, 1998). Qualitative typology analyses classified leaders into three types (high, moderate, or low instructional leaders) while LCAs placed leaders into two types (a focus on instructional leadership versus managerial leadership). These analyses of principal logs were supplemented with additional, but different, quantitative or qualitative data, thus expanding what we could learn from either one of the two analytic approaches independently. For example, the LCA included both treatment and non-treatment principals for comparison purposes, while the qualitative typology included only principals assigned to or attending the treatment but drew on coded qualitative data to produce more elaborated profiles of each type of leadership. We used the two classifications of principals and summaries of interview themes to select a subset of principals for in-depth case studies of principal change (Mathison, 1988; Miles & Huberman, 1994). As a whole, this combination of strategies provided a complex yet instructive picture of the nature of practicing principals' learning and change process.

Quantitative Data, Sample, and Analyses

Quantitative data used for this study come from daily logs which are web-based self-administered questionnaires in which participants report their leadership and management activities for a single day. To examine change in principals' practice, we used log data from four time points: spring 2005, fall 2005, winter 2006, and spring 2006. At each time point, principals filled out logs for 5 consecutive school days. Since the first round of DPD trainings was conducted in the summer of 2005, data from the spring 2005 administration of the logs provide a baseline measurement of principal practice. Fall 2005, winter 2006, and spring 2006 administrations occurred after the first round of training, and data from these time points thus constitute "post-treatment" measures. A total of 48 principals completed daily logs over the four waves of the study. Because our primary interest was in examining change over time, our analysis was limited to 27 principals who provided data at all four time periods. Most principals who were asked to complete logs did so, and response rates among participating principals were high, ranging between 80% and 93%.

For each day on which they completed a log, principals reported the number of minutes they spent on nine domains of leadership responsibility. In developing these leadership categories, we consulted a wide range of studies that produced comprehensive schemes classifying the domains of responsibility of principals' work (Drake & Roe, 2003; Hallinger & Murphy,

1985; Heck & Marcoulides, 1992; Larsen & Hartry, 1987; Martin & Willower, 1981; Peterson, 1978; Pitner & Hocevar, 1987). The nine domains measured by the log resulting from a synthesis of these classification schemes exhaustively characterize principals' work: building operations, finances, community or parent relations, school district functions, student affairs, personnel issues, planning/setting goals, instructional leadership, and professional growth.

This study utilized a grosser set of categories because our primary interest was simply to understand the relative emphasis that principals placed on instructional leadership compared to all other domains. To facilitate this contrast, we collapsed the original nine domains into four categories: political leadership (contact with parents/community, contact with district), managerial leadership (finances, building operations, student affairs, and personnel), instructional leadership, and planning. In our view, these four categories cover the entire range of leadership domains identified in the synthesis of classification schemes. Cuban's (1988) classification of principal leadership into three domains—political, managerial, and instructional leadership—supports the construct validity of these collapsed categories. Our collapsed set of domains adds a fourth category, planning, which encompasses strategic planning and setting goals. This category is a crucial addition because it was identified in multiple classification schemes we reviewed and because it is a major emphasis of the district professional development program under study.

One method we employed for examining change in principal practice was a LCA conducted with data from the end of day logs. LCA is a statistical method for empirically identifying subgroups of related cases (latent classes) from multivariate categorical data. For this study, LCA models identified groups of principals who spread their time across the four leadership domains in a similar fashion. The LCA models assume that the population consists of a discrete number of unobserved subgroups that can be referred to as latent classes or latent profiles, and then estimate class membership from sample data (Vermunt 2004).

Qualitative Data, Sample, and Analyses

Data sources. We interviewed principals immediately following their DPD sessions at four time points covering 11 days of the DPD program and six of the seven units in which they participated. The themes analysis included five of those principals for comparison: Four principals who were not assigned to the DPD are identified in Tables 1 and 2, as Wimm, Batt, Pace, and Bade; and one principal who was assigned to the DPD but never attended, is identified as Welt. For these principals, we used a similar protocol but focused on

Table 1. Samples and Data Sources for Quantitative and Qualitative Analyses

Principal	Assigned to Treatment Group	Assigned to Control Group	Attended DPD	Did Not Attend DPD	Latent Class Analysis of Change[a]	Qualitative Typology Development—Initial Classification[b]	Qualitative Typology Development—Change Analysis[c]	Qualitative Theme Identification[d]	In-Depth Case Studies[e]
Tome	X		X		X	X	X	X	X
Orem	X		X		X	X	X	X	X
Walt	X		X		X	X	X	X	X
Lamm	X		X		X	X	X		
Teem	X		X		X	X	X	X	
Cale	X		X		X	X	X	X	
Weat		X	X		X	X	X	X	
Wile		X	X		X	X	X	X	
Dubb	X		X		X	X			
E	X			X	X	X			
F	X			X	X	X			
G	X			X	X	X			
Hill	X		X		X	X			
K	X			X	X	X			
N	X			X	X	X			
Welt	X			X	X	X		X	
Batt		X		X	X			X	
B		X		X	X				
Bade		X		X	X			X	
C		X		X	X				
D		X		X	X				

(continued)

Table 1. (continued)

Principal	Assigned to Treatment Group	Assigned to Control Group	Attended DPD	Did Not Attend DPD	Latent Class Analysis of Change[a]	Qualitative Typology Development—Initial Classification[b]	Qualitative Typology Development—Change Analysis[c]	Qualitative Theme Identification[d]	In-Depth Case Studies[e]
Pace		X		X	X			X	
I		X		X	X				
J		X		X	X				
L		X		X	X				
M		X		X	X				
Wimm		X		X	X			X	
Cole		X	X			X	X	X	
Jimm	X		X			X	X	X	
O	X		X			X			
Dann	X		X			X		X	
Q	X		X			X			
T	X		X			X			
U	X					X			
V	X			X		X			
Total	21	14	16	18	27	24	10	15	3

Note: DPD = district professional development program.

a. Only the 27 principals included in latent class analyses of change are noted here. Log data for all principals listed in the table plus an additional 13 principals not listed were used to identify latent classes.

b. Based on instructional leadership data from logs, coded scenario responses, and coded description of daily decisions.

c. Based on instructional leadership data from logs, coded scenario responses, and coded description of daily decisions.

d. Based on interviews conducted after DPD sessions, cognitive interviews, and shadowing observations.

e. Based on log data (including coded open-ended question), scenario responses, interviews, and shadowing observations.

principal development they had attended other than the DPD. At each point, we questioned the treatment principals about their understanding of the unit, what they learned and why, as well as how they might *use* the new ideas introduced by the DPD in their daily practice (or in the case of non-treatment principals, ideas in the other professional development they had attended). We also asked them to describe a typical day in their practice; their approach to leadership for improving student learning; if, how, and why that practice had changed; and what, if anything, they were doing differently as a result of the DPD (or other PD they had attended).

