What Are You Driving At?: How School Leaders Use Data When Making School-level Decisions About Instructional Improvement

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Abstract

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Increasingly, educational policies include mandates for school leaders to use data to "drive" their school-level decisions about instructional improvement. Extant research suggests that school leaders are trying to use data in their school-level instructional improvement decisions—decisions that impact instruction across multiple classrooms—but provides little guidance about the types of data school leaders use and how they use them when making such decisions.

This dissertation begins to address these gaps through a qualitative, embedded case study of two middle schools implementing data-driven decision making at the school-level.

Drawing on concepts from the theory of organizational decision making under conditions of uncertainty and ambiguity, the study relies heavily on observational methods to examine the full breadth of data school leaders use, how they use them, and how data usage relates to the outcomes of the decisions.

Findings reveal that the leaders in the two study schools used a broad array of data, including student test scores, data on their schools' resources, data on the implementation of current programs and school operations, and data on potential strategies, programs, or interventions. Because these data were rarely available, the school leaders spent significant amounts of time gathering additional data and they, at times, used their personal knowledge in place of data. Further, this study demonstrates that leaders used these data throughout the decision making process, and that how leaders used these data was related to the outcomes of the decisions.

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Chapter 1: School Leaders' Use of Data in School-level Decision Making About Instructional Improvement

Over the past two decades, federal, state, and district educational policies have encouraged or required school staff to use data to drive their decisions, mostly with a focus on helping teachers use data to improve their teaching (Marsh, 2012; Marsh, Pane, & Hamilton, 2006; Means, Padilla, DeBarger, & Bakia, 2009). Policymakers and advocates of data-use assume that if school staff use data to identify problems and responses, then student outcomes will improve (Marsh, 2012; see also, Bambrick-Santoyo, 2010; Data Quality Campaign [DQC], 2011; Institute for Educational Sciences, 2009).

More recently, educational policies have begun to emphasize the importance of school leaders using data—which I define as systematically collected information with the potential to inform school improvement—not just in classrooms but to guide school-level instructional improvement decisions such as those about developing annual improvement plans, selecting professional development, adopting interventions for struggling students, or other decisions that impact instruction across multiple classrooms (DQC, 2011; Means, et al., 2009). For example, in 2008 Seattle Public Schools adopted a tri-annual formative assessment with the expressed goal of helping school staff "make data-driven decisions about instruction, staff training needs, and each school's annual Continuous School Improvement Plan" (n.p., Seattle Public Schools, 2011a). School-level DDDM policies build on a theory of change shared by policies in other sectors that promote the use of data for organizational improvement: if school leaders can move beyond politics, fads, personal knowledge, experiences, and preferences, to

focus on data when making teaching and learning decisions, then these leaders will make better school-level instructional improvement decisions, and student outcomes will improve (Anderson, Leithwood, & Strauss, 2010; Loeb, 2012; Marsh, et al., 2006; Slavin, 2002; Wohlstetter, Datnow, & Park, 2008).

Like the policies, research on how school staff implement DDDM policies has overwhelmingly focused on how teachers use data to inform their classroom-level decisions. The few studies of school leaders' data use suggest that principals are trying to use data when making school-level instructional improvement decisions and that they draw on range of data, including test scores, enrollment data, and observations (Anderson, et al., 2010; Datnow, Park, Kennedy, 2008; Marsh, et al., 2006; Means et al., 2009). However, this line of research has yet to closely investigate key aspects of what policy demands of them, including how school leaders confront the inevitable gaps in available data, the ways in which leaders beside besides principals contribute to data use in school-level DDDM, the processes in which leaders engage when making school-level instructional improvement decisions with data, or the outcomes of such decisions.

The time is ripe to address how school leaders use data in their school-level instructional improvement decision making since the resulting decisions often call on most, if not all, of a school's teaching staff to participate in implementation, and can have a similarly wide impact on students and their achievement. Further, since the vast majority of DDDM guides, professional development, and data warehouse systems are aimed at supporting the data of use for classroom-level decision making (Means et al., 2009), with few resources available to help guide school leaders to use data in their decision making. Even policies

encouraging data use offer little help, especially considering their definitions of "data" and what it means to use it in decision making are often ambiguous at best (Marsh, 2012). The first step in supporting school leaders is to develop an understanding of how data use and school-level instructional improvement decisions currently happen in schools. To what extent are school leaders realizing the policy goal of using data when making school-level instructional improvement decisions, and with what results?

