SCHOOL LEADERS AS LEARNERS: ACQUIRING EXPERTISE FOR IMPROVING TEACHING AND LEARNING

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Introduction

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. Recent work in the learning sciences indicates that traditional modes of instruction typical of many principal training programs often result in limited transfer of learning from the workshop classroom to the real world of schools (Bransford, Brown, & Cocking, 2000).

Multiple lenses on this crucial problem of developing and improving the competence of professional practitioners' capacity to perform in complex domains, from fields as diverse as cognitive science (expert/novice and social learning literature), scholarship on professional education, policy implementation studies, and knowledge utilization scholarship, converge on several principles of effective program design for developing or improving competence in practitioners. First is coherent content and sustained learning. Professional growth opportunities for adults should organize knowledge around important concepts and integrate curriculum topics across sessions, over time (Bransford, Brown and Cocking, 2000; Sykes, 2002).   Next is the organizational strategy of cohorts, teams or communities of professional learners. Building on the work of Vygotsky, social learning theories argue that people learn well and function productively in a community of practice or social context (Bandura, 1989;

Lave, 2002; Resnick, 2002; Resnick, Levine and Teasley, 2002; Wenger, McDermott, and Snyder, 2002; Wertsch, 2002; Rogoff, 2002). Scholarship on expertise and professional education also shows the merits of orchestrating instructional transactions (social interaction around content with knowledgeable others and peers) for developing "scaffolding" through cognitive apprenticeships, guided practice, peer teaching/learning, common language, and parallel experiences. (Kelly and Peterson, 2002; Sirontnik and Mueller, 1993; Sykes et.al, 2002; Bridges & Hallinger, 1993; Feltovitch, Ford & Hoffman, 1997; Hallinger, Leithwood, & Murphy, 1993; Hart and Pounder, 1999; Patel, Kaufman & Magder, 1996; Sykes, 1999). Finally, on a closely related point, professional practitioners attempting to improve their competence need opportunities for reflection and problem solving in context; that is, to work on actual problems embedded in their practice or work environment. Thus, to develop competence and translate "research-based knowledge" into "useable," shared, professional knowledge for improvement, practitioners benefit from engaging with coherent content, in the company of other members of their organization or professional group, and sustained opportunities to reflect on and apply new knowledge in their work situation (Ball & Cohen, 1999; Bransford, Brown and Cocking, 2000; Feiman-Nemser, 1983; Greeno, Collins, & Resnick, 1996; Hood, 2002; Kennedy, 1998; Putnam & Borko, 2000; Resnick, Levine and Teasley, 2002; Resnick, 1998; Seashore-Lewis, Febey and Schroeder 2005; Schon, 1983; Argylis and Schon,1996; Spillane, Reiser & Reimer, 2002; Sykes, 2002).

An Ambitious District Professional Develop Program (DPD)

The ambitious leadership development program used by the urban district in our study was aimed at reducing the time and cognition principals put into non-

instructional matters. The program focused them instead on new information and "best practices" related more directly to improving instruction and achievement. In doing so, the DPD set challenging, even transformational, goals for principals.

The program design incorporated many of the elements characterizing effective professional learning and knowledge use sketched above. Principals were organized into cohorts consisting of leaders from primary, middle, and secondary schools. The cohorts remained together for one year and worked in teams on common problems or interests. They had ample opportunities to apply new knowledge to meaningful problems: for example, principals engaged in "action projects," which addressed local priorities and required principals 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. Though the program was intended to be implemented over two years, it was truncated to one year due to leadership turnover in the district.

The main focus of the leadership curriculum is the drive to raise student achievement, and the content presents variations on this theme across the first year with units such as strategic planning for improved instruction, standards-based instructional systems and foundations of effective learning, and coaching and leadership in the academic content areas of literacy and math. But the DPD program 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 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 pedagogies are rooted in research and theory characterizing effective learning experience for adults.

Such opportunities for practitioners to engage with and learn how to use new knowledge are unusual in policy or program implementation and can be an important instrument of reform implementation (Barnes, 2002; Cohen and Barnes, 1993; Cohen and HIll, 2001; Elmore and McLaughlin, 1988; Knapp, 1997; McLaughlin 1976; 1987; Spillane, Reiser & Reimer, 2002). But demanding curricula and practice-oriented methods alone cannot bring about change in leadership practice. The principals in this study had to make an effort to understand and use the ideas in DPD, and thus had to find some value in them. Moreover, their work was situated within district and state policy contexts in which competing incentives vied for their time (Honig and Hatch 2004; Berends, Bodilly, et al, 2002). All of this challenged, constrained, and sometimes enhanced the development of principals and the year one outcomes of the program.

Conceptual Frame

Based on the reasoning that "performing" well in complex conditions is the mark of competence in professional practice, and that such performances include a cognitive, as well as a behavioral, dimension, in this paper we use an implementation frame that takes in learning or "sense-making" as well as knowledge use in practice (Argyris and Schon, 1996; Cohen and Weiss, 1977; Feltovitch, Ford et al., 1997; Huberman, 1984; 1987, 1990; Hood, 2002; Putman and Borko; Schon, 1983; Spillane, Reiser, and Reimer; Spiro, Coulson, Feltovich, Anderson, 1988; Weick, 19XX; Weick, Sutcliffe, & Obstfeld,

2005). The Deweyan practitioner-inquirer or learner, therefore, 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 and Schon, p. 31). With this frame we explore the interplay of the local environment, components of the DPD program design (instructional formats, content, and principles), and principals' prior knowledge and their practice over the year of the DPD program.   In doing so we examine the nature of *change* in principals' habits of mind, learning experiences, and practice – i.e. in their professional *performances* -- at the beginning and during the treatment year and shortly thereafter.

In what follows we first describe the data, sample and analyses, then report the results of the quantitative analysis, comparing the self-reported practices of principals in both a treatment and control group, before and after the first year of the DPD program. Next, we use the qualitative data to describe how the reported learning experiences of DPD participants developed over the course of the treatment year, discussing the professional development context, DPD program activities, principals' perceptions about the most useful aspects of the DPD experience, and the influence of principals' prior experience on their work with the program. Finally, we use evidence from quantitative and qualitative sources to describe *the nature of change* in principals' practice or performances. We conclude with a discussion of the implications for changing leadership practice toward improved instruction and learning in America's struggling schools.

Mixed Methods and Data

Our research team designed a set of qualitative and quantitative data collection procedures that could stand alone, but more importantly could be used for complementary mixed method analyses (Tashakkori and Teddlie , 1998; Camburn and Barnes, 2004; Spillane, Pareja et al., paper presented at 2007 AERA). Given the emerging press for randomized trials, using mixed methods for collecting and analyzing data can add rigor and insight to the conclusions such studies produce. Data from multiple sources, both qualitative and quantitative, allowed us to unpack the black box of principals' performances – both cognitive and behavioral.

In this section we first describe the qualitative approaches in more detail, followed by a discussion of the quantitative approaches. These methods were used concurrently, and then sequentially (Tashakkori and Teddlie; Spillane et al), to inform our reasoning as the analyses progressed. For this paper we use qualitative and quantitative evidence from "shadowing" principals and observing program implementation, cognitive and post observation interview data, principals' responses to scenarios simulating practice, and a principals' daily practice logs and end-of-year questionnaires to address the following questions:

1. How do the learning experiences of principals change or develop over the course of the first year of an ambitious leadership development program (DPD) aimed at increasing the time and cognition these principals invest in improving instruction? How do they differ from principals not assigned to or participating in the program?

2.   What instructional formats and content of the leadership development program influence principals' learning experiences?

3.   Do the principals who attended the DPD program 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 in principals' practice during the year of the DPD?

5.   How did the principals' propensities as leaders – their existing knowledge, beliefs and experience – influence their use of knowledge for the purpose of changing their practices during the treatment year of the program?

Study Design

The results reported here are based on data from a mixed-method longitudinal study that was conducted in a mid-sized urban school district in the Southeastern United States. At the heart of the research design lies a randomized experiment where 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 impact of the program on principals' knowledge and practice. Components of the overall design that were used for the present study are described below.

Qualitative Data, Sample and Analyses

One set of qualitative approaches consisted of observations of principals' practice or "shadowing," followed by in-depth cognitive interviews probing on the cognitive dimension of the principals' practice for that day. These methods complemented the end-

of-day (EOD) logs that principals' filled out, as the shadowing occurred on a logging day. Another qualitative approach used principals' responses to scenarios simulating leadership practice. Both of these methods allowed us to investigate the black box of "principals' performances"; that is, the relationships among knowledge, knowing, thinking and doing.

We also used observations of program delivery and post observation interviews for understanding how and to what extent the DPD program was implemented, as well as interviews for studying the larger environment in which the program was implemented. Data from each of these domains—the black box of principals' practice, program implementation and the larger policy environment—influence program outcomes, but informed inferences accounting for disparate findings in our quantitative and qualitative analyses (Camburn and Barnes, 2004).

We observed the implementation of the DPD program at four time points. Each DPD unit ran for one or two days, and more than one unit was covered at two of the observation points. We therefore observed six of the seven DPD units in which principals were trained. At each time point, we interviewed principals to ascertain their understanding of the unit, what they learned, and why and how they might use the new ideas broached by DPD in their practice. We also asked principals to describe a typical day in their practice as well as their approach to leadership for improving student learning, and if or how that practice had changed. In interviews following later units we asked further if that practice has changed because of their participation in the DPD training, and, if so, what they were doing differently as a result of DPD.