In addition, at mid-year, our research team shadowed a sub-sample of principals from among those who were attending the DPD program, for 2 days each. Every 15 minutes during these daylong observations in schools, observers documented the principals' practice using written description and closed-ended categories aligned to the end of day log. At the end of the day, our research team interviewed each principal about the practices that he or she had observed using an explanation protocol (Chi, 1997) to prompt principals' recall of prior, practice-based cognitive performances, that is, how and why principals used new knowledge in the context of their work (Klein, Calderwood, & MacGregor, 1989).

Finally, the research team collected principals' narrative responses to a video simulation of a teacher's lesson and written scenarios describing a range of brief, school-related problems. Principals were asked how they would respond to these prompts and their brief narratives included the aspects of the practice-based situation they *noticed*, how they *thought about* these aspects, and what they would actually *do* in response to a range of leadership problems.

Sample and typology development. As discussed earlier, the results of LCA were used to categorize principals with respect to changes in their practice over time. In a parallel analysis, we employed qualitative typology development to categorize principals as high, moderate, or low instructional leaders at the beginning of the program (24 principals assigned to or attending the DPD in spring 2005), and then again after the treatment year (when the sample we compared across the year included 10 principals). We based the classifications on principal logs, coded narrative responses to practice-based problems, and principals' descriptions of their most consequential decisions each logging day (an open-ended question on the log). First, we examined the qualitative sample of principals and their distribution on the two items of interest to us using spring 2005 data: the percentage of principals' total time in the logging session devoted to instructional leadership activities and the average number of minutes a principal spent on instructional leadership.

Next, we *quantitized* (Tashakkori & Teddlie, 1998) selected principals' responses to a video scenario simulating the observation of classroom practice because we wanted to focus on these leaders' mentions of subject matter content—a key component of instruction. The logic that strong instructional leaders must have deep and current knowledge of instruction in specific content areas runs through the DPD curriculum. Important functions for instructional leaders, such as monitoring instructional practices, coaching teachers, modeling instruction, and even teaching classes, are not content free. We thus examined principals' responses for evidence that they noticed and provided feedback to teachers in the core content of a lesson as it interacted with teacher-student exchanges. Our simple coding scheme included response grounded in subject matter, modest or potential grounding in subject matter, or subject matter neutral response. Two members of our team coded the responses across all principals independently and then resolved disagreements in conference. We generated a report using a HyperResearch[1] database listing the principals and counts by each coding category—ordered from most frequent mentions to least.

We also quantitized a second source of qualitative data. The logs asked principals to describe the most "consequential decision" they had made each day of the logging period. Our rubric for rating the descriptions of these consequential decisions was designed to focus on the core elements of instruction—students, teachers, and academic content—and the extent to which work with these elements figured into principals' daily leadership decisions (as another indicator of instructional leadership). The rubric included high mentions of work with students or teachers on academic or instructional matters; some work on these matters, but also a focus on other, non-academic matters; or a focus on non-academic work—building operations, for example. We generated another list of principals who scored high, moderate, or low in terms of these categories.

We bundled these data by case and arrayed them in a matrix where the cells showed the variation in instructional leadership by percentage of time and total minutes recorded on the log but also summarized data on the principals' mentions of instructional leadership categories from the coded qualitative data. These clusters created succinct profiles that allowed us to identify extreme cases but also gave us information about mixed cases and more typical cases. Thus, we could summarize data but also identify nuance or variation within "types" of leadership. We found, for example, that a principal could spend a relatively modest amount of time on "instructional leadership" in terms of logging reports but frequently discuss academic content and work with students or teachers in the qualitative reports.

Sample and interview theme identification. We focused our initial qualitative analyses of learning, knowledge use, or change themes in the interview data primarily on 10 of the 24 DPD participants (see Table 1). Selection criteria included principals' ranking in the spring 2005 qualitative typology and their attendance at the DPD, thus generating a sample that included a range of leadership types for whom we had solid qualitative data. Of the 10 principals in the sample, 2 were high instructional leaders, 6 were moderate, and 2 were low. One of the 10 attended the program 5 days, 2 attended 8 days, and 7 attended 10 or 11 days of the 11-day DPD institute. We collected shadowing data for all 10 principals. Nine responded to written scenarios and a video of a teacher's literacy instruction in the spring of 2005 and again after the year of DPD.

Finally, we used interview summaries, shadowing data, and the two classifications of principals to select and develop cases of change for three principals classified as managerial leaders in the LCA at the beginning of the program. In the LCA, two changed toward instructional leadership; one did not. Their cases are instructive for considering the meaning of change in practicing principals' leadership.

Limitations and Challenges of the Study

Because we studied a single school district, our results do not generalize to a larger population of schools or districts. Despite this limitation, by examining the consistency between our results on one hand, and theoretical perspectives and prior research on the other, we believe we have extended what is known about principal development and have highlighted potential avenues of inquiry for future research. From this perspective, we believe the value of our results extends beyond this study in their potential to contribute to future conversations and inquiry around problems of principal development.

We also faced a challenge making causal inferences about the influence of the DPD on principals. Our basis for such inferences comes both from direct quotes in which principals, over time, repeatedly attributed changes or refinements in their knowledge, thinking, and behavior to participation in the DPD as well as from quantitative evidence to assess program impact. In the latter case, the potential for confounding variables made valid inferences challenging. One example is that, as in most districts in the United States, principals in this study were exposed to ideas about leadership practice from multiple policies and programs, thus complicating the attribution of influence to any one source. Anticipating this challenge, we developed interview questions that asked participants not only about the DPD but also about the contributions to their learning made by other professional development and about other

contextual supports or obstacles that influenced their leadership practice. Principals who were interviewed thus had multiple opportunities to reveal factors, other than the DPD, that may have influenced their practice toward managerial or instructional leadership. Our mixed method design helped us disentangle some of the contextual influences on principals and revealed, for example, that the district introduced instructional coaches as well as offered alternative professional development to principals in some schools during the course of the study. There may have been other contextual factors beyond the scope of our study that contributed to the patterns in the principal practice we observed.

Results

Instructional Formats and Principals' Learning Experiences (Questions 1-2)

We begin by considering the nature of new knowledge presented to principals through the DPD and by describing the nature of principals' learning experiences as they developed over the year of the program. An important, overarching theme that emerged at the outset is that the ideas to which principals were exposed in the DPD or elsewhere in the policy environment were not transmitted in a fully worked out or ready-to-use state. Principals had to interpret and make sense of them (see, for example, Argyris & Schön, 1996; Barnes, 2002; Cohen & Weiss, 1977; Hood, 2002; Hallinger, Leithwood, & Murphy, 1993; Majone & Wildavsky, 1977; Schön, 1983; Spillane, Reiser, & Reimer, 2002). These practitioners had to expand upon program content and then develop "procedural" knowledge for actually using the content under conditions of complexity and uncertainty.