As noted above, extant research on how school leaders use data when making decisions suggests that principals are trying to use data in their decision making, but ultimately this line of research does not address key questions about how school leaders implement DDDM policies at the school-level. For further guidance I turned to research on the implementation of two related policies: site-based decision making and classroom-level DDDM. Empirical evidence from these literatures suggests that school leaders use multiple forms of data to identify problems and that selecting responses—essentially making decisions—may be difficult, if not impossible for school leaders. As such my study focuses the outcomes of school-level decisions about instructional improvement and how they vary according to the data school leaders use, their decision making processes, and the context within which they operate.

Given the encompassing nature of these questions, I wanted to employ a conceptual framework that fully described the processes involved in decision making, and how data and various organizational factors influence these processes to produce decision outcomes. To do so, I turned to March and colleagues' theory of organizational decision making under conditions of uncertainty and ambiguity (March, 1991, 1994; March & Olsen, 1989; March & Shapira, 1987; March & Simon, 1993). This theory conceptualizes decision making as a complex and

multi-dimensional process where groups of decision makers use various forms of data and knowledge to match problems and goals to responses.

To examine the detail and complexity suggested by this theory, I conducted a qualitative, embedded case study of school-level decision making about instructional improvement in two middle schools implementing DDDM. Because self-report data regarding decision making processes are often incomplete or unreliable (March, 1991, 1994; Weiss, 1980), my data draw heavily from observations of school leaders as they engaged in decision making. I used the individual decision discussions function as my unit of analysis, allowing me to examine patterns between the outcomes of school-level instructional improvement decisions, types of data school leaders use in these decisions, the processes in which they engage when making these decisions, and the organizational factors.

I found that the school leaders in these two schools did, in fact, make school-level decisions about instructional improvement and that some of the decisions called for deep changes to their schools' educational program while others called for superficial changes. When examining patterns in the school leaders' data, I found that school leaders frequently used multiple types of data, but the decision outcomes did *not* vary according to their data use. Instead, I observed patterns in how the school leaders confronted gaps in the data available regarding their school resources, implementation of current programs, and information on potential strategies or interventions. In response, the school leaders spent significant amounts of time searching for and gathering additional data and, when they lacked time, they mined their personal knowledge to use as data. I further observed the school leaders use multiple

"triangulation" strategies to check the extent to which their personal knowledge matched broader patterns in their schools.

When examining the school leaders' decision making processes, I found that patterns in how the school leaders made decisions did vary according to the decision outcomes. For example, when school leaders were not able to reach consensus about the nature of the problem they were trying to address, these discussions stalled and the leaders did not make a decision. For other decisions, when the school leaders were able to identify a potential strategy that matched their conception of the problem and their goals, these discussions resulted in the leaders making a decision to adopt the strategy. When the school leaders merged data on potential interventions with their personal knowledge, these decisions resulted in decisions called for deep changes to their schools' educational program.

My findings suggest that the emphasis in DDDM policies and guides on analyzing student test scores to identify problems, and their disregard for personal knowledge, is incomplete and potentially misguided. In these two schools, test scores were necessary, but not sufficient. Instead, the leaders relied on multiple types of data, supplemented with their personal knowledge, to engage in the complex processes of school-level instructional improvement decision making. These findings suggest that school leaders need support to gather and use multiple forms of data, to identify appropriate times to rely on their personal knowledge, and to use these data and personal knowledge throughout the decision making processes.

Overview

In Chapter Two I examine the empirical evidence on how school leaders use data in their decision making. I start by reviewing the extant research on how principals implement DDDM policies at the school level. For further evidence on the process of decision making at the school level and on the use of data in schools I review, respectively, the extant research on site-based decision making policies and classroom-level DDDM policies.

In Chapter Three I present my conceptual framework that highlights the multiple processes involved in decision making, the role data and personal knowledge play in these processes, as well as how multiple contextual factors can influence the processes. In Chapter Four, I present my research design and methods, focusing on how I selected the two schools for the study and my approach to collect and analyze my data.

In Chapters Five through Eight, I present my findings. In Chapter Five I present the outcomes for the 13 instructional improvement decision discussions I observed over the course of the study. In Chapter Six, I examine the extent to which the school leaders' data use varied according to the decision outcomes. Here I argue while the patterns in school leaders' data use did not correspond with the outcome patterns, they are nonetheless interesting because they highlight how school leaders confront data gaps and use their personal knowledge as data. In Chapter Seven, I focus on how school leaders' decision making processes and find that the patterns in school leaders' decision making correspond to patterns in the outcomes. In Chapter Eight, I describe how the availability of data, the schools' existing systems, and the school leaders' values each influenced the school leaders' broad data use and decision making

processes. Chapter Nine provides a summary of findings, as well as the implications of these findings for research and practice.