In addition, we shadowed a sub-sample of fifteen principals for two days each – twelve from among those who were attending the DPD program, and three from the control group – selected based on their reports of both professional development attendance and time spent on instructional leadership (we sampled high, moderate and low principals on indicators of IL). During these day-long observations, we documented the principals' practices using a standardized observation guide aligned to EOD logging categories. Every 15 minutes, a researcher following the principal would complete one row in the observation guide recording the time, marking the *type of activity* in which the principal was engaged (based on EOD logging categories) and providing a written description of what the principal was doing. At the end of the day the team followed up with an in-depth cognitive interview with these principals, focusing on the practices we had observed. Interviewers used an explanation protocol (Chi, 1997) to prompt principals to recall prior, practice-based cognitive performances from their recent "naturalistic" context (Klein, Calderwood and Macgregor, 1989). Such protocols are used to describe recalled events related to cognition and knowledge application in complex situations characterized by time pressure and changing conditions (Feltovich, Ford and Hoffman, 1997; Spiro, Coulson, Feltovich, Anderson, 1988). We also used our records to triangulate with the principals' end-of-day logs, which they completed on the same day (see more details further below).

Finally, we used a video simulation and written scenarios representing segments of leadership practice that prompted principals to respond to problems of practice. In this paper, we used principals' coded narrative responses to these prompts, including what aspects of the practice based situation principals *noticed,* how they *thought about* these

aspects, and what they would actually *do* in response to a range of practice based problems.

We are focusing our qualitative analysis primarily on ten DPD participants, selected from the larger group based on their attendance at the DPD program. Using reports from the EOD logging and other data, we classified all principals as high, moderate or low instructional leaders, and then selected two or more program attendees from each group who had attended five or more program days. We therefore have interviews and observations for each of these principals, with the exception of one low instructional leader one whose training attendance was sporadic (5 days), and one moderate instructional leader who was not available for several interviews. Of the ten principals – two high, six moderate, and two low instructional leaders – one attended the program five days, two attended seven or eight days, and seven principals attended ten or eleven of the eleven-day DPD institute. All ten responded to five scenarios and one video of a teacher's literacy instruction in the spring of 2005. Nine of the ten did the same in spring of 2007.

Evidence of Change

Building on a framework developed by Tashakkori and Teddlie (1998) for classifying mixed methods approaches, in this paper we use an approach our team has labeled an extended "multi-step sequential analysis" (Spillane, Pareja et al.) to study the nature of change in principals' leadership performances over time. We used quantitative data from the principals' logs, principals' responses to practice-based problems, and principals' short qualitative descriptions of their most consequential decisions each logging day to create a typology of principals' leadership as they entered the professional

development program. To do this, we first we examined our sample of principals and their distribution on two measures of instructional leadership: the overall percentage of time principals logged as instructional leadership and the average number of minutes a principal spent on instructional leadership. Next we coded principals' responses to video scenarios simulating the observation of classroom practice because we likewise wanted to focus on these leaders' mentions of subject matter content or instructional leadership categories (in the daily log). We generated a report listing the principals and counts by each coding category and ranked them from high to low. Finally, the EOD logs asked principals to describe the most "consequential decision" they had made each day of the logging period. We coded these decisions using a rubric for rating these principals' responses as high on mentions of work related to instructional leadership, especially with students or teachers on academic or instructional matters, moderate mentions of these same topics, or a focus on non-academic work, such as building operations or non-academic student affairs. In each category, therefore, we generated a list of principals who scored high, moderate or low on instructional leadership.

We bundled these data by case and arrayed them in a matrix where the cells showed the variation in leadership activities, but also summarized data on the principals' mentions of instructional leadership categories. These clusters created succinct profiles that allowed us to investigate extreme cases but also gave us information about mixed cases and more typical cases—e.g. a principal could spend a relatively modest amount of time on "instructional leadership" based on logging, but frequently discuss academic content, and working with students or teachers. Thus, examining quantitative data using qualitative methods allowed us to summarize and identify nuance within "types" of

leadership.   That, in turn, provoked more thought about what it may mean for a principal to actually change his/her "performances" and the relationship between cognitive and behavioral change.

We then used cases of these leadership types to study the process of change in our sample of the treatment group's leadership practice. We developed *cases of change* in such leadership using shadowing data and cognitive interview data, as well as our interview data from four time points over the treatment year.

Quantitative Data, Sample and Analyses

To analyze change in principals' reports of learning, we used data from a principal survey administered in the spring of 2005 and the spring of 2006. Data from spring 2005 provides a pre-treatment measure of principals who participated in the DPD program, while data from the second wave provides a post-treatment measure. Forty-eight principals responded to the annual survey in the spring of 2005, and 40 principals responded to the survey in the spring of 2006.

Our strategy for analyzing principals' learning was to compare the means of principals who participated in the training program to those of the control group. This comparison provides us with an initial look at whether program participants' reported learning experiences that were perceived as more sustained and coherent than those of the control group principals. Our analyses also look at whether principals' learning experiences changed after the start of the program by examining means on learning indicators prior to treatment (spring 2005) and after the onset of treatment (winter 2006 and spring 2006).

Analyzing Change in Principals' Practice With End of Day Logs

We examined changes in principal practice by conducting a latent class analysis (LCA) of data from the end of day logs. Daily logs are web-based self-administered questionnaires in which respondents report their leadership and management activities for a single day. We use data from the daily logs from four time points: spring 2005, fall 2005, winter 2006, and spring 2006. At each time point, principals filled out logs for five consecutive school days. Since the first round of DPD trainings were conducted in the summer of 2005, data from the spring 2005 administration of the logs provides a baseline measurement of principal practice. Fall 2005, winter 2006 and spring 2006 administrations occurred after the first round of training and we therefore analyze data from those three periods as "post-treatment" measures. A total of 49 principals responded to the daily log instrument over the three waves, most of whom recorded data on all 15 days that the instrument was administered.

We used latent class analysis (LCA) to identify principals who might have changed their practice as a result of participating in a district PD program. Latent class analysis is a statistical method for finding subgroups of related cases (latent classes) from multivariate categorical data. Because our analyses use continuous measures (time in minutes spent by principals on various activities), we employ a special version of LCA called latent profile analysis (LPA) which is designed to handle continuous outcome measures. The LCA and LPA 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).

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Finally, we compared the cases of change from qualitative accounts to change as measured by a latent class analysis using logging data and found convergent as well as divergent analytic themes. We revised our qualitative typology adding planning and goal setting because this dimension emerged in our LCA. We then reproduced the qualitative typology tables across time points during the treatment year. Together, these analyses were an attempt to replicate findings, but also provided an opportunity to for us to investigate and coherently account for divergent findings (Camburn and Barnes, 2004; Mathison, 1988; Miles and Huberman, 1994) in the leadership change process.

Survey Evidence on Principals' Learning Experiences

We used principal survey data to examine how principals' learning experiences developed over the course of the first year of the professional development program, and to examine how these experiences were different than those of principals not assigned to participate in the program. As noted in the literature review, professional development for principals is often criticized as incoherent because it focuses on too many topics and does not provide a sustained, common experience for thinking about professional practice with colleagues over time. To understand how this issue played out with the principals in this study, we asked principals: "To what extent do you agree that your learning opportunities focused on too many topics?" The frequency distribution of principals' answers to this item indicates that prior to the training program, principals were largely split between disagree and agree, and this reflected in the average response of 2.5. On the same survey we also asked principals: "To what extent do you agree that your

learning experiences allowed you to focus on a problem over an extended period of time?"

In examining evidence from the annual survey, we observed a general positive trend in items characterizing the degree to which principals' learning experiences were sustained and coherently related between spring 2005 and spring 2006. In particular, in spring 2006, principals were more likely to agree that they were able to focus on a problem over an extended period of time, and that their learning opportunities were coherently related, as compared to spring 2005. Similarly, in spring 2006, principals were *less* likely to agree that their learning experiences focused on too many topics. While principals' assessment of whether their learning experiences were coherent and sustained grew more positive district wide, program participants changed at a greater rate than control group principals on all three items. For example, the degree to which program participants agreed that their learning experiences allowed them to focus on a problem over an extended period of time increased from 2.5 to 3.2 (.6 points) on a scale of 1 to 4, whereas the control group principals only increased from 2.8 to 3.0 (.2 points). An increase of .6 points roughly corresponds to the standard deviation on most of these kinds of items. Similarly, the degree to which program participants characterized their learning experiences as "coherently related" increased from 2.6 to 3.3 (.7 points), whereas the control group principals increased from 2.7 to 3.1 points (.4 points).