By their own accounts, the DPD was the only program that helped principals with these tasks through their active participation in the ongoing social learning environment or community of practice that the program cultivated. During their June 2005 interviews, the DPD principals reported that the team or cohort approach was a key benefit of their early DPD experience. Principal Cale, for example, said, "Just interaction with the colleagues, that's something that we don't have time [to do]. We're all so busy with our own buildings and our problems and challenges." Another principal reported, "You can take experiences that others have and apply them to what you're doing. . . . We don't get to do that a lot on the district level." Just as the egg carton structure of schools tends to isolate teachers, the structures of Local Education Agencies (LEA) in which schools operate and the immediacy of school-level demands also tend to

isolate principals. Meetings that do occur rarely focus on instruction or involve the kinds of peer discussions that support improved leadership practice.

Thus, the DPD provided a structure—the time, content, connections among these school leaders, and instructional formats—that served as a forum for principals' exchanges guided by knowledgeable facilitators. The DPD program's spiraling curriculum also allowed this team of principals to return to and jointly make sense of the big ideas in it: "Some things you just hear over and over again and then you talk through it and it just makes sense" (Orem, February 2006). These arrangements provided principals with "social capital" (Coleman, 1988; Wegner, McDermott, & Snyder, 2002) such as connected thinking or problem-solving opportunities, pooled knowledge, and trust that are typically unavailable to them. Guided discussion with colleagues began to de-privatize principals' practice just as such discussion can de-privatize teaching practice (Little, 2002; Louis & Kruse, 1995).

Over time, principals also valued a learning environment in which they could *actively* engage with peers to elaborate and extend the abstract through more detailed and concrete accounts embedded in practice, thus making declarative knowledge relevant to their work:

> You're not just listening to a lecture. You're talking. You are also brainstorming and really dealing with ideas. So sharing and listening to what different principals or administrators have had to say about certain topics, that's been very helpful because it makes it real, makes it relevant. (Wile, February 2006)

Another principal echoes the kind of situation-specific, activity-based processes we elaborated in our frame when she talks about the value of actually applying knowledge when making sense of new information:

> I can relate it [new information] to something specific that I've done at the school . . . and give specific examples. Because you can have book knowledge, but if you haven't put it to practical use then it's not as effective. (Orem, February 2006)

Generally, we found principals' interactions through the DPD to be consistent with descriptions of "communities of practice" advanced in the literature as the DPD allowed teams of connected professionals to develop, share, and apply knowledge within or across organizations (Argyris & Schön, 1996; Wegner, McDermott, & Snyder, 2002).

Investigating Change in Principals' Practice

Equipped with an understanding of the nature of principals' learning experiences, we turn to an investigation of change in principal practice. We first take up the question of change using the results of latent class statistical analyses to identify change in reported behavior toward program goals and differences between DPD participants and non-participants. We then compare our qualitative typologies to the LCA and use themes in the interview data to illustrate and account for convergent as well as divergent themes in our data. Finally, we more closely examine the nature of the change process through case studies of three principals.

Assessing Change in Principals' Practice With Daily Logs (Questions 3 & 4)

We fit LCA models to log data as a way of examining changes in principal practice over time. Separate models were fit for each of the four log periods from spring 2005 to spring 2006. Recall that spring 2005 is a pre-treatment measure and the other three measures were taken post-treatment. For each time period, LCA models identified groups of principals who distributed their time across the four leadership functions in a similar fashion. The number and composition of the principal groups were not pre-determined but rather were empirically determined by the results of the latent class models. We then analyzed visual displays of principals' group classifications over time in order to assess changes in principal practice.

In spring 2005 and fall 2005, the best fitting model identified two classes, one of which (class 1) was distinguished by principals' emphasis on managerial leadership (building operations, finances, student affairs, and personnel issues), and the other distinguished by an emphasis on instructional leadership. In winter 2006 and spring 2006, the best fitting model identified only one class. However, statistical criteria are often used in conjunction with substantive and theoretical considerations in LCA model selection. In our case, the two-class solution we obtained in every wave is theoretically sensible, separating managerial leadership from instructional leadership, and the meaning of these classes remains *similar* over time.

To make the meaning of the classes the *same* across waves in order to examine change, we fit LCA models for the pooled data from all four waves. Again, a two class solution offered the best fit to the data. Given that survey responses might be similar within each wave and for specific principals, we accounted for these factors by including covariates for principals and data collection waves in the model. This LCA model distinguishes two classes of

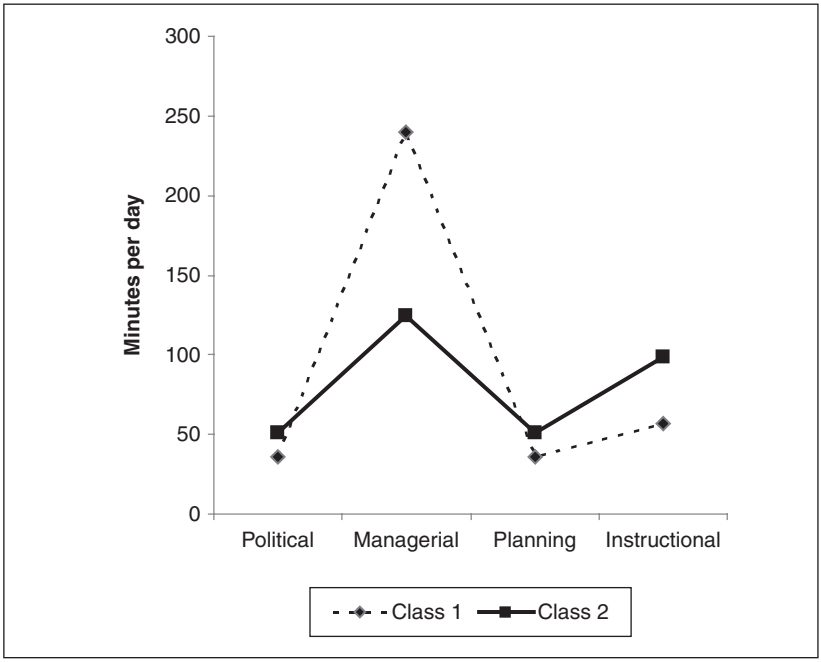

Figure 1. Profile plot for latent class analysis

principals for all waves, and we interpret class 1 as a group of principals who place greater emphasis on running the building, and class 2 as a group who place greater emphasis on instructional leadership. The latent class models are probabilistic models; each principal has a probability of belonging to both classes in each wave. The final LCA model had a classification error of less than 2%, which means that on average the typical principal had a 98% probability of being assigned to the correct class.

Profile plots are an intuitive way to understand LCA results. Figure 1 contains the profile plot for the LCA. In Figure 1, the conditional means per day for the four leadership indicators (political leadership, managerial leadership, planning leadership, and instructional leadership) are plotted for class 1 (managerial focus) and class 2 (instructional leadership focus). The graph clearly indicates that class 2 principals spend more time on instructional leadership than class 1 principals. In contrast, class 1 principals spend substantially more time on managerial leadership, and somewhat more time on political leadership, than class 2 principals.