Chapter 2: Prior Research on School-Level Decision Making About Instructional Improvement

As DDDM policies spread to encompass school leaders' school-level instructional improvement decisions, questions arise on how school leaders implement these policies: What kinds of data do school leaders use and need when making school-level instructional improvement decisions? What does school-level instructional improvement decision making using data look like? What are the outcomes of school-level instructional improvement decisions that use data? How does the broader policy context and school environment influence school-level instructional improvement decision making? Answering these questions will help policy makers and advocates of data use design better DDDM policies and models for school leaders. At the local level, answering these questions will help district leaders support the use of data by principals, teacher leaders, and other school leaders, and they will help school leaders improve their data use in their in school-level instructional improvement decision making.

In this chapter I review three bodies of literature to begin to understand what extant research already teaches about how school leaders use data when making school-level decisions about instructional improvement. I start by reviewing the research on how school leaders use data in their school-level decision making. I then turn to a second body of research examining the implementation of another policy designed to change how school leaders make decisions: site-based decision making research. Third, I review a broader set of research focusing on how teachers implement DDDM policies in their classrooms.

Overall, extant research shows that school leaders report using a range of data in their decision making and suggests that data use is a multi-stage process, with the context within which it unfolds complicating or preventing school leaders from making decisions at all. Outside of these broad findings, the literature does not provide detail on what types of data school leaders use or need, what happens in each stage of the decision-making process, or what the range of outcomes might be for school-level instructional improvement decisions. These omissions leave district and school leaders without an understanding of how to support school leaders as they try to use data in their school-level instructional improvement decision making. I conclude with a set of research questions to ground a study that seeks to expand existing knowledge on school-level decision making, and a list of criteria to conceptually and methodologically ground such a study.

Research on School-level Data Driven Decision Making

In this section I review the emerging literature on how school leaders make school-level decisions using data. I separate school-level decisions from classroom-level in two ways. First, principals, other administrators, or leadership teams typically make school-level decisions, whereas teachers, coaches, or subject matter teams make classroom-level decisions. Secondly, school-level decisions differ in terms of scope, with school-level decisions drawing on school-level resources, spanning several classrooms, providing guidance to more than one teacher, and tend to be implemented over long periods of time. Taking these together, I define school-level decisions as those that school leaders, such as principals, leadership teams, and administrators, make that set policy for multiple classrooms and aim to improve teaching and learning in the school.

I culled these findings from the broader DDDM literature that generally focuses on how teachers use data in their classroom-level instructional decisions, such as whether or not to re-teach a lesson or to identify struggling students. To identify the studies included in this review, I began by searching for research on DDDM and then looked within these studies for any mention of principals, school leaders, or other individuals who might make school-level decisions. I also looked for any mention of decision topics that might be addressed at the school-level, such as curriculum adoption or professional development. I followed any citations that appeared to come from school-level studies. In all, I identified six studies that included findings on how school leaders use data in their school-level decision making.

School Leaders Report Using Data in School-level Decision Making

In this group of studies, researchers asked principals and other school leaders via survey or interviews about their use of data in their decision making. In general, principals reported using data in their school-level decision making (Datnow, Park, & Wohlstetter, 2007; Datnow, et al., 2008; Halverson, Grigg, Prichett, & Thomas, 2007; Marsh et al. 2006; Supovitz & Klein, 2003). For example, Marsh and colleagues (2006) surveyed principals in California, Georgia, and Pennsylvania and more than half reported using data during previous three years in their instructional decision making. In another study, relative to teachers who predominantly reported using student test score data, school leaders reported using a broader range of data, including student placement data, observational data, and student engagement data, and that these data came from across the classrooms in the school (Datnow, et al., 2008). The authors do not further describe these data types. The principals and school leaders in this study also

suggested that their decision making relied on their analysis of data from across multiple classrooms (Datnow, et al., 2007).