Table X: Descriptive results regarding the coherence of professional learning experiences	Treatment		Control	
	Spring 05	Spring 06	Spring 05	Spring 06
Extent to which learning experiences were coherently related*	2.6	3.3	2.7	3.1
Extent to which learning experiences had an extended focus*	2.5	3.2	2.8	3.0

Extent to which learning experiences focused on too many topics*	2.6	2.2	2.5	2.2

*Scale: 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree

Qualitative Data: DPD Principals' Professional Growth Over Time, Spring 2005 – Winter 2006 and Spring 2006

Content Focus, Collaboration and Coherence

Consistent with the trend in the quantitative data, while we found few shared learning experiences and very little overlap in the content that principals said they were studying in the spring 2005, by winter and spring of 2006 that had changed. DPD was nested within multiple organizations including the district and state contexts (Scott, 1992; Weick, 1979; Weick, 1995). These organizations are frequently the source of competing signals about reform (Cohen, 1982; Cohen and Spillane, 1993). But in the case of this district and state, multiple sources of ideas for improvement across these organizations from the state and the district appeared to converge in content focus in the winter and spring of 2006. As the year progressed, DPD participants not only reported attending fewer professional development opportunities outside of DPD, but more principals participated in half of those development activities, creating a more common professional development experience. Near the end of their first year of participation in DPD, principals also reported fewer topics of study, and said that these large content topics were consistent across different sources of professional development. Notably, they discussed at length DPD's role in this dynamic learning context; that is, how DPD provided them with a sustained opportunity to make sense of the big ideas they were

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hearing about from multiple sources while in the company of their peers and knowledgeable others.

Program Pedagogy and Instructional Formats: Making Sense of Reform Principles and Reform-Oriented Content

The big content topics that DPD participants were exposed to and trying to understand in the winter and spring of 2006 were not transmitted to principals in a fully worked out or ready-to-use state; rather, principals had to interpret and make sense of them for their own practices (see e.g. Argylis and Schon; Barnes, 2002; Cohen and Weiss, 1977; Schon; Spillane, Reiser and Raimer, 2002; Majone & Wildavsky, 1977). While the DPD program used video and written materials to bring evidence based knowledge to the practitioner group—theorists, researchers and so on—the nature of that knowledge tends to be problematic for practice as it is often probabilistic, abstract and complex. Thus it is "difficult for practitioners to form images of research results that can be used to guide action in a particular local setting" (Argylis and Schon p. 41). Practitioners have to invent strategies or otherwise operational terms in content and then try to actually use them under conditions of complexity and uncertainty.

By their own accounts, DPD helped principals in this task. The program formats helped principals elaborate or expand on somewhat abstract concepts to develop varying practical applications for their own work. For example, principals valued the collaborative nature of the DPD program from the very beginning. Not unlike the egg carton structure of schools in which classrooms tend to isolate teachers, the structure of LEAs in which schools operate also isolate principals. Moreover, working conditions –

the diversity and immediacy of school-level demands – also bind principals to their individual schools for long days and weeks. Although principals do meet, those meetings are rarely focused on instruction and the kind of professional peer discussions that support leadership practice.

Thus, it is not surprising that during their June 2005 interviews, DPD principals viewed the team or cohort approach as one important benefit of their early DPD experience, not only at the same level – horizontally – but vertically as well; that is, working with and learning across levels from elementary to middle to high school. When asked what was most valuable in the DPD program, for example, many principals responded similarly to this one:

> Just interaction with the colleagues, that's something that we don't have time really as educators, to sit down and talk with other principals. We're all so busy with our own buildings and our own situations and our problems and challenges that it's rare that we get an opportunity to sit down colleague to colleague and discuss what's going on in your school or at your site and what you're doing (Cale, June 2005).

The DPD provided a structure– time, content and instructional formats – that served as a forum for principal exchanges guided by knowledgeable facilitators. This arrangement began to de-privatize principals' practice just as such discussion can de-privatize teaching practice (Louis and Kruse 1995, cited in Spillane, Reisner and Reimer, 2002; Little, 2002).

As training progressed, we learned more about why principals found the nature of the group work so valuable and how their learning experiences developed over time:

> The things that I do at home in preparing [for DPD sessions] give me a foundation for what we're doing. But one of the things I find most valuable is the sharing among the other members because it's. . . our own professional learning community. . . . although the schools are not the

> same, you can take some experiences that others have and apply them to
> what you're doing. . . .Because we don't necessarily get to do that a lot on
> the district level. So this [DPD] is a good time to be able to do that.
> (Orem, February 2006)

What principals valued most was an environment in which they could interact with peers

to elaborate, extend, and expand on the abstract through more detailed and concrete

accounts embedded in practice, thus making "ideas" or principled knowledge relevant to

their work:

> Sitting here [at a DPD session] 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)

The principal just above, and many others, explained how knowledgeable others–

through video or in person – could also elaborate and thus clarify details in the important

topics these principals were attempting to understand. For example:

> The videos are always by very famous scholars, and you know, you don't
> get to see those people in person all the time. So to hear them really
> elaborate on ideas, that was very helpful. (Wile, February 2006)

> I like the more detailed information. We talked today about professional
> learning communities, and the insights from actual instructors and
> professionals that come in help make it clearer for us (Weat, February
> 2006).

Another principal talked about the value of actually applying knowledge for making

sense of new information:

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

Thus, by their accounts, DPD was providing a critical, sustained opportunity for

principals to transform relatively abstract ideas or research knowledge into more detailed,

concrete, and thus "useable" knowledge for their own practice:

> I think a lot of the principals began to look at students' work and began to
> actually see what students know, what standards they're working on, and
> how it affects their learning. That immediate piece . . . each time we come
> back [from DPD] there's something that we have learned that really we
> can take back with us immediately and use it, and get feedback (Weat,
> February 2006).

DPD was the time and place for principals to work through "situated problems" in the

context of their own and their peers' practice, then reflect on, discuss, and refine

solutions or new procedures for addressing them.

As year one of the DPD program progressed, a pattern emerged from our

interviews. Principals characterized what they most valued from their DPD experience in

terms that align with the kind of habits of mind and organizational arrangements that

professional practitioners need in order to acquire expertise and translate research

knowledge or principles into practice:

> The assigned reading that goes with the program… the video clips from
> other people, the trainers from DPD. Some things you just hear over and
> over again and then you talk through it and it just makes sense (Orem,
> February 2006).

> So really, the framework of DPD has helped me as a relatively new leader.
> . . . I mean the big pieces. Like the professional learning communities,
> looking at data. . . .So those big pieces, that really give us true professional
> learning to take back and . . . actually use and implement it in the building
> (Dann, February 2006).

Thus, over time, these principals engaged in guided exchanges with knowledgeable

others and peers that took up variations on a set of recurring big ideas over time, with

opportunities for situated learning, reflection and problem solving; all are the

characteristics that research and theory suggest create a professional practice and/or learning community.

A Mixed-Methods Look at Implications for Changing Principals' Practice

1. Do the principals who attended the DPD program change their practice in the direction of program goals?

2. How do they differ from principals not assigned to or participating in the program?

3. What is the nature of change in principals' practice during the year of the DPD?

Analyzing Changes in Practice with EOD Log Data

We fit an LCA model to log data 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. In spring 2005 and fall 2005, the model identified two classes, one of which (class 1) was distinguished by principals' emphasis on managerial leadership (Building Operations, Student Finances, Student Affairs, and Personnel issues), and the other distinguished by an emphasis on instructional leadership, and, sometimes, planning & goal setting. In winter 2006 and spring 2006 the model only identified one class using the BIC statistic (a model fit statistic) as the model selection criterion. 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 remain similar over time. So

we chose to analyze two classes for all periods, and we roughly interpret class 1 to include principals who place greater emphasis on running the building, and class 2 to include principals who place greater emphasis on instructional leadership.

An intuitive way to understand LCA results is to examine profile plots which graph conditional means for each indicator used in the model for the classes identified by the model. Figure 1 contains a profile plot for the LCA for fall 2005, the first post-treatment measure. 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. We observed similar patterns for the other two post-treatment measures taken during the winter and spring of 2006.

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 in hopes that this might shed light on how principals' practice might have changed. Since the LCA classifications reflect how principals distribute their time across major leadership domains, we interpret principals' latent class assignments as indicative of the prevailing focus of their practice. In the spirit of Tashakkori & 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 also considered principals' assignment to the treatment and control groups and the extent of the DPD treatment they received in assessing change. Reflecting this logic, our analysis of the LCA results is organized according to principals' class assignments prior to treatment. Table 1 displays

post-treatment latent class assignments for principals classified in the managerial

leadership group prior to treatment while table 2 displays post-treatment measures for

principals classified in the instructional leadership group prior to treatment. Because we

felt it was important that our judgments of principal change be based on complete post-

treatment data, we limited our analyses to 27 principals who had data for all four waves.

One of the first things we see is that the principals falling into the managerial

leadership group prior to treatment outnumbered those in the instructional leadership

group by a 2 to 1 ratio. Another important piece of contextual information is a

consideration of program attendance patterns and what they might mean for principals'

predisposition to either managerial or instructional leadership. As mentioned above, the

DPD program placed a major emphasis on instructional leadership. Among those

assigned to DPD, 40 percent of those who *didn't* attend were classified in class 2 in

spring 05 whereas only 15 percent of those who *did* attend were classified in class 2.

Thus, on average, the group of principals who actually attended placed significantly less

emphasis on instructional leadership than the principals who chose not to attend. This

raises a number of interesting questions. Did the district encourage principals who it felt

were weak on instructional leadership to attend the DPD in hopes of improving their

instructional leadership? For those in class 2 prior to treatment, and who were assigned

to treatment but didn't attend (e.g. principal K in table 2), did they skip the training

because they were already strong on instructional leadership and because they felt they

didn't need the program?