The logic of our analysis was to examine patterns in principals' practice *after* the onset of treatment delivery in light of their practice prior to treatment to shed light on how principals' practice might have changed. Table 2 displays post-treatment latent class assignments for principals classified in the managerial leadership group prior to treatment and Table 3 displays post-treatment measures for principals classified in the instructional leadership group prior to treatment. Because we felt that it was important that our judgments of principal change be based on complete post-treatment data, we limited our LCAs to 27 principals who had data for all four waves.[2]

In the spirit of Tashakkori and Teddlie's (1998) description of "qualitizing" quantitative results, we viewed principals' latent class assignments from spring 2005 to spring 2006 holistically in order to form a judgment about whether principals might have changed during this period. We operationalized potential changers as principals in class 1 (managerial leadership) in spring 2005 who were placed in class 2 (instructional leadership) for at least two periods between fall 2005 and spring 2006. In assessing whether and how principals changed during this period, we also considered principals' assignment to the treatment and control groups and the extent of the DPD treatment they received.

Tables 2 and 3 show that the principals falling into the managerial leadership group prior to treatment significantly outnumber those in the instructional leadership group (by a 4 to 1 ratio). The results also suggest that while stability in practice after spring 2005 was the most commonly observed pattern, a considerable minority of principals (29%) appear to have changed their practice during this period. Among those who appeared to have changed their practice, all showed movement toward a greater emphasis on instructional leadership rather than an increased emphasis on managerial leadership.

Table 2 also indicates that both treatment and control group principals moved toward a greater emphasis on instructional leadership. Likewise, the group of principals whose practice remained stable during the 2005-2006 school year contained equal numbers of treatment and control group principals. While these findings suggest a lack of an *overall* program effect, using the LCA results to examine individual cases sheds light on those principals whose logging patterns do suggest they changed.

To identify these principals who may have changed their practice, we first focused on those who were assigned to the DPD and who actually attended even a few of the professional development sessions. Among the principals assigned to the treatment group, there are three such principals listed at the bottom of Table 2 (Tome, Orem, and Cale). From the LCA, we viewed these three principals as being likely to have been affected by their program

Table 2. Post-Treatment Latent Class Assignments for Principals Assigned to Class 1 (managerial leadership) Prior to Delivery of District Professional Development Program (DPD)

Spring 05	Fall 05	Winter 06	Spring 06	Pattern Interpretation	Treatment Assignment	DPD Attendance	Pseudo.
M	M	M	M	no change	control	0%	Wimm
M	M	M	M	no change	control	0%	B
M	M	I	M	no change	control	0%	C
M	M	I	M	no change	control	0%	D
M	M	M	M	no change	control	0%	L
M	M	M	M	no change	control	0%	M
M	M	M	M	no change	treatment	0%	E
M	M	M	M	no change	treatment	0%	F
M	M	I	M	no change	treatment	0%	G
M	M	M	M	no change	treatment	0%	N
M	M	I	M	no change	treatment	27%	Hill
M	M	M	M	no change	treatment	91%	Teem
M	M	M	M	no change	treatment	100%	Walt
M	M	M	M	no change	treatment	64%	Dubb
M	I	I	I	toward inst. leadership	control	0%	Batt
M	I	I	I	toward inst. leadership	control	0%	I
M	I	I	I	toward inst. leadership	control	0%	Pace
M	I	I	I	toward inst. leadership	control	0%	Bade
M	I	I	I	toward inst. leadership	treatment	0%	Welt
M	I	I	I	toward inst. leadership	treatment	64%	Cale
M	I	I	I	toward inst. leadership	treatment	91%	Orem
M	I	I	M	toward inst. leadership	treatment	73%	Tome

Note: M = assigned to class 1 (managerial leadership); I = assigned to class 2 (instructional leadership).

Table 3. Post-Treatment Latent Class Assignments for Principals Assigned to Class 2 (instructional leadership) Prior to Delivery of District Professional Development Program (DPD)

Spring 05	Fall 05	Winter 06	Spring 06	Pattern Interpretation	Treatment Assignment	DPD Attendance	Pseudo.
I	I	I	I	no change	control	100%	Weat
I	I	I	I	no change	control	100%	Wile
I	I	I	I	no change	control	0%	J
I	I	I	I	no change	treatment	0%	K
I	I	I	I	no change	treatment	36%	Lamm

Note: M = assigned to class 1 (managerial leadership); I = assigned to class 2 (instructional leadership).

participation. We examine two of these three principals and other principals who showed change based on our qualitative data in greater detail below through qualitative evidence. Consonant with a *positive program impact* on instructional leadership, we found that nearly all of the principals assigned to treatment but who *failed* to attend, and who were classified as managerial leaders prior to treatment (principals E, F, G, and N), *did not* move toward a greater emphasis on instructional leadership. Principal Welt is an exception to this general pattern, as she did not receive any of the DPD curriculum but *did* show movement toward a greater emphasis on instructional leadership between fall 2005 and spring 2006. Interviews with Ms. Welt help address this puzzle. Ms. Welt reported attending multiple professional development workshops but also said that none of them led to a change in her practice. However, this principal described using a new process for designing engaging lessons that she put in place that year, and this process may have led her to increase her focus on instructional leadership as she observed teachers' new lessons. No other principal in our sample mentioned this process when probed, so in this teacher's case, this change appears to have been idiosyncratic.

Four principals listed in Table 2 did not receive the treatment but exhibit the same practice trajectory we label as "change" among principals who did receive the treatment (Batt, I, Pace, Bade). As noted earlier, this suggests a *lack* of an overall treatment effect on instructional leadership practice. Interviews with three of these four control principals who appeared to change their practice again showed a lack of systematic influence on their change. One of the un-treated principals who did change toward instructional leadership (Bade), for example, revealed that she had instituted a common development time for teachers during which she and others would substitute for these

teachers in classrooms. In this case, the increased instructional leadership time may have been due to the increase in principals' direct work with students.

In addition to identifying potential changers, the quantitative data also show those who, based on the LCA, do not appear to have changed as a result of program participation. Principals Hill, Teem, Walt, and Dubb (Table 2) fall into this category, as these principals were in class 1 prior to treatment and remained in that class during nearly every other period. One of these, Principal Hill for example, attended less than a third of the DPD days and dropped out of the program in June 2005. Two principals, Weat and Wile (Table 3), who were not assigned to treatment but attended anyway further attest to the potential validity of the LCA results. Both principals were classified as placing a greater emphasis on instructional leadership at all time periods, both pre- and post-treatment. These principals also had perfect attendance at the DPD trainings. Qualitative evidence suggests that they sought out the program, despite their assignment to the control group, because of its substantial emphasis on instructional leadership. They were likely positively motivated to engage with the DPD ideas and to place a greater emphasis on instructional leadership.