Together, these studies suggest that principals and other school leaders are responding to the newer, school-level DDDM policies by trying to use data when making school-level decisions. Further, these studies suggest that school-level decisions may require different and broader forms of data than do classroom-level decisions (Datnow, et al., 2007; Halverson, et al., 2007). However, this group of studies has yet to move beyond school leaders' reports of data use and decision making to more closely examine the types of data they use and how they "mix" them, how they use data in their school-level decision making, the outcomes of such decisions, or how groups of school leaders work together when making school-level decisions using data.

Research on Site-based Decision Making and Classroom-level DDDM

To further inform this study on how school leaders use data in their school-level instructional improvement decisions, I turned to two additional literatures. In this section, I first review the research on how school leaders implemented site-based decision making policies—policies that formally transferred decision making authority from district central offices to school-site councils. I turned to this research because it helped me to identify potential outcomes of school leaders' instructional improvement decisions as well as several contextual factors that constrain leaders' ability to make decisions. I then examine research the implementation of DDDM in classrooms. This broader set of DDDM research is useful to me because it suggests how to study school-level decision making, including data collection opportunities and methods.

Together, these bodies of literature suggest that a study that examines how school leaders use data in their school improvement decisions should focus on whether or not school leaders actually make decisions, look for leaders using multiple types of data and engaging multiple processes when making decisions, and examine how contextual factors can constrain data use in school-level instructional improvement decisions.

Research on Site-based Decision Making: Outcomes and Barriers

In this section I examine the research on site-based decision making (SBDM) to better understand the processes and outcomes of school-level decisions and the extent to which a school's context can shapes these functions. This body of literature examines how school leaders implemented policies—including SBDM, school-based management, and decentralization—that formally transferred decision making authority from district central offices to school leaders or school-site councils (Honig & Rainey, 2012; Malen, Ogawa, & Kranz, 1990b). Under these policies school leaders controlled a number of school-level decisions, and the research on these policies examined how, if at all, the leaders made school-level decisions. I turned to this body of literature to see if it could shed light on data use in school-level decisions, but because school leaders faced numerous barriers when attempting to make decisions, instead I found this literature to demonstrate how context can influence leaders' school-level decision making. Because the research on these policies is expansive, I primarily focused on existing reviews, supplemented by frequently cited or key studies.

School leaders struggled to make school improvement decisions. One of the main findings from research on how school leaders implemented SBDM reforms is that they often did not make decisions, and if the leaders did make decisions they were relegated to non-

instructional topics (Malen et al., 1990b; Murphy & Beck, 1995). To understand why leaders made so few decisions, several studies tracked how the school leaders spent their time and noted that much of it was spent on setting up the site councils including electing or establishing membership, figuring out processes and areas of authority, and navigating school and district politics (Cotton, 1992; Hall & Galluzzo, 1991; Hill & Bonan, 1992; Leithwood & Menzies, 1998; Malen et al., 1990a, 1990b). Other contextual factors, detailed below, also hampered their efforts to make school-level decisions.

When school leaders were actually able to make decisions, they were rarely related to instructional improvement. Instead councils tended to focus on "tertiary activities" (Peterson, 1991, n.p.) including student discipline, campus aesthetics, staff responsibilities, and the distribution of funds often from small discretionary budgets (Cotton, 1992; David, 1989; Ogawa & White, 1994; Peterson, 1991; Wohlstetter & Odden, 1992). Their decisions did not focus on instruction, teaching, or the schools' educational program, but more operational aspects of their schools. For my study, these findings suggest the importance of examining decision outcomes, including such fundamental outcomes as whether or not school leaders actually make decisions and if they do, the proximity of the decisions to their schools' instructional core.

Context constrains school improvement decision making. To better understand why school leaders struggled to make any decisions, several studies examined the site councils' context or the policy, organizational, and resource environment in which the school councils operated. A main contextual factor that several researchers attributed the site council's lack of decision making was that district central office administrators often did not grant the councils the authority or autonomy to make decisions in areas related to instruction or the educational

program. For example, the school district central office administrators were typically charged with implementing the programs at the district level but they often ignored, resisted, or outright did not support the reforms (Arterbury & Hord, 1991; Bimber, 1993; Malen et al., 1990a, b; Murphy and Beck, 1995; Ogawa & White, 1994; Peterson, 1991; Wohlstetter and Odden, 1992). A main way the school district central offices resisted the reforms was that they often failed to provide critical resources to the site councils, such as the time to meet and engage in decision making, or money to fund the councils decisions (Clune & White, 1988; Cotton, 1992; Malen et al., 1990b).