In order to identify principals who might have changed their practice, we first

focused on principals who were assigned to attend DPD and who actually attended even a

few of the professional development sessions. 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 2 periods between fall 2005 and spring 2006. Among the principals assigned to the treatment group, there are 3 such principals listed at the bottom of table 1 (Tome, Orem, and Cale). From the LCA we viewed these three principals as being likely to have been affected by their program participation. We examined these principals and other principals who showed change based on our qualitative data in greater detail below through qualitative evidence. Consonant with a *positive impact* of the program on instructional leadership, we found that most of the principals assigned to treatment who *failed* to attend, and who were classified as managerial leaders prior to treatment (principals E, F, and G), *did not* show this pattern. Principal Welt is an exception to this general pattern, as s/he did not receive any of the DPD curriculum, but *did* show movement towards a greater emphasis on instructional leadership between fall 2005 and spring 2006.

Evidence that principals assigned to the control group who *did not* attend DPD training but also exhibited the pattern we interpret as movement towards a greater emphasis on instructional leadership could cast reasonable doubt on this method of identifying program effects and principal change. There are four principals listed in table 1 who fit this pattern—principals Kite, H, I and J. One might rightly ask why these principals who did not receive the treatment exhibit the same practice trajectory we label as "change" among principals who did receive the treatment. A potential explanation for these results might be that these principals received an alternative treatment, and we do

know anecdotally that there were other initiatives operating in the district that were designed to develop principals' instructional leadership.

Considering all of those classified as placing greater emphasis on managerial leadership prior to treatment delivery in the district, the relatively equal numbers of control and treatment principals who exhibited movement towards instructional leadership suggests a *lack* of an overall treatment effect on instructional leadership practice among these principals. There was another major leadership initiative operating in the district at the time of this study. In future work we will be pursuing these and other alternative explanations in more detail.[1] In addition to using these data to identify potential changers, the data can also be used to identify those who, based on the LCA, don't appear to have changed as a result of program participation. Principals Teem, Walt and Dubb (Table 1) fall into this category, as these principals were in class 1 prior to treatment, and remained in that class during every other period.

Looking at two principals, Weat and Wile (Table 2), who were not assigned to treatment, but who attended anyway, we see further evidence that attests 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 DPD trainings. We view these two principals as potentially seeking out the program, despite their assignment to the control group, because of its substantial emphasis on instructional leadership. In other words, these are two principals for whom the program might have been "singing to the choir."

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[1] We should also note that we are missing logging data for 4 of the principals who attended the DPD, though we have qualitative data. Likewise we have logging data for one the principals who changed classification over the treatment year toward instructional leadership, but have little qualitative data to explain or account for that change.

Counterevidence that might cast doubt on this method of identifying program effects and principal change would be evidence that principals assigned to the instructional leadership group prior to treatment, and who actually received treatment, actually began to place *less* of an emphasis on instructional leadership after receiving treatment. Only Principal Hill was classified as placing a greater emphasis on instructional leadership prior to treatment and then assigned to class 1 in 2 of the three periods between fall 05 and spring 06. This finding runs counter to what we would expect if the DPD program was having its intended effect. But the weight of this evidence is called into question by the fact that this principal did not receive a significant treatment "dose"; rather, s/he attended less than one third of all of the DPD trainings offered, and dropped out of the program at the end of June 2005. Thus s/he did not attend the program in the following fall, winter or spring.

It is important to acknowledge potential limitations of these results. The validity of our inferences hinge on an assumption that classification into class 2 post-treatment is a valid indicator of program effect. Disproportional emphasis on instructional leadership is a crude indicator of the kinds of leadership practices the DPD strives for. Thus, this measure has limitations in its ability to be a valid indicator of program effect. The potential fallibility of our measures also raises a limitation of our interpretation of the spring 2005 results. Our interpretation in a sense assumes that principals are in a stable state at spring 2005 and that we've measured that state well. Being able to establish whether principals were in a stable state or not would require data prior to spring of 2005. On the other hand, our interpretations are buoyed by the multiple sources of evidence we use from qualitative approaches, as shown below.

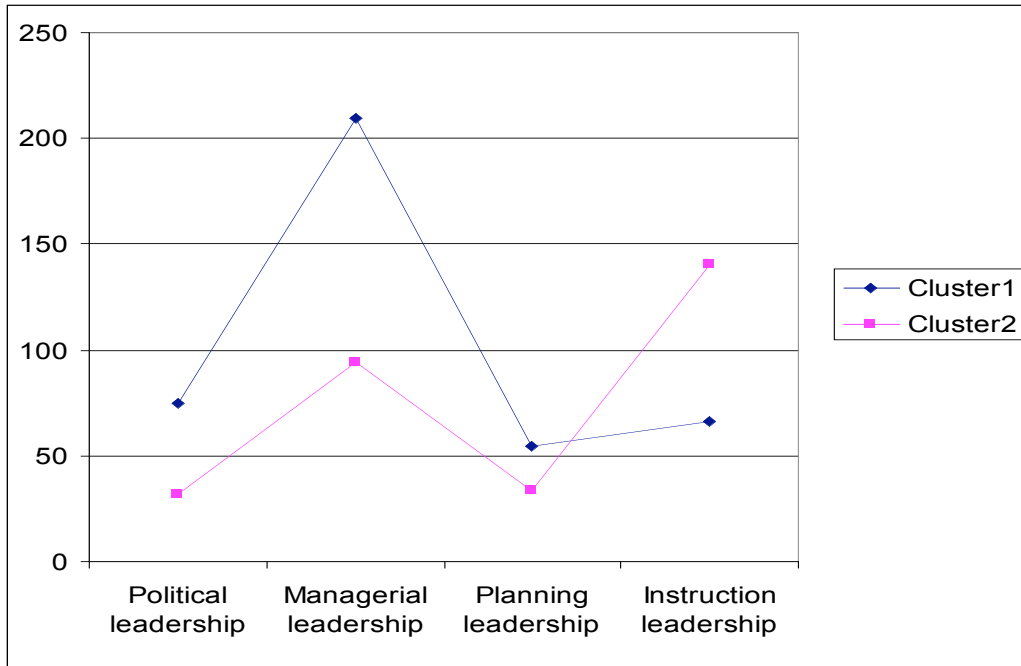**Figure 1: LCA profile plot for Fall 2005**

Table 1: Post-treatment latent class assignments for principals assigned to class 1 (managerial leadership) prior to delivery of district professional development program

Fall 05*	Winter 06*	Spring 06*	Pattern interpretation	Treatment assignment	DPD Attendance	Pseudonym
M	M	M	No change	Control	0%	Wimm
M	M	I	No change	Control	0%	A
I	M	M	No change	Control	0%	B
I	M	M	No change	Control	0%	C
M	M	M	No change	Control	0%	D
M	M	M	No change	Treatment	0%	E
M	M	I	No change	Treatment	0%	F
M	I	M	No change	Treatment	0%	G
M	M	M	No change	Treatment	91%	Teem
M	M	M	No change	Treatment	100%	Walt
M	M	M	No change	Treatment	64%	Dubb
I	I	I	Towards inst. leadership	Control	0%	Kite
M	I	I	Towards inst. leadership	Control	0%	H
M	I	I	Towards inst. leadership	Control	0%	I
I	I	I	Towards inst. leadership	Control	0%	J
I	M	I	Towards inst. leadership	Treatment	0%	Welt
M	I	I	Towards inst. leadership	Treatment	64%	Tome
I	I	I	Towards inst. leadership	Treatment	91%	Orem
M	I	I	Towards inst. leadership	Treatment	73%	Cale

*M=assigned to class 1 (managerial leadership), and I=assigned to class 2 (instructional leadership)

Table 2: Post-treatment latent class assignments for principals assigned to class 2 (instructional leadership) prior to delivery of district professional development program

Fall 05*	Winter 06*	Spring 06*	Pattern interpretation	Treatment assignment	DPD Attendance	Pseudonym
I	I	I	No change	Control	100%	Weat
I	I	I	No change	Control	100%	Wile
I	I	I	No change	Treatment	0%	K
M	I	I	No change	Treatment	36%	Lamm
M	M	M	Towards mngl. leadership	Control	0%	L
M	M	M	Towards mngl. leadership	Control	0%	M
M	M	I	Towards mngl. leadership	Treatment	0%	N
M	I	M	Towards mngl. leadership	Treatment	27%	Hill

*M=assigned to class 1 (managerial leadership), and I=assigned to class 2 (instructional leadership)

DPD Experience and Implications for Changing Practice: Mixing Methods and Data

To investigate the process of knowledge use and change more closely, we also used our qualitative typologies to categorize principals based on instructional leadership (IL) and strategic planning/goal setting (PGS) independently from the LCA. In our qualitative analysis we looked at these two dimensions separately, using not only their logging records on these dimensions, but also coded responses to scenarios, and coded descriptions of their most consequential decision each day. Unlike the LCA classification, we used 3 categories—low, moderate and high—to classify principals in a matrix. We compared these principals over time, adding shadowing data and interview data, and then used Huberman's (1983) taxonomy of "Types and Patterns of Knowledge Use in Schools" to develop our cases of change and stability.