Comparing Quantitative and Qualitative Analyses: Analyzing the Nature of Change Using Qualitative Data (Questions 3 & 4)

To investigate the change process more closely, we also used our qualitative typologies across the year in which the DPD was delivered to look for change in principals' instructional leadership (see earlier section on qualitative data for details). We compared these analyses and change themes in data from interviews or observations of principals with the LCA change profiles. Below, we explore convergent as well as divergent patterns in the qualitative and quantitative analyses. In general, consistent with the LCA, principals' qualitative accounts of change did not often include a wholesale, linear adoption of an innovation or dramatic change in daily work. Instead, 8 of the 10 principals in the qualitative sample attributed to the DPD a *refinement* in existing practice and *deeper procedural knowledge*, including the use of *overarching structures such as tools or routines* for organizing the many ideas they were encountering.[3] Their change themes were consistent with the DPD curriculum and the program's intent to develop more strategic performances—thinking and behaviors—in these practitioners.

Both our qualitative profiles and the LCA show that two of the principals for whom we have complete data, Wile and Weat, began the DPD classified as *high* on instructional leadership (or class 2 in the LCA) and remained so throughout. But the qualitative data suggest that they adopted some of the DPD tools and, by their accounts, *refined* their practice through *growing*

knowledge of *how to put some of their previously held beliefs or ideas into practice*. The two principals we classified as *low* instructional leaders on our qualitative typology in spring 2005 (Jimm and Teem) were likewise in class 1 in the LCA—focused on managerial issues. Although neither of these principals showed a change from class 1 at point 1 to class 2 at point 4 on the LCA, based on the qualitative analysis they too appear to have *refined* their practices by increasing their *emphasis on strategic planning and modifying some of their daily routines* over the treatment year.[4]

Finally, we classified six principals as moderate instructional leaders in our qualitative typology for spring 2005, and those were among the principals who also clustered into class 1 of the LCA at that time, that is, more focused on management. Consistent with the LCA, two of the six for whom we have qualitative data did change their practice based on our casework (Orem and Tome). The qualitative data also suggest that one principal (Walt) who falls into the LCA "no change" group, and a second (Dann) who was not included in the LCA because of missing logging data, changed their thinking and their approach to leadership. These two attended all 11 DPD sessions. We take up the change process in more detail first through qualitative themes and, then, further below through three more in-depth cases of change.

Change Patterns in the Qualitative Data

Given the omnipresence of reform in the American schools, it is not surprising that all of the principals in our qualitative sample mentioned that at least some of the DPD topics addressed practices that they were already doing or ideas that they already knew. From one view, these reports could be problematic as enactors of reform notice what is familiar to them more often than what is novel (Barnes, 2002; Cohen, 1990). When encountering new information, novices—which many of these principals were—are especially prone to notice superficial similarities with their existing "schema" or prior knowledge (Bransford, Brown, & Cocking, 2000; Spillane, Reiser, & Reimer, 2002). Thus, some of these principals could have misunderstood the DPD topics as familiar, potentially impeding their learning.

But we also found that the change stories of DPD participants reflected a second theme in the literature, that is, principals gained a deeper understanding of "declarative" knowledge even though it was not necessarily new to them and acquired or developed new procedural knowledge. They used both kinds of knowledge to *refine* rather than transform their practices. After a year in the program, principals described a new, deeper understanding of their own practice and of how to put previously held beliefs or ideas into action. In other words, principals reported that they had deepened their understanding of *how to* change aspects of their practice, *what to do*, and *why*

such change was important. The learning and change process that emerged from principals' accounts included opportunities for making sense of abstract ideas subject to misinterpretations at a grain size concrete enough to avoid, or even remedy, misunderstanding. Not only could these principals "break down" declarative, principled knowledge to better understand its meaning for practice, but by their accounts the DPD also gave them tools, routines, and other structures for reorganizing the many pieces of information resulting from that process into more strategic procedural knowledge. They reported less than transformative, but nevertheless substantial, concrete *refinements* in their practices. Most also cast the changes in practice toward program goals as being distributed across a team of leaders. Principal Dann reports changing the purpose, content, and transactions that occur inside teacher meetings from management oriented to instruction oriented:

> Before [DPD] we had committees . . . and we would meet and talk about logistical kinds of things. Now we have committees—a design team, a leadership team, a data team, a PLC-facilitated team. . . . The conversation is deeper. . . . [We] look at data, investigate student learning. . . . That's what I mean by "deeper and richer."

Here, the content and focus of routine meetings changed toward a more strategic and substantive focus on instruction and student learning. Principal Wile, who remained in the instructional leader classification across the treatment year in the LCA, suggests that since engaging in the DPD, she better understands the value of using formative assessments and has revised the way she works with data. She has also hired a data coach, which might account for why she personally does not document spending more time on this activity on her end of day logging:

> I'll tell you *the biggest change* since DPD . . . it's been *a better understanding* of . . . performance assessments . . . really *spending more time* analyzing data and turning it around quickly, getting it back into the classroom. So what *we've* done is organize data. We now have a data coach.

Principal Weat, who like Wile was classified as high on instructional leadership and did not change in the LCA, represents most principals in her account of learning *not only how* to refine her practice but also *in and from actually doing* something new.

> We knew that we had to make sure that we covered standards and covered what we called objectives . . . but *we really weren't quite sure,*

> *exactly, how to formally assess*. . . . *Actually using the assessment piece, the formative piece*, has really shown us what children know [before] we get a final assessment at the end of the year. . . . We are now assessing and looking at the data more frequently.

Note here that her term is *we*, suggesting again that through principals, the DPD may have influenced a team of leaders who distribute instructional leadership tasks, thus producing a kind of collective change.

In these instances, principals did not transform their practices but instead used procedural knowledge to refine them in ways that were consistent with DPD goals. Principal Jimm illustrates this point:

> You automatically know you have to monitor. But prior to DPD I would have counted on those things [after school tutoring components] being in place. . . . The ways that [DPD] showed us to monitor are really proactive measures, make sure you know what's going on in the program, as opposed to being reactive, and that's how I was doing it prior to going to the DPD program.

In this sense, Jimm may have become a more strategic thinker, a "problem finder" rather than simply a "problem solver" (Kelley and Peterson 2002). Jimm also described how the DPD provided him and his leadership team with new procedural knowledge:

> It's very few times . . . that you can come back [from professional development] with something you can put in [practice] the next day. The example with the safety nets, I mean I brought that right back, and we were able to jump on it the next time we had a design meeting.

By his account, the DPD also helped him organize and integrate what he was already doing to refine his practice:

> Again, you're already doing these things, but then when we go to the DPD—or you may be doing some parts of it—but they [the DPD] kind of put it together for you. It's sort of like our curriculum design.

This comment illustrates an important point made earlier: Not only did principals report that the DPD allowed them to break down abstract content into more "concrete" details for use in their schools, but they conversely reported that the DPD gave them procedural tools for organizing the myriad details into overarching strategies.