Norms of hierarchy between district administrators and schools, as well as an environment filled with multiple, conflicting policies, also hampered school site councils' ability to make school improvement decisions. For example, longstanding norms and systems of service delivery supported the district central office administrators' authority as decision makers and these same norms meant that school site council members were themselves resistant to take their new authority from the central office. (Malen, et al., 1990b; Wohlstetter & Odden, 1992). Similarly, complying with various district, federal, and state statutes, as well as district collective bargaining agreements, constrained the site councils' ability to make decisions because these other policies clouded whether or not school site council members controlled decisions in various policy areas (Cotton, 1992; Hill & Bonan, 1992; Malen et al., 1990a, b; Murphy and Beck, 1995; Ogawa & White, 1994; Wohlstetter and Buffett, 1992). The policy environment not only constrained councils because central office administrators enforced these policies, but also because the site council members themselves were confused by the multiple, conflicting policies. Hill and Bonan (1992) argue that conflicting policies sent mixed

messages to school site councils by simultaneously asking schools to take initiative to make decisions and to comply with existing curriculum or accountability.

As suggested above, individual-level factors influenced school site councils' ability to make school improvement decisions, namely, a lack of members' capacity, know-how, or ability to make productive use of their new decision making authority. In the instances where school site councils did receive autonomy and authority to make decisions, at times the members did not have the ability to make decisions (Briggs & Wohlstetter, 2003; Clune & White, 1988; Cotton, 1992; Malen et al., 1990b). For example, one review cited school leaders' lack of knowledge about school operations and group process skills as individual-level factors that contributed to an overall lack of capacity to make decisions (Cotton, 1992). Another review cited decisions makers' lack of decision making expectations—stemming from norms of principal as decision makers—that led leaders, especially teacher and community leaders, to not push the site councils to make decisions (Malen, et al., 1990). Furthermore, most school-based decision making policies did not include training or other approaches to help augment members' capacity. Instead they simply assumed that members would know what to do and made "general reference to the need for participants to understand the process of shared decision making" (Ogawa and White, 1994, p. 69). Together these studies raise questions about the schools' context, in particular the central office, policy environment, and capacity of individual school leaders, and how they impact school leaders' ability to make school-level decisions.

To summarize, the research on site-based decision making helps me to identify a range of possible outcomes for school-level instructional improvement decisions, including whether

or not the school leaders make decisions at all, and if they do, the extent to which these decisions are related to the school's instructional core. This body of research also suggests that my study should examine how the policies, organizational norms, and resources may constrain school leaders' decision making

Research on Classroom-level DDDM: Data and Process

Compared to school-level DDDM, the literature on classroom-level implementation of DDDM is much larger and examines DDDM across multiple contexts and therefore provides a fuller picture of the types of data staff use in their decision making. In many cases, the studies of classroom-level DDDM were more in-depth and provide wider examination of the process of using data in decision making. For these reasons, I turned to the classroom-level research to help me define what counts as data and provide clues as to how to study the data and decision making processes school leaders use when making school improvement decisions.

Defining data. Considering the amount written on how to use data to drive decision making in schools, surprisingly few policies, guides, or empirical research studies actually define "data". For those that do define "data", the definitions fall into two broad categories, narrow and broad.

To elaborate, DDDM policies generally do not define "data" or they tend to define it narrowly as numbers related to student outcomes (e.g. test scores, attendance rates). For example, Means and colleagues (2009) surveyed a nationally representative sample of teachers about their uses of data, but confined their questions to teachers' uses of "student data systems". Some prescriptive, "how to" guides define data slightly more broadly to also include data or evidence on the implementation of existing programs (e.g. classroom observations,

school community surveys). For the empirical studies that report a definition of "data", they tend to define it rather broadly. For example, Halverson and colleagues (2007) define it as information with the potential to inform teaching and learning. Other researchers do not define data, but instead offer a broad range of data categories upon which teachers might draw when making decisions (Datnow, et al., 2007; Ikemoto & Marsh, 2007; Marsh, et al., 2006). For example, Marsh and colleagues (2006) identify four categories of data: input, process, satisfaction, and outcome (see below for further discussion). These broad definitions favored by researchers contrast the overly narrow definitions used in policies and prescriptive guides. In general, the definitions of data found throughout DDDM research fall into one of these two extremes.

These definitions suggest for my study that I also define broadly as to ensure I capture the full range of data used by school leaders, but also define it in a way that differentiates it from other types of information and reflects the statistical elements of the term as used in DDDM. As such, I define "data" in this study as systematically collected information with the potential to inform school improvement.