Though we learned more about the leadership change process when we looked at divergent themes in the qualitative and quantitative data, in a general sense our leadership types and cases are reasonably consistent with the LCA. Of the sixteen principals who attended even one of the DPD sessions, in our qualitative work we focused initially on those who attended 4 or more days, and classified three of those 12 principals as high on IL in spring 2005 (Lamm, Wile and Weat). The latter two had not been assigned to the program originally, but attended all 11 days of it. Our classifications were based not only on principals' documented logging time—percent and minutes—but also on either high or moderate mentions of IL activities in their scenario responses and descriptions of their most consequential decisions each day. The three cases of high IL are all consistent with the class 2 leadership types that emerged from the LCA—more focus on instructional

leadership and planning. Two principals—Hill and Lamm—attended only 3 or 4 days of the DPD, respectively, so we dropped them from our qualitative case sample, focusing instead primarily on those who attended 7-11 days of the program over the year. Both the LCA and our qualitative cases show that principal Wile and principal Weat remained high on IL, but the qualitative data suggest some change in their practice as well: they adopted some of the DPD program tools, for example, and, by their accounts, deepened their understanding of how to think and plan strategically. In fact one of them did increase the time she documented as strategic planning during the treatment year although she remained stable on IL.

The two principals (Jimm and Teem) we classified as low instructional leaders on our qualitative typology in spring 2005, were in class 1 in the LCA—a focus on managerial issues. But the qualitative data show that while these two principals recorded little time on IL, one of them (Jimm) recorded a moderate number of IL activities in his most consequential decisions, and the same in his responses to scenarios. The other (Teem) recorded an extremely low time on IL logging and in descriptions of consequential decisions, but her IL related scenario responses were high in the spring 2005. Although neither of these principals showed a change from class 1 to class 2 on the LCA, based on the qualitative analysis both appear to have increased their emphasis on strategic planning and thinking over the treatment year, and Teem may have done likewise on IL.

Finally, we classified seven principals as moderate instructional leaders in our qualitative typology for spring 2005, and those were the principals who also clustered into class 1 of the LCA; i.e., those who devote more time and attention to management

than to instructional leadership. Of those seven , all but one scored moderate or even

high on their responses to scenarios in terms of IL activities by spring 2007. While we

have logging data for all three principals who changed from class 1 to class 2 in the LCA,

we have solid qualitative data for only two of the three (see appendix B for treated

sample and missing data). Those two also changed their practice based on our qualitative

casework. The qualitative data also suggests that others (Walt and Teem) who fall in the

LCA "no change" group, and a third (Dann), who was not included in the LCA because

of missing logging data, may have changed their thinking and behavior as well. These

three attended all 11 DPD sessions. We take up the more complex view of change in the

qualitative themes and cases further below.

Looking at the dimensions of planning and IL separately using more qualitative

approaches, we found that 7 of the 10 principals in our case sample increased their

attention on strategic planning over the treatment year. Of the 10 principals who attended

DPD 5 or more times, 8 increased the percent of work time spent on planning/goal setting

from the logging period in spring 2005 to the winter or spring 2006 logging period. Of

course, this does not meet the criteria we set in the LCA of change in two of the three

data points, but by spring 2006 six of eight principals for whom we had data were

moderate or high planners. In 5 of our cases we found that when recorded IL went down

over the treatment year, planning time went up. Moreover, when logging time IL did go

down, such leadership remained on front burner in terms of most consequential decisions

for some principals: Tome, for example, one of the principals changing from type 1 to

type 2 in the LCA, increased the number of consequential decisions related to IL from a

low classification in spring 2005 to high classification during the treatment year, and did likewise on her scenario responses from spring 2005 to spring 2007.

Using New Knowledge to Change Practice

To understand more about the divergences in our quantitative and qualitative data, we take up more detailed, qualitative themes and cases of change for a sample of these leaders below.[2] The principals we selected to study more deeply attended the DPD program seven or more times with the exception of one who attended 5 times. Thus, of those who tended to be motivated to attend and actually engage in DPD content, two (Weat and Wile) had documented a considerable fraction of their work time as instructional leadership as the DPD program was just beginning (just over 30 to 50 percent), while 5 principals (Dann, Tome, Orem, Walt and Cole) devoted a more moderate fraction of their work time to instructional leadership – about 18-24 percent. Two others (Teem and Jimm) recorded very little time on this kind of work on their daily logs.

It is therefore not surprising that many of these principals felt the big ideas they encountered in DPD confirmed or elaborated on what they were already doing, knew about or believed. Indeed, all nine of the cases we used across the high, moderate and low instructional leadership groups mentioned that at least some DPD topics confirmed what they were already doing or already knew or were learning elsewhere. From one

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[2] Recall that we have *incomplete* logging data for 5 of the principals who attended the DPD (Wurt, Dann, Char, Crul, Jimm) though we have solid qualitative data for some of those (Dann, Char, and Jimm). Likewise we have logging data for 3 principals (Dubb, Lamm and Cale—one of whom (Cale) changed classification in the LCA over the treatment year toward instructional leadership—but have little qualitative data to explain or account for that change (see Appendix B). We have little shadowing or interview data for Cale and thus can not shed much light on her change from class 1 to class 2 on the LCA.

view, these reports could be problematic for principals' learning and change.

Implementation or reform literature and cognitive science show that while reforms should

indeed focus on big ideas or principles rather than a long list of specifics, enactors can

misunderstand the intent of such abstractions (Cohen, 1990; Cohen and Weiss, 1977;

Peterson, 1977-1978; Barnes, 2002; Spillane, Reiser, and Reimer, 2002; Greeno, 1989).

Enactors of reform notice what is familiar to them more often that what is novel.

Novices – as many of these principals were – especially notice very superficial

similarities to their existing "schema" or prior knowledge when encountering new

information, while experts see deeper knowledge structures or principles (Bransford,

Brown and Cocking, 2000; Spillane, et al, 2002). It is possible, therefore, that some of

these principals misunderstood the DPD topics as familiar, and thus were at times

impeding their own learning or change.

But we also found that the DPD principals' learning and change stories pick up

another theme in cognitive learning, knowledge use and implementation literature; that is,

the possibility of sustained opportunities for making sense of big ideas that are subject to

mis- or multiple interpretations at a grain size concrete enough to avoid, or even remedy,

misunderstanding. In essence, the DPD program allowed principals to describe, try out

and exchange multiple, diverse cases thus elaborating the meaning of how to apply ideas

in the DPD framework to refine their practice. Thus, by many of these principals'

accounts, they were able to deepen their understanding of *how to change* their practice,

what to do, and why such change was important.

In their change stories, many of our case principals picked up these themes when

talking about their own practice. For example, when we asked principals about change in

their leadership approach due to DPD after almost one year in the program, they

described a new understanding of how to actually put previously held beliefs or ideas into

action and reported subtle, but nevertheless concrete changes in their practice. Most also

cast the changes in practice toward instructional leadership as being distributed across a

team of leaders. For example, principal Dann, for whom we have incomplete logging

data and thus did not include in the LCA, reports changing in concrete ways the purpose,

content, form and transactions that occur in teacher meetings from management to

instruction:

> We've deepened it and made it more of a focus for our school. Giving
> teachers leadership. . . . Before [DPD] we had committees. . . . and we
> would meet and we would 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"
> (Dann, February 2006).

Principal Wile—a class 2/high IL principal who remained in class 2 across the

treatment year in the LCA—suggests that since engaging in DPD she better

understands the value of using formative assessments, and has changed 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

EOD logging:

> I'll tell you the biggest change that we've done since DPD, I think DPD,
> the workshops that we've been doing, it's been a better understanding [of
> previously encountered ideas or practices]. I keep going back to
> performance assessments . . . really spending more time analyzing data
> and turning it around quickly, getting it back into the classroom. That's
> been the biggest piece for us. So what we've done is organize data. We
> now have a data coach (Wile, February 2006).

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 change 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 (Weat, February 2006).

Note here that her term is "we," suggesting again that through principals, DPD may have

influenced a team of leaders who distribute instructional leadership tasks, thus producing

a kind of collective change.

We also found a pattern in accounts from principals above and further below,

related to using more strategic thinking and planning in their work due to their

participation in the DPD program; that is, generally focusing the organization's attention

on a narrower set of objectives related to student learning through planning, allocating

resources strategically, and evaluating progress. As described in the introduction, content

related to strategic planning and thinking spiraled through the DPD curriculum,

especially in units two, three and four. These concepts continued with more details about

the "how to" aspects of these ideas in units five, eight, and beyond. For example, Unit 2

presses principals to develop or refine a vision and strategy as well as an action plan to

both implement and evaluate that vision. By Unit 3, the content focuses attention on

formative assessments and other diagnostic tools drawing attention to the pressing need

for principals to know if students are meeting standards. The other units take up a kind of

"cycle of improvement" (see graph 1) in which principals focus on how to meet the

narrower goals set out by the plan, through a set of strategies for implementing the action

plan, assessing progress, modifying it to reflect specific needs, and then implementing it

again.