This last point speaks to another pattern in principals' change stories. In addition to developing greater procedural knowledge and refining their practice, principals also consistently reported doing more strategic thinking and planning in their work. Recall from our literature review that such strategic performances are consistent with those of more competent practitioners and leaders. Recall also that content related to strategic planning, thinking, and monitoring spiraled through the DPD curriculum from a unit on principal as strategic thinker to one on standards-based instructional systems including formative, diagnostic, and summative assessments. Taken together, seven of the DPD units constitute a kind of "cycle of improvement" in which principals are asked not only to develop a focused vision and action plan for meeting the vision's goals but also to use a set of strategies for implementing the action plan, assessing its progress, modifying it to reflect specific needs, and then implementing it again.

Eight of the 10 principals who attended 5 or more days of the DPD reported using elements of the strategic planning/improvement cycle as well as being much more focused and strategic in their thinking, attention, or daily actions due to the DPD. When we asked what ideas principals had used to improve their practice, we heard accounts such as the following:

> [Focus on] something that's manageable; something that's doable. And write a plan around that. That helped me a lot because our school is doing so many different things. . . . I can't imagine how teachers can grasp all this when I, as the leader, can't grasp it. So it [DPD] really helped me tailor that focus. (Dann, February 2006)

This is similar to what other principals said about sharpening their focus and working more strategically toward improving student learning, a variable that Hallinger and Heck (1996) found present across studies of effective principals. For example, Teem said, "I think I've become more focused, and more focused on results, and data-driven." Orem, whom we feature in a case description further below, reported, "All of our focus has to be on student achievement. So it's not a personal thing, if they're [teachers are] receiving an NI [needs improvement]." Principal Walt, also featured in a case study, reported,

> I went back and put together a strategic plan for how we were going to accomplish all these things we had to do . . . and that's been my blueprint. And as long as I can stick to that, I can stay focused without feeling so scattered.

Principal Jimm said, "It can't be random acts of improvement. It has to be strategic acts of improvement and . . . here is a way to do it." Most principals

also described variations on the idea of strategically linking student learning to teaching, primarily through performance assessment data, student work, and standards for teachers' learning and instruction. Moreover, many reported aligning resources and daily actions to the overarching planned goals based on information about what students need. This too is a theme in the literature on expertise and principal effectiveness, that is, connecting myriad daily activities to an overarching, focused strategy.

These comments are all consistent with the DPD curriculum and the program's intent to develop more expertise and more strategic performances—thinking and behaviors—in these practitioners, and doing so with new "useable" routines or other tools.

Three Case Studies: Digging Deeper Into Leadership Change (Question 4)

We now explore the change patterns we found in the quantitative and qualitative analyses more deeply using three cases. The DPD's "action projects," especially developing and implementing a strategic plan, figured prominently in the change stories of several principals, including the three we take up here. All three—Walt, Tome, and Orem—were classified by the LCA as emphasizing managerial leadership prior to DPD delivery. Two of these principals were recorded as changing to the instructional leadership category in later time points, while the third principal remained in the managerial leadership group.

Principal Tome attended 8 days of the DPD and changed from the managerial class to the instructional leader class in the LCA of logging data. In interviews, she also reported changing her own and her team's leadership practices, shifting toward a more strategic focus on improving instruction and student learning, changes she attributed to her participation in the DPD. In one example, she explained,

> I guess a specific [example of change] would be that as we looked at the data from the formative assessments with the [state test] . . . we specifically targeted those areas that our students this year need to be working on. We're . . . focusing on those, and we're conferencing with [students] so that they will buy into the instruction that's specifically tailored to their needs.

Here, Tome described one of several new approaches to her practice that she was using as a result of the DPD. She also documented an increasing emphasis on strategic planning and instructional leadership in descriptions of

her most consequential daily decisions over the year (data we coded for our typology development). But based on her cognitive and post-observation interviews, none of these changes in behavior appear to have provided her with insight into her fundamental approach to practice. In one cognitive interview, for example, she said, "The majority of my day seems to be spent with parental concerns, with student issues, with managerial quote-unquote type tasks" (February 2006). And she continued, "In theory we need to be and want to be instructional leaders. I think we end up being managers 99 percent of the time." Thus, she is a case of a principal who refined her practice considerably and perhaps created new procedures. But she is also a principal who does not appear to have deepened her understanding of her work situation and practice in a manner that many other principals described doing. We could not find any evidence that Tome altered the way she thinks about her practice.

Principal Walt attended all 11 days of the DPD. She was classified as a "managerial" leader in the LCA of logging data and did not change from that classification over the year. But the qualitative data suggest that she changed her thinking quite dramatically, if not her daily activities. When we asked her to describe a typical day and her current approach to leadership in June 2005, as she was just beginning the DPD, her account reflected much of the past literature on principals' practice: She described constant interruptions, few if any routines planned to focus on classrooms or instruction, and little time invested in strategic planning (see, for example, Marshall, 1996; Martin & Willower, 1981; Peterson, 1978; Wolcott, 1973):

> There is no typical day, there is no typical day. . . . You never know what you're going to be doing when you get to work. You think you know what you might be doing, but there are days you never even get your calendar out of the book bag. (June 2005)

Moreover, that same literature on principals' work is consistent with how this principal described her then-current approach to leadership and daily activities, for example, as innumerable interpersonal interactions that were brief, sporadic, highly varied, and fragmented—bits and pieces of many different practices:

> We have a full range of responsibilities from clerical work, email and correspondence, evaluating teachers, ordering materials, keeping the budget balanced . . . meeting with irate parents, and happy parents, with discipline, dealing with students, dealing with irate and dealing

> with happy teachers. . . . Many times I feel like a negotiator between teachers and parents. It seems like a great deal of our time is spent in conflict-resolution with upset people—whoever those upset people might be—and then you have all that stuff that you have to take care of like the budget. I never knew I would sign my name so many times. (June 2005)

By Principal Walt's own account, her habits of mind and practice were quite fragmented and "scattered." She appeared to be "stymied by the surface details" of her work situation as novice practitioners frequently are (Bransford, Brown, & Cocking, 2000; Ohde & Murphy, 1993), lacking focus, intentionality, and purposeful routines for attending to instruction. Walt described her learning and the content in her development activities in similar terms. In this, she was unusual among our cases as most principals reported routines that would, at least by intent, focus their work on instruction or some other aspect of work.