Teachers use multiple forms of data. Many empirical DDDM studies focus on cataloguing the types of data teachers use in their decision making. These studies tend to group the data into different categories based on the source of the data, and suggest that while teachers report using test scores most frequently, they also rely on other forms of data to make classroom-level decisions.

To elaborate, I identified three categories commonly identified in these studies: *output data* such as student test scores, *input data* such as student demographics, and *process data*

such as data on the implementation of specific programs, classroom observations, or parent and staff feedback (Datnow, Park, & Wohlstetter, 2007; Ikemoto & Marsh, 2007; Marsh, et al., 2006). Differentiating between data categories allows researchers to highlight that staff use data besides test scores as part of their decision making. Although no studies have yet to track when staff use the different categories of data in the decision making process, some hypothesize that different categories of data may be more or less useful at different stages of the decision making process (see for example, March, et al., 2006).

In surveys and interviews school staff reported predominantly using student achievement test score data in their decision making (Anderson et al., 2010; Datnow et al., 2007; Datnow et al., 2008; Englert, Fries, Goodwin, Martin-Glenn, & Michael, 2004; Marsh, et al., 2006; Mason, 2002; Means et al., 2009; Supovitz & Klein, 2003). Teachers and other school staff also reported using, although to a lesser extent, other types of output data such as attendance, mobility, graduation, retention, and dropout data (Englert et al., 2004; Marsh, et al., 2006). In Datnow and colleagues' (2008) study of schools renowned for their use of data, teachers reported that they preferred using their own "informal assessments" of students' learning such as class participation or talking with students when making classroom-level decisions. Finally, staff reported using different forms of input data and process data, although both types were much less widely used as compared to test scores and other output data (Englert et al., 2004; Marsh, et al., 2006). Because of a reliance on self-report data in these studies it is difficult to tell if the non-test score forms of data were not as central to teachers' decision making, or if teachers simply do not consider input and process data as "data" since

they are not accessible from district-administered data repositories (as noted in the previous section) and therefore do not report their use.

School staff also reported encountering gaps in the data they needed and having difficulty gathering or analyzing additional data. For example, teachers generally reported having access to multiple forms of student outcome data, and not having access to, not being able to collect, or not able to analyze non-assessment data such as input or process data (Englert et al., 2004; Ikemoto & Marsh, 2007; Means et al., 2009). Some researchers hypothesized that staff were less likely to have process data because they were especially time consuming to collect (Marsh, et al., 2006).

Taken together, the studies of how teachers use data to inform their classroom-level decisions suggest that teachers and other school staff overwhelmingly use student outcome data—especially test scores—in their decision making. But that other types of data, such as input and process data, also play a role in decision making. These studies also suggest that while teachers have multiple forms of outcome data, they still face gaps in the data they need when making decisions.

Teachers engage in three main processes when using data. Researchers examining classroom-level DDDM agree that when teachers and other school staff use data in their decision making, they engage in multiple processes. While the names and steps vary slightly from framework to framework, I identified three overlapping sub-processes across these

studies[1] (see for example, Anderson et al., 2010; Halverson et al., 2007; Ikemoto & Marsh, 2007; Knapp, Copland, Swinnerton, 2007; Mandinach, Honey, & Light, 2006).

During the first sub-process, teachers *collect data,* or retrieve data from various sources, including classroom tests, school databases, or centralized repositories and, if necessary, organize it into useable formats such as reports or digests (Halverson, et al., 2007; Ikemoto & Marsh, 2007).

The second sub-process of using data in classroom-level decision making is to *analyze data* to identify student performance problems. For example, Halverson and colleagues (2007) found that school staff summarize, combine, or disaggregate student outcome and other data in order to identify problems to address. They further note that data analysis often took place in meetings of school leaders, teachers, or the whole school community (Halverson et al., 2007).

Their findings, and those from other studies, suggest that during this sub-process school staff use their personal experience to make sense of data or to turn it into usable information or knowledge (see for example, Coburn & Talbert, 2006; Coburn, Toure, & Yamashita, 2009; Halverson et al., 2007; Ikemoto & Marsh, 2007). These studies highlight how teachers' personal experiences influence what data school staff gather, as well as the conclusions they reach as a result of their analyses. They suggest that examining decision makers' personal experiences is

[1] Several frameworks include "feedback" or "evaluate" as main sub-processes to represent the steps in which teachers return to the beginning of the DDDM process to evaluate the efficacy of the programs enacted during the first cycle of DDDM. I exclude these from this review because these sub-process are part of the normative conception of what DDDM should entail, and not empirically based.

critical to understanding what data school staff gather, as well as how staff come to understand the problem to which the data point.