Figure 1
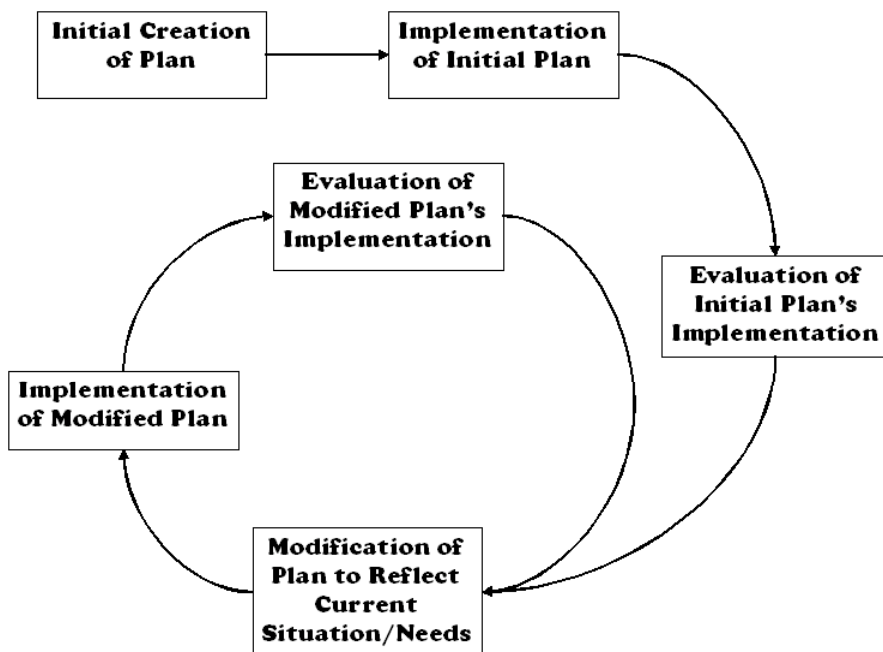
Many of our principal cases gave accounts of using one or more elements of this

planning cycle in their DPD practice-based assignments over the treatment year, then

refining it and integrating it into new school routines. Thus the theme of a more focused

and "strategic" practice – aimed at student outcomes and manageable objectives – was

prominent in principals' stories of change.   In seven of the nine cases of change we

examined, ADPD principals reported using elements of the strategic

planning/improvement cycle and much more focus in their thinking, attention and

actions. When we asked what principals had used that had helped in practice we heard

accounts such as the following:

> Something that's manageable; something that's doable. And to 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).

> DPD also talks about just narrowing your focus, because you can't do everything. . . . we need to work on one or two things and get those accomplished, as opposed to doing a litany of stuff. [For example] we know they [teachers] don't all do everything [we ask] with the data. . . . So let's streamline and say when we get this data back, these are the three things, or the two things, or the one thing that we'll do with this data (Jimm, February 2006).

These and several other principals said they had not only sharpened their focus

toward improving student learning. Most principals also described variations on the

theme of change related to strategically linking student learning to teaching, primarily

through using performance assessment data, student work and standards to guide

teachers' learning and instruction (see quotes earlier above and further below).

Moreover, aligning resources to more concrete objectives based on information about

what students need was a prominent theme in the accounts of change we list further

above and just below. Recall principal Dann below described changing the content and

form to teacher meetings to focus on meeting concrete objectives related to student

learning. From planning to resource allocation to monitoring progress to readjusting

resources based on information from that monitoring process, by their own accounts

Dann and others reported applying the principals and tools DPD provided. Though some

reported that student outcomes had always been their focus; still they all refined their

practice using DPD content). For example:

One of the big pieces I've learned is to tailor the focus in our schools to student learning. Everything else is just secondary. . . . Everything I'm learning at DPD has been focused on student learning: whether it's professional learning communities, deciding what your benchmarks are, [or] looking at data; it's all about student learning (Dann, February 2006).

I think I've become more focused, and more focused on results. And data-driven. And, just more focused (Teem, February 2006).

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] (Orem, February 2006).

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 (Walt, February 06).

But in order for it to be effective, you can't do it on Monday, and then do it on Thursday, and then do it next Wednesday. It's something that has to be done everyday. I think DPD does the same thing in saying, OK, here are some things that you need to do to be successful, but you need to do these on a regular basis to be successful. It can't be random acts of improvement. It has to be strategic acts of improvement and . . . here is a way to do it. . . .Theory is fine; DPD gives you some theory. But it gives you some practical ways of doing things. (Jimm, February 2006).

The comments we have used here are all consistent with the DPD curriculum and the program's intent to develop more strategic performances—thinking and behaviors—in these practitioners and doing so with new "useable" routines and other tools. The content areas common in the learning and change stories map onto DPD ideas, and those in common with a narrow set of other sources of professional development principals reported. But the change stories tend to integrate these ideas into workable practices or procedures.

Conceptualizing Change: Digging Deeper Into Leadership Performances.

We used elements of Huberman's (1983) taxonomy of "types and patterns

of knowledge use in schools" (p. 479) to categorize some of the cases of prior experience, leadership and change more systematically using the following domains: improved understanding; refinement of existing practice; adopting a new practice (innovation); creation of a new practice; and reinforcement of existing practice. We found of the cases of principals across all groups of high (Weat and Wile), moderate (Tome, Orem, Walt, Cole, Dann) and low (Jimm, Teem) instructional leaders (prior to DPD) described a deeper understanding of how to put a previously held idea into practice, and thus a refinement in how they or others performed an existing individual or collective practice. All but Tome reported gaining a deeper understanding of their work situation and of how to address persistent problems they faced.   In a few cases, descriptions of change included not only doing existing routines differently, but also a cogntive shift in how to think about and actually create new practices.

Two of the principals who may have "self-selected" the program as they were originally not assigned began and remained high on instructional leadership. But they did document on logging and report in interviews that they had increased their focus on strategic planning and thinking over the treatment year as we described earlier. They also reported using DPD in their practices to refine what they they were doing. Both remained in typology cells defined by high instructional leadership and low planning until spring 2006 when they changed to moderate and high planners respectively. Below we take up six cases of moderate or low leaders in spring 2005—Tome, Orem, Walt, Jimm Teem and Cole—in more detail to upack details and provide more insights into how we might conceptualize the change process for professional practitioners.

Low Instructional Leaders and Change

Recall that both principals who were classified as very low on logged time spent on instructional leadership prior to DPD—Jimm and Teem—also scored moderate or high on the scenario measures of their knowledge. Both were class 1 in the LCA. Based on qualitative data, these principals reported becoming more "focused," and strategic in their practice, and even developing new routines for applying what they learned in DPD.

We begin with the case of Jimm. He dropped out of DPD in the winter 2006, though when we "shadowed" him that February he spent a good deal of time on instructional leadership or strategic planning. Jimm was not included in the final LCA due to missing logging data in spring 2006, but using the data we do have we can see that he did change from a class 1 to a class 2 in winter 2006. He also *increased* to a high classification on *planning/goal setting* in both fall 2005 and winter 2006 in our qualitative typology. Our shadowing data confirm this emphasis and show that such planning was integral to his instructional leadership that winter:

> 8:00 AM Buzz. Where: "teacher meeting room" labeled the "war room" With whom: Co-leading with 2 teacher leaders (science-social studies specialist and literacy coach) and 1 Vice-principal who is also an instructional. Jimm is waiting for the leadership team to arrive and reading the "data wall"-information collected from focused walks, DRA & state reading assessment (CRCT), 25 book campaign. The team arrives and they talk about reporting school status on these indicators at upcoming conference. 8:30 AM Buzz: Science specialist reports on some teachers' need to do better on planning. Need better lesson plans. Literacy coach says she has a couple of weak teachers in literacy content planning as well. Jimm tells them to continue to monitor these teachers and tell them: "plan, plan, plan". Jimm reports that 2 people from district will come to school to talk @ "unpacking the standards" and the systematic process of monitoring implementation. Also a group out of Denver provides instructional planning training and will be in the district. Suggests directing problem teachers to this. 8:45: Leadership team meeting continues as the state SIP specialist is sharing information from the state

> school improvement office on using "Focused walks" to monitor teachers work vis a vis their lesson plans and the school plan. Converation about the problem of "executing plans" versus planning. One teacher, e.g., plans well but does not execute. Jimm says we should use our CSR for this. Organization is specified as a routine by the program. Manuals specifiy how the room is organized, just as they do the think aloud and the word wall. They discuss arranging for weaker teachers to observe stronger teachers. Jimm asks about supplies-where are they needed to carry out the weeks plan? He discusses preparing for the state test and stresses "pulling out kids who need it." Jimm focuses for quite a while on attendance data. Says "we have 164 students who have missed" up to 30 days of school. (Obs2039-JIMM-Feb06)

Jimm coded these segments of practice as "planning and goal setting" while the observer, one of the authors, coded the segment as instructional leadership *and* planning. In his interview Jimm said: "**A** major purpose of that meeting is to just drive the instruction of the school**, which is the most critical part, in my opinion".** This sample of his practice suggests that his increased time documented as planning in the winter of 2006, was crucial to his instructional leadership. Jimm reported that this routine meeting with his instructional team occurred weekly, but that he found it a "challenge" to always attend.

But is this a change in his practice, and is it related to DPD? This segment of practice shows the complex nature of attribution in professional practice or change. Here we see his school is engaged in a CSR, and from interviews we know the program is very consistent with DPD. Two principals in fact reported using this program, and that DPD not only allowed them to better understand common ideas across the two programs, but more importantly, how to apply them. Jimm also mentions other district PD programs for leaders and teachers, all consistent with DPD.