But in her second interview in November 2005, continuing through February and March 2006, Ms. Walt began to recognize that her approach was problematic. She appeared to change her expectations and beliefs about her work and its outcomes, and she reported a change in her practice related to the elements of the strategic planning cycle discussed earlier. In February, Walt described a fundamental change in her approach to practice. Like most other principals, Walt said that her work was more tightly focused on strategic goals and actions, but in her case, this was a significant shift from her previous long list of fragmented activities:

> [I'm] trying to make the school truly a professional learning community, so that we're all very clear on what it is the students are supposed to know and be able to do. . . . [I'm] focusing on learning. . . . [I'm] getting everyone to accept that even though we *say* our children can learn, what are we going to *do* to make sure that they do? (February 2006)

What helped her most to become more focused in her practice? In February, Ms. Walt described an "aha" moment that had occurred earlier in the year. She began to embrace the tool of a strategic plan as a way not only to integrate disparate ideas she was encountering but also to restructure her beliefs and practice. Ms. Walt was consistent across the interviews in her accounts of what helped her reorganize her world-of-work-view:

> It goes back to the strategic plan. Once I got that in a written form, it was very clear how all this ties together and where we're going with

> it. We refer to that all the time. Every now and then, you get a little fragmented, and you go, "Now this is part of the plan, and this is what we're going to do." . . . Coming up with that plan, and having everybody support it [was important]. Plus I finally was able to get the vision and mission that I can live with in place. . . . That was essential. (February 2006)

In describing the value of strategic planning, she said, "That's been my blueprint. And as long as I can stick to that, I can stay focused without feeling so scattered" (February 2006). Walt is a case of adopting and using an innovation to fundamentally change how she thinks about and approaches her practice. She may not have dramatically changed her daily activities, but perhaps she changed how she and her organization function collectively. We do not have interviews with others in the school to confirm or disconfirm this conjecture.

Principal Orem attended 10 of the 11 days of the DPD and changed from the managerial class to the instructional leader class in the LCA of logging data. In her interviews, she described spending more time on both improvement planning and monitoring the plan's implementation. But she also described change not in terms of more or less *time* devoted to prior leadership routines but rather in terms of doing those routines *differently* based on a more focused understanding of *why* she was engaged in the practice. Thus, she made a conceptual shift *and* a behavioral shift without much change in the frequency or duration of a previous monitoring routine.

In June 2005, unlike Ms. Walt, Ms. Orem explained that she always had an "idea" of what she intended a typical day to be, and she described some routines—frequent or recurring activities—that would focus her time and attention on instruction. She said that monitoring instruction,

> is *something I strive to do every day* . . . getting in the classroom and seeing what is going on in there. . . . The teachers come to expect me in the classroom and see that as not threatening.

Though she described the "primary function of the principal" as "instructional leadership," Ms. Orem also said that was a big change from what she had learned in graduate school.

By February, when we asked if she had changed her practice, Orem said, "I think DPD has been a huge impact on the way I look at what I do." When we further asked her *how* she had changed due to the DPD, she reported several examples of prior practice routines: Ms. Orem was still using these

routines but, by her own account, was doing them "differently" due to what she was learning in DPD. For example, whereas before the DPD she would drop by any classroom at an arbitrary time almost every day to see what was "going on," by February she had developed a much more systematic, focused approach to monitoring instruction. She attributed that newly created monitoring method to the DPD. Ms. Orem described having narrowed her focus to one academic topic in need of improvement, mathematics, and, in particular, to student learning in that topic (the key focus of her improvement plan). She had also incorporated more specificity in her observations by using a standards book to look for explicit types of teacher or student performances based on an external criterion. Ms. Orem explained in part that, "now," rather than dropping by a classroom at any time,

> I want to go into that room when they're teaching math . . . in the beginning because [that is the] teacher focused instruction. . . . I'll bring my book of standards. That's going to tell me what . . . I should be seeing. . . . I've got a focus for my observations and they are geared towards student achievement and changing some things [in classroom instruction]. (February 2006)

In summary, Principal Orem not only changed from a managerial classification to the instructional leadership class in the LCA, but her case shows that she also changed both her daily activities *and* the way she thought about the process inside an important daily routine. Orem is the clearest case of a principal who not only increased the time she devoted to strategic planning but also, based on a goal she identified in that plan, appeared to create a new procedure for monitoring instruction. Principal Walt remained in the managerial class in the LCA of logging data, but her case illustrates how she changed her thinking quite dramatically and therefore her approach to work, if not her daily activities. She was a case of innovation, a principal who may have actually adopted a new tool—the strategic plan—and then used it as a central organizing structure for her approach to leadership, thus *reorganizing* and focusing what had been, by her own account, a quite "scattered" work schema. Finally, Principal Tome appeared to change her practice considerably based on both quantitative and qualitative evidence. But while she may be a case of change in terms of reported behavior, she did not appear to change her thinking or overall approach to her practice; that is, she did not gain a deeper understanding or insights into her practice. Instead, she continued to classify herself as a manager, not an instructional leader.

Conclusions

In this study, we used mixed analytic approaches to examine the learning and change process for a set of urban principals in the context of a district-based leadership development program. Principals' descriptions of what they valued most from their experience in the program closely aligned with the kind of sustained social arrangements, habits of mind, practice-embedded learning, and coherent content that characterize a "community of practice" or "learning community." Within such a professional community, principals could make sense of program content through guided exchanges with knowledgeable others and colleagues. Not only could principals "break down" *declarative knowledge* in order to better understand its consequences for their work, but the DPD process also provided them with knowledge structures, tools, and routines for *reintegrating* the many ideas they encountered into strategically-valuable *procedural knowledge*. Principals were able to try out ideas in their schools, work through "situated problems" in the context of their own and their peers' practice, and then reflect on, discuss, and refine methods for addressing them.

We considered change from three perspectives: principals' understanding, principals' behavior, and the processes by which principals organized or reorganized their thinking in and about their practice. LCAs of principals' daily log data identified three cases of treated principals who appeared to change from a focus on managerial leadership to a focus on instructional leadership. These analyses also identified four treated principals who largely remained in the managerial class after treatment (though in one case the principal dropped out of the program after only the first 3 days). Qualitative evidence provided insights into both patterns and also illuminated unique features of principals' complex change stories.

Principals' qualitative accounts of change rarely included the wholesale adoption of an innovation or dramatic change in daily activities. Rather, in interviews, principals described and attributed to their development experience varying degrees of *refinement* to existing practices. Most principals reported that they had learned not only *how* to improve an existing routine or *how* to put a previously encountered idea into practice, but they had also learned *in and from actually doing* something new.

Eight of the 10 principals in our qualitative sample reported using one or more elements of the DPD's strategic planning and improvement cycle in their practice-based assignments over the treatment year, then refining them and integrating them into school routines. Through multiple, specific examples, principals reported sharpening their focus and working more

strategically toward improving student learning during this process. Several principals described change not in terms of more or less *time* devoted to prior leadership routines but rather in terms of doing those routines *differently* based on a more focused understanding of *why* they engaged in the practice. Some principals also described reorganizing or restructuring their thinking processes toward those frequently discussed in the expertise literature as more competent, that is, from attention to myriad surface details of a situation toward attention to simplifying principles or strategies that connect those details.