Other studies examined the range of approaches school staff used when analyzing their data. These studies found that most staff engaged in relatively basic and quick analyses of single data sources. Far fewer staff reported engaging in more complex approaches where they worked with other staff members over several meetings to analyze multiple data sources to identify the so-called root causes of student achievement problems (Anderson et al., 2010; Halverson et al., 2007; Ikemoto & Marsh, 2007; Marsh et al., 2006).

Finally, the third sub-process is that school staff *select a response,* a strategy, or course of action to address the problem identified during data analysis. Across DDDM research, how staff engage in this sub-process has been the focus of far fewer studies, relative to the number of studies of data collection and analysis. In one of the only studies to use observations in addition to staff reports, Halverson and colleagues (2007) suggest that selecting responses is a process where school staff match possible responses (e.g. curriculum, instruction, student interventions) to the problem identified during data analysis, however, they did not delve deeper into the process in which school staff engage when identifying responses or the types of data or information staff examined as part of this matching process.

Some researchers asked school staff about barriers they encountered when using data in their classroom-level decisions making and found that staff struggled with this sub-process, (Anderson et al., 2010; Datnow et al., 2008; Marsh, McCombs, & Martorell, 2009; Marsh, et al., 2006, Means, et al., 2009). In some cases, the struggles started during data analysis with teachers stalling while they analyzed their data. Without a clear idea of the problem they were

attempting to address, they could not identify, or ultimately, select relevant responses (Ikemoto & Marsh, 2007; Luo, 2008; Marsh, et al., 2009; Marsh, et al., 2006). In other instances, staff were able to analyze their data, but still stalled since data analysis only pointed out problems and did not help teachers to identify responses, or their data pointed to more than one response (Anderson et al., 2010; Datnow et al., 2008; Marsh, et al., 2009; Marsh, et al., 2006, Means, et al., 2009; Spillane & Miele, 2007). For example, school staff at times complained that they did not know of ways, other than what they were already doing, to tackle their performance problems (Anderson et al., 2010; Datnow et al., 2008; Ikemoto & Marsh, 2007; Marsh, et al., 2009; Marsh, et al., 2006, Means, et al., 2009).

To summarize, research on how teachers and other school staff use data in their classroom-level decision making illustrates the lack of a universal definition of data. Without a common definition of what counts as data, teachers are left to define it for themselves, and ultimately a lack of definition calls into question the overwhelming use of self-report data in this literature. This body of research suggests that staff use multiple forms of data, including student test scores, informal assessments, and data on their resources and processes, but that they face gaps in the data they need to make decisions, particularly in terms of input or process data. This finding suggests that my study should look to see if school leaders use a range of data, and whether or not they encounter gaps in these data over the course of their decision making. These studies also suggest that data use and decision making involve three sub-processes, with decision makers' personal experiences playing a pivotal role in how decision makers analyze and understand their data. Staff report that a lack of data analysis skills or the inability of teachers to identify appropriate responses cause many decision processes to stall. These

findings suggest that my study should look for multiple processes involved in data use in decision making and that personal experience and capacity may play a role in each sub-process. Further, these findings suggest a special focus on how decision makers select responses as this seems to be a particularly challenging process at the classroom-level.

Implications for the Current Study

In this chapter I reviewed three bodies of prior research pertaining to how school leaders use data when making school-level instructional improvement decisions. I used these literatures to better understand the types of data—defined as systematically collected information with the potential to inform school improvement—school leaders use when making decisions, the processes in which they engage when using data to make decisions, and how the broader context influences data use and decision making.

Due in part to the newness of the policies, findings are just emerging on how school leaders implement DDDM policies. These studies—based solely on self-report data such as surveys or interviews—suggest that school leaders are using multiple forms of data in their school-level instructional improvement decision making, and that they may use a different range of data from those used by teachers. However, as noted earlier, because these studies (as well as many others focused on classroom-level DDDM) rely on self-report data they do not explain whether or not leaders and teachers use different forms of data or if they tend to have different definitions of data and therefore report different data usage. This suggests that my study should go beyond surveys and interviews to observe leaders as they engage in decision making, thus avoiding these definitional problems.