Thus while it is logical that in the crowded American education environments, DPD may not have affected his practice independently, in his

interview he described *refining* his performances—both cognitive and
behavioral—to *create* a more strategic practice due to DPD.   For example he
described adopting a DPD activity to examine his school's "safety net programs"
for struggling students and to adjust them as necessary. He talked to students
and to supplemental providers, and gave questionnaires to teachers so that they
would know what leadership teams would be looking for when assessing
progress. He explained the change in his practice:

> You automatically know you have to monitor. But prior to DPD I would
> have counted on those things being in place. . . . But since DPD, I know
> that's something I need to be doing on-going. [Also] the way that they
> showed us to monitor are really pro-active 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.

Jim also described how the DPD program provided him and his
leadership team with tools, guides for practice and routines that in turn
reminded them to do this monitoring on a regular basis. On the former point he
said:

> It's very few times. . .that you can come back [from a development
> program] 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.

He reported transferring this new insight and practice to monitoring instruction
more generally in the school. By his account, DPD helped him integrate what he
may have already been doing, to refine his practice or even invent something
new:

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

The other principal, Teem, attended all the DPD sessions, but was less concrete in her descriptions of change but did describe refining the way she approached her practice. She described not only a more "crystallized" understanding of some DPD ideas, but also the use of a DPD assignment on strategic planning to implement "the standards," a goal she set for herself over the course of the year:

> A lot of the standards-based kinds of ideas and things that we've gone through [in DPD] we've put in place. . . . My goal was to get standards implemented this year. And I've taken that plan we made for part of the DPD presentation and I'm working the plan (Teem, February 2006).

Teem attributed her new and heightened attention to standards in her classroom monitoring, to the DPD program saying that ". . .had I not been in DPD I probably would not have been focused on looking for standards-based instruction." She reports that she and teachers in her school use data to inform decisions more than in the past:

> I think the emphasis on data. I think that, particularly where I am now, we, we had a culture of – there were good things going on, but we couldn't prove they were good. It was, just, we think this is good and we think kids are learning from it. And I think that the whole movement has sort of gotten teachers to look at the data, and the more we emphasize that if you know it but don't have the data, then it's not any good to you (February 2006).

Recall that although neither of these principals were among those who changed from class 1 to class 2 in the LCA (one was not included due to missing data), based on the qualitative analysis both appear to have increased their emphasis on strategic planning and thinking over the treatment year. Moreover, both have discussed revising their *team* approach to leadership—not just what they do, but how their leadership teams function. Thus, we classified these two principals who had begun DPD devoting a very small

fraction of their own time to instructional leadership, as cases of refinement in practice—in their cognitive performances and in the case of Jim, perhaps in his behavior. Jimm, in refining his practice he may have created something new. Both gained a deeper understanding of their work situation and that along with DPD tools may have contributed to collective or organizational change. Of the two cases, Jimm is the most definitive.

DPD's "action projects" such as the one Ms. Teem mentioned above, especially developing and implementing a strategic plan, figured in the change stories of several other principals, three of which we take up here. All three—Walt, Tome and Orem-- were classified as moderate instructional leaders at the onset of DPD in our qualitative typology, and as class 1 in the LCA. Two of the three—Tome and Orem--changed from class 1 to class 2 in the LCA and increased their emphasis on instructional leadership or planning based on the qualitative typology over the treatment year. We classified Tome as a case of perhaps adopting a new practice in terms of collective and her own behavior, but not gaining a deeper understanding of why, or even of her work situation.

Principal Orem, was our clearest case of a principal who, based on a goal she identified in the plan, appeared to create a new practice or procedure to replace an existing practice – monitoring instruction. In the process, she changed her behavior and her focus of attention, without changing the frequency or duration of the prior practice. Walt, remained in class 1 in the LCA, but increased her emphasis on strategic thinking and planning over the treatment year quite dramatically based on the qualitative data. She was our one case of innovation, a principal who may have actually adopted a new practice or tool – the strategic plan – and then used it as a central organizing structure for

her practice, thus *reorganizing* and focusing what had been, by her own account, a quite "scattered" work schema. Principal Tome appeared to refine her practice considerably based on both quantitative and qualitative evidence. But while she may be a case of change, she did not appear to gain a deeper understanding of or insights into her practice. Rather she continued to classify herself as a manager, not an instructional leader. We illustrate more about how these three principals conceptualized their changing cognition and knowledge use as applied to their practice just below.

Principal Tome's winter logging shows an increase in planning and goal seatting—planning doubled as a percent of her work focus. Still she remained in a moderate or low category on this dimensions and instructional leadership in the qualitative typology. Nevertheless, instructional leadership appeared to be increasingly important to the decisions she was making. In spring 2005 she mentioned instructional leadership in only one of the most consequential decision she described over the week of logging. In fall of 2006 three out of four of her most consequential decisions related to instructional leadership. By winter and spring 2006, 4/5 and 3 /4 of her consequential decisions respectively, were focused on instructional leadership or the cycle of strategic planning and improvement we discussed earlier. These included such activities as "monitoring classrooms, looking at data to move students from one teacher to another, looking at effective practices for working with teachers to evaluate leadership and evaluating teachers effectiveness in classrooms".

Tome was also one of many principals who reported changing her own and her team's leadership practices in concrete ways toward a more strategic focus on improving instruction and student learning due to DPD. For example

early in the treatment year when asked what DPD activity she found most

helpful she said:

> Certainly looking at a measurable vision, or at least looking at your vision
> as what ultimately you would like to have and then your mission is
> working toward that and the strategies - that would align everything.

Later in the year when asked about using something she had or was using in her

practice from DPD, she said:

> I guess a specific thing would be that as we looked at the data from the formative
> assessments with the [state test], we specifically targeted those areas which our
> students this year need to be working on. And this month and next month what
> we're doing is breaking those areas down and focusing on those—and we're
> conferencing with them so that the students will buy in to the instruction that's
> going on that's specifically tailored to their needs (Tome, February 2006).

Thus she described something new she was doing as a result of DPD; docuemnted an

increasing emphasis on strategic planning and instructional leadership in her descriptions

of most consequential decisions she was making, and jumped from low to high on her

responses to scenarios related to planning (in spring 2007). But none of these changes in

behavior or thinking she described appeared to have changed or deepened her

understanding of the work situation as in her cognitive interview she said: the majority

of my day seems to be spent with parental concerns, with student issues, with

managerial quote-unquote type tasks. And continued: " In theory we need to be

and want to be instructional leaders, I think in theory we end up being managers

99 percent of the time. And that's unfortunate." Thus we classify her as a case of

refining, perhaps creating new practices. But she is also the one principals who

does not appear to have deepened her understanding of her work situation and

practice in a manner that many other principals described.

  When we asked **Principal Walt to** describe a typical day and her current

approach to leadership in June 2005, as she was just beginning the DPD program, her

account reflected much of the past literature on principals' practice: She described

constant interruptions, few if any routines planned to focus her on classrooms or

instruction, and little time invested in strategic planning (see for example, Wolcott, 1973;

Peterson 1981; Martin and Willover, 1981 cited in Fullan, 1991, p. 146).

> 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.

Moreover, that same literature on principals' work is consistent with how this principal

described her then-current approach to leadership and work day: for example, as myriad

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.

The picture of her habits of mind and practice that emerges from the interview is one that

by her own account is quite fragmented and "scattered." She seemed to lack focus,

intentionality, purposeful routines for attending to instruction, and so on. She 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 from the second interview we had with Ms. Walt in November 2005 through February and March 2006, this principal seemed to change. She began to recognize her approach as problematic. She appeared to change her expectations and beliefs about how her work world operated; and she reported a change in her behavior related to the elements of the strategic planning cycle we sketched earlier. In February Walt described change and her approach to practice. She, as most other principals, talked about more focused and strategic goals and actions, but in her case, this was a significant shift from her previous long list of fragmented activities:

> 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. . . Focusing on the learning – when you go back to the real reason that you have professional learning communities. . . . . And getting everyone to accept even though we *say* our children can learn, what are we going to *do* to make sure that they do? Looking at those pieces.

What helped her most to make these kind of changes in her practice?

> 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 doing 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. Plus I finally was able to get the vision and mission that I can live with, in place. . . that was essential.

In February Ms. Walt also described an "aha" moment at an earlier point in the year when she embraced the tool of a strategic plan as a way to not only integrate disparate ideas she was encountering, but also as way 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. 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 06). We thus classify Walt as a case of adopting and using and

innovation to change how she approaches her practice, and perhaps how her organization functions collectively.

Principal Orem, another moderate instructional leader we introduced at the onset of this section, is a case of prior knowledge, leadership and change we classified using the category Huberman labeled: "creation, development of a new practice" in this case replacing an existing practice (1983). She changed from class one to a class 2 in the LCA, and in the qualitative typology moved from a low to high category category on planning over the treatment year, even though she remained moderate in terms of instructional leadership. Interestingly principal OREM 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 instructional leadership practice.

She was spending a moderate fraction of her time on instructional leadership at the onset of DPD. In June, 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 as 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 due to DPD her comments were somewhat ambiguous:

> Certainly it has contributed. I mean not completely, I mean – it's good that our new superintendent is kind of on the same page with all this as well. But I think DPD has been a huge impact on the way I look at what I do.

Here she is pointing out that other development program she had attended, the new superintendent's new development program was consistent with DPD, and struggling with attribution in terms of influence on her practice. When we asked her *how* she had changed due to DPD, she clarified the ambiguity by describing several examples of prior practices: Ms. Orem was still using these, but by her account, was doing them "differently" due to what she was learning in DPD. For example, where prior to 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 DPD. Unlike her former method of observing classrooms, Ms. Orem described having narrowed her focus to one academic topic – mathematics – in need of improvement and on student learning in that topic. She had also incorporated more specificity in her observations by using a standards book to look for very particular types of teacher or student performances based on an external criterion. She 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.