The change themes were consistent not only with the DPD curriculum and the program's intent to develop more strategic performances—thinking and behaviors—in these practitioners, but also with the literature on expertise and principal effectiveness. A more organized knowledge base is one mark of more expert practitioners (Ohde & Murphy, 1993), just as a well-organized focus on student learning appears to be one mark of an effective principal (Hallinger & Heck, 1996). We are not suggesting that these principals became "experts" over the course of 1 year but that the DPD's curriculum and the community of practice it orchestrated provided them with tools for organizing their work performances more effectively.

We used three case studies to probe variations in these themes more deeply and to expand upon our other results. Both qualitative and quantitative evidence show that in one case, a principal changed her daily activities considerably but not her thinking or understanding of her own work practice (as many other principals described doing). Another principal who did not change in the LCA of logging data appeared to quite dramatically change how she organized her thinking and approach to practice but may have only refined her daily activities. Finally, the third case was a principal who changed from a managerial to instructional leader in the LCA and, by her interview accounts, changed her *understanding* of why she was conducting certain daily routines, her *thinking* about how to organize the work inside the routine, and her *activities* in classrooms as she carried out the routine—all as a result of the DPD.

Our study raises important questions for research, policy, and program design in terms of how to think about planned change for practicing professionals in general, and school leaders in particular. The learning and change process that we observed included refinements in understanding, thinking, and doing that were in many cases neither sequential nor interdependent. Change in principals' understanding of their practice or cognitive shifts in how they approached that practice could precede, follow, or occur iteratively with change in their daily activities. Furthermore, one kind of change could

occur without the other, as our cases showed. Our results suggest that frequently used quantitative strategies for studying change such as linear "growth" over time may not provide the most accurate representation of this complex phenomenon. Instead, understanding the meaning of complex program outcomes such as change in principals' professional practice, or lack thereof, requires multiple methodological lenses. Given the press for randomized trials and large-scale survey research, we think that using mixed methods for collecting and analyzing data can add rigor and insight to the conclusions that such studies produce.

Our results also raise questions about whether it is reasonable to expect dramatic rather than incremental innovations as a result of development programs or policies that target practicing leaders who must maintain their responsibilities even as they change their practice. Principals face structural constraints that can make dramatic change an unrealistic expectation. They are responsible for a core set of functions that put demands on their time (though some delegate one or more functions to leadership teams). School schedules, maintenance of the physical plant, student discipline, school finances, and personnel issues can all constrain the degrees of freedom principals have to transform their practice from a managerial to an instructional emphasis. Furthermore, for Ms. Orem and other principals in our study, new insights and new practices emerged gradually, oftentimes after repeated opportunities to reflect on and try out the new practice. These findings are consonant with conceptions of learning that argue that change unfolds gradually over time and with the common wisdom that change, once accomplished, is fragile. Finally, given the current shift in focus toward instructional leadership across multiple policies and programs, it is not surprising that all of the principals in our qualitative sample mentioned that at least some recommendations they were trying were not completely new to them. For all of these reasons, a substantial *refinement* in practice through sustained, incremental innovation, based on understanding why and how to change, may be a more reasonable goal for developing effective principals than is rapid transformation of their practice.

Still, policies and reforms continue to demand dramatic results on short timelines, frequently without providing the scaffolding that educators need to learn how to achieve the results. While standards-based reform and the No Child Left Behind Act of 2001 (NCLB) stipulated many of the same outcomes as the DPD, these reforms and policies in large part failed to provide the tools for school leaders to achieve these outcomes. As evidence, the qualitative data show that the principals we interviewed were uncertain about how to make sense of and implement many of the change ideas in these or

other reforms. In sharp contrast, the DPD *did* provide a structure to scaffold principals' efforts to achieve program outcomes. Rather than simply mandating outcomes, the DPD actually helped principals learn how to achieve the desired outcomes.

With a new administration and renewed policy press for developing and using strong instructional leaders to improve struggling schools, all of these points lead to a key question for policy and program design: How can the kinds of social arrangements, instructional transactions, content and work based processes embedded in the "community of practice" we observed be cultivated and sustained in struggling districts? Our results show considerable potential to motivate and develop principals' competencies for improving instruction through the continuous learning opportunities that such an orchestrated community affords, as opposed to the intermittent, fragmented development programs in which most principals engage. Such communities would allow practitioners to manage the ever-changing education reform landscape and develop a repertoire of procedural knowledge for exchange and testing.

But the arrangements that allow such communities to thrive are not naturally occurring in education and are fragile. Indeed, only half of the DPD studied here was actually delivered because of a change in district leadership. Thus, developing professional learning communities would require new structures such as time away from school, connections among school leaders, and space; new incentives for principals to engage in monitored work-based trials over time; and finally, the kind of capacity building resources that the DPD provided, such as knowledgeable facilitators and coherent knowledge about effective instructional leadership.

Sustaining such structures, incentives, and resources would require *broad*, *sustained* support from knowledgeable district leadership that could withstand staff or superintendent turnover, support coherent guidance for the principal group, and buffer their communities of practice from strong undermining forces toward the status quo; that is, the egg carton organizational norm in which principals are typically isolated from substantive interaction with peers that is focused on the problem of improving teaching and learning (e.g., Barnes, Massell, & Vanover, 2009).

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Notes

1. Software is from ResearchWare, Inc., Randolph, Maine.
2. We are missing logging data for three of the principals who attended the DPD five or more times, though we have qualitative data. Likewise, we have logging data for one of the principals who changed classification over the treatment year toward instructional leadership, but we have missing qualitative data from the end of the treatment year to explain or account for that change. Seven of the 10 principals in the qualitative sample are also in the quantitative sample.
3. We had only partial qualitative data for one principal at the end of the treatment year so we could not include her in our analyses of change (though we did in the learning community analysis).
4. Jimm was changing toward instructional leadership in fall and winter 2006 but was missing logging data in spring 2006. Thus, he is not on the quantitative table.

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Bios

Carol A. Barnes, PhD, is an assistant research scientist in the School of Education at the University of Michigan. Her research interests are school renewal and instructional improvement in high-poverty settings—especially the pedagogical features of reform implementation and the role of learning as a lever for complex change. Her recent research has focused on the relationship between education reform and change in instructional or leadership practice.

Eric Camburn, PhD, is an assistant professor in the Department of Educational Leadership and Policy Analysis at the University of Wisconsin–Madison. His research has two related threads—investigations of factors that support instructional improvement, and the use of survey methods for studying instructional improvement. Studies in the former area have examined how teachers' learning opportunities affect their improvement efforts, how leadership can serve as a resource for instructional improvement, and how comprehensive reform programs can support instructional change.

Beth R. Sanders is a doctoral candidate in educational administration and policy in the School of Education at the University of Michigan. She is writing her dissertation on federal law and its influence on the field of school administration.

James Sebastian, PhD, is a researcher at the Consortium on Chicago School Research (CCSR). His research interests include organizational theory and behavior, organizational learning, comparative and international education, and school reform. He is also interested in the application of latent variable models for the purposes of understanding school organizations and organizational change.