Research on SBDM suggests that two possible outcomes for my study of school-level

instructional improvement decision making is whether or not the school leaders are able to move beyond establishing their own processes to use data while making instructional improvement decisions and, if they do make decisions, to which areas of the school's educational program or operations do they pertain. SBDM research suggests that the context within which decision making unfolds may also be particularly influential as to whether or not decision makers are able to make decisions. For example, the school district and policy environment may constrain school leaders as they attempt to make school-level instructional improvement decisions.

Research on classroom-level DDDM prompts me to pose several hypotheses as to the types of data school leaders use as well as how they use these data. For example, leaders, like teachers, may engage in multiple processes when using data in their decision making, including collecting data, data analysis, and selecting a response. However, most existing studies focus on how teachers analyze or make sense of data during the data analysis phase. This is likely because these studies tend to use sensemaking theory to understand how decision makers process new information. In order to address the whole decision making process, my study should employ a framework that conceptualizes the full decision making process to also examine how leaders confront gaps in the available data and how they use data when selecting responses.

There is also space for research on school-level instructional improvement decision making to further explore the role of personal experience and group dynamics in data use and decision making processes. Classroom-level DDDM research suggests that personal experience is important in how data are analyzed (Halverson et al., 2007; Marsh et al., 2006), but DDDM

research has yet to examine how decision makers' personal experience influences how they gather data or select responses. Similarly, classroom-level research suggests that data use typically happens in groups, but provides little examination of how group dynamics or different personal experiences—which SBDM research suggest would confound decision making—might influence data use and decision making.

Based on the findings from these bodies of research, I developed the following research questions to investigate how school leaders engage in school-level instructional improvement decision making:

- What are the outcomes of school-level decisions about instructional improvement that use data?
- To what extent do these outcomes vary according to the:
    - Types of data school leaders use?
    - Decision making processes in which school leaders engage?
    - Context in which decision making unfolds?

These questions will help to build knowledge around this topic, and allow subsequent studies to establish stronger relationships between the data use and decision making outcomes. In the next chapter I describe the conceptual framework I developed to investigate these questions.

Chapter 3: Conceptions of Data Use and Decision Making from Organizational Decision Making Theory

For my conceptual framework I draw from a body of research originating from March and colleagues on how organizations make decisions sometimes called organizational decision making under conditions of uncertainty and ambiguity – but to which I refer simply as organizational decision making theory (see for example March, 1991, 1994; March & Olsen, 1989, 2008; March & Shapira, 1987; March & Simon, 1993; Shapira, 1997). This theory draws ideas from theories of bounded rationality, sociological institutionalism, and sensemaking to develop a framework to understand how organizations *actually make decisions*, as opposed to how organizations *should* make decisions. Starting in the mid-1950s, these ideas have been empirically tested through various computer simulations, observational studies, and surveys of decision makers in a variety of organizational settings (See for example, Cohen, March, & Olsen, 1972; Cyert and March, 1955; Feldman and March, 1981; March & Olsen 1975; March & Shapira, 1987).

To date, organizational decision making theory has been relatively under utilized in educational research but I found it to be useful primarily because it provides a *complete* theory of decision making. The theory suggests that decision making in organizations is a complex and multi dimensional process where groups of decision makers use various forms of data and knowledge to match problems and goals to responses. Because it is a theory of decision making, it conceptualizes the origins of problems, how decision makers evaluate responses, and potential outcomes. Importantly for my study, it highlights when decision makers turn to data

as part of decision making and how they address the uncertainty and ambiguity resulting from limited data. It also describes how decision makers' interactions with their organization and environment can shape their decision making. This characterization of matching goes far beyond the descriptions currently in DDDM research that focus primarily on identifying the barriers staff report when trying to select responses.

Each of these facets corresponds with an implication I drew from my DDDM and SBDM reviews and suggest this theory will help me to contribute knowledge on how school leaders use data in their school-level instruction improvement decision making. Furthermore, because of its completeness, this theory stands in stark contrast to the frames typically found in DDDM research which tend not to focus on the complete decision making process, and instead train researchers' attention to individual parts of the decision making process. For these reasons, I selected organizational decision making as the theory upon which to base my conceptual framework, and in this chapter I describe this conceptual framework.

Figure 1

Organizational Decision Making Involves Matching, Outcomes, Data /Knowledge, and Contextual factors