She went on to say she was unhappy with some of what she was observing and that she

would be giving teachers "needs improvement" in their evaluations, something Ms. Orem was anticipating would make teachers very unhappy as this was something new for her, as well as for the teachers.

Finally, we found one case of a principal—Cole--whose DPD or other learning experiences may have "reinforced existing practice" (Huberman, 1983). But this case is ambiguous. Cole was identified as a class 1 in the LCA but was not included in the final analysis due to missing logging data. She was classified as moderate on both instructional leadership and planning in spring 2005 using the qualitative typology and remained in those categories in fall and winter of treatment year. She is also the third case of a principal who may have self selected the program as she was not assigned, but attended all 11 days.

On one hand we could attribute this principal's lack of change to a misinterpretation of the similarities between her practice and the new information with which she was engaged. On the other hand, she may have actually incorporated much of what she was learning to refine her practice without being cognizant of these subtle changes. She may have changed some of the schools collective practices or routines.

In her June 2005 interview she described her practice as that of an "instructional leader" and reported engaging in routines that focused her attention and time, primarily on instructional improvement. In November and February she reported "no change" from the previous June suggesting she was a "hands off" leader. In March 2006, when we asked her about change , she said:

> I don't necessarily think I have changed my way of thinking. I feel
> like I have become more reflective, and I'm learning how to focus
> on specific things. So it's not really a change; I've improved. I feel
> like I've gotten better, and it's just caused me to reflect, to really

think about some of the things that we are doing at school and how
we can do it better (Cole).

Her comments are ambiguous – as were many principals' – in part due to the difficulty of

reflecting on and understanding changes in one's own behavior or thinking. But while

she characterized her approach as "more reflective" (Schon) and "better" than it had been

prior to DPD, when she described what she actually did, or her typical day, she seemed to

have moved away from the routines that had orchestrated her instructional leadership at

the beginning of the year, even as she adopted some DPD tools to refine her practice. As

all other principals in our sample of cases, Cole reported adopting a more strategic

approach to her practice. At the same time her descriptions move toward a long list of

activities more characteristic of the literature on the principal's practice – i.e., as she put

it: "Staffing, budgeting, curriculum, instruction, student safety, and a little bit of this and

that, depending on what day of the week it is." However we interpret this case of

leadership learning and change, we could detect little change in thinking or description of

practice across the year. But we have yet to examine the "shadowing record" of her

practice, or the post observation cognitive interview we conducted in February.

Moreover, her profile on the end of day log and end of year questionnaire is also

ambiguous; she improved on one measure of "reflective practice" but not on the other.

Conclusion

Our quantitative analysis and qualitative tend to be consistent in describing DPD

participants' learning. The multiple sources of evidence and methods we used are

likewise relatively consistent in categorizing leadership types as high, moderate or low on

instructional leadership at the onset and across the treatment year.   But the LCA

identified only 3 cases of change, while our qualitative data provided a compelling and much more complex change story. Consistent with the LCA, principals' qualitative accounts of change did not often include the wholesale adoption of an innovation. But all principals who attended 5 or more days of the DPD program described a substantial refinement in existing practice, a deeper understanding of how to actually put previous ideas into practice, and in several cases the creation of new practices.

In terms of learning experiences, DPD principals were more likely to attend professional development with one or more of their colleagues and to focus on consistent content across these activities in the spring 2006 than in spring 2005. Moreover, they told us they found the ideas they encountered to be very consistent – even complementary. We also found a positive trend in the degree to which principals characterized their learning experiences as sustained and coherently related between spring 2005 and spring 2006. Moreover, in spring 2006, principals were *less* likely to agree that their learning experiences focused on too many topics. While these trends were district wide, ADPD participants changed on these items measuring sustained and coherent learning experiences at a greater rate than control group principals.

Interview and observation data show that during the DPD program these principals engaged in guided exchanges with knowledgeable others and peers that took up variations on a set of recurring big ideas over time, with opportunities for situated learning, reflection and problem solving; all are the characteristics that research and theory suggest create a professional practice and/or learning community.

The frame we introduced at the outset of our paper accounts for and summarizes the themes in principals' reports. Professional communities such as the one DPD

organized can support practicing professionals' learning and, more generally, "sense-making" (Spillane, et al, 2002) for a variety of reasons: first, interaction within a professional community that is orchestrated to be instructional can surface a range of insights on confusing or ambiguous situations, which are especially prevalent in the complex conditions under which principals work. The accounts of learning in our sample of principals who attended DPD program reported this feature of the process. Such collective arrangements create scaffolding for professionals to think through common problems as the reasoning of colleagues or "experts" becomes more transparent (Argylis and Schon; Resnick, Levine and Teasley, 2002). This too was frequently reported by participants in DPD and our observations confirm the view. Professional communities in which practitioners converse also develop a common language and understanding for the group to use (Bandura, 1989; Lave, 2002; Resnick, 2002; Resnick, Levine and Teasley, 2002; Weick and McDaniels, 1989); participants can draw on the expertise distributed across the group, thus addressing problems that any one member may not be able to understand alone. These professional practice groups are important because they help practitioners "form images" of principles or abstract content, allowing them to try their inventions out in practice, enable problems to surface, and more generally translate abstract content into practice (Argylis and Schon,1996; Hood, 2002; Huberman, 1987; 1990; Spillane, Reiser & Reimer; Wenger, McDermott, and Snyder, 2002). This last theme was perhaps the most prominent in our cases accounts of learning.

By most principals' accounts, they were able to deepen their understanding of *how to change* their practice, *what to do,* and why such change was important. The theme of a more focused and "strategic" practice – aimed at student outcomes and

manageable objectives – was also prominent in principals' stories of change. Eight of the nine principals in our case sample reported using one or more elements of a DPD strategic planning cycle in their practice-based assignments over the treatment year, then refining it and integrating it into new school routines. In eight of the nine cases of change we examined, DPD principals reported revising their practice using elements of the strategic planning/improvement cycle and becoming much more focused in their thinking, attention and actions. Most principals also described variations on the theme of change related to strategically linking student learning to teaching, primarily through using performance assessment data, student work and standards to guide teachers' learning and instruction (see quotes throughout). Moreover, aligning resources to more concrete objectives based on information about what students need was a prominent theme in the accounts of change.

Moreover, all these themes are consistent with the DPD curriculum and the program's intent to develop more strategic performances—thinking and behaviors—in these practitioners and doing so with new "useable" routines and other tools. Thus the content areas common in the learning and change stories map onto DPD ideas, and those in common with a narrow set of other sources of professional development principals reported. Central to all the change accounts is "integration" of many, sometimes unwieldy ideas and practices into a more manageable whole. Interestingly, principals suggested that DPD helped them differentiate the meaning of previously held beliefs and ideas for practice. But their accounts also show that DPD provided overarching knowledge structures, tools or routines on which DPD participants were able to hang the multiple and varied ideas they were encountering in order to integrate those ideas in

practice. This kind of organized knowledge base is one mark of more expert practitioners (Ohde and Murphy, 1993). We are not suggesting that these principals became "experts" over the course of one year, but that DPD was providing them with some tools for organizing knowledge use and practice.

While the ADPD training sessions provided an opportunity for engaging in a professional community that the principals valued and used, principals were unable to continue such connections outside of the formal ADPD training—perhaps due to competing pressing demands on their time, and the isolating nature of the district organization that we discussed earlier. Our point here is that organizational arrangements such as the community of practice that ADPD created are not naturally occurring in education or other organizations (Argylis and Schon; March.) The structures that make such communities productive need a design orchestrating instructional exchanges, knowledgeable facilitators, as well as support and maintenance – primarily by district leadership or outside intervenors (Barnes, Massell and Vanover). The content—the nature and form of knowledge as well as the source—is also a crucial component as our analysis has shown.

We think ou study raises an about the nature of change in practice and the ROLE OF PLANNING and goal setting in instructional leadersip. WE PROPOSE changing both thinking and behavior toward a more strategic approach, and using the tool of a well developed "plan" may be more important than some scholars have thought. At least one principal appeared to reorganized her entire cognitive approach to practice, and as noted above most other substantially revised their practices based on the cycle of strategic planning. Seven of nine cases actually increased their emphasis on planning over the

treatment year. While we separated the two for analytic purposes, in practice these seem to be key elements of competent instructional leadership as they emerged in both the LCA and qualitative accounts of change.

A problem in our analyses is that we do not adequately account for organizational, collective or distributed change. Our qualitative data suggests that through principals, DPD may have influenced a team of leaders who distribute instructional leadership tasks, thus producing a kind of collective change. At the same time this phenomenon could account for the low frequency of dramatic or wholesale change among our sample principals. We intend to take up this question in future analyses.

Given the press for randomized trials, we think using mixed methods for collecting and analyzing data can add rigor and insight to the conclusions such studies produce. Our mixed approaches allowed us to unpack the black box of principals' performances—both cognitive and behavioral. These methodological approaches have allowed us to learn more about the nature of change and the relationship between knowing, doing and thinking. They are thus more commensurate with our conceptual frame--a performance perspective taking in learning, knowledge use and professional practice.

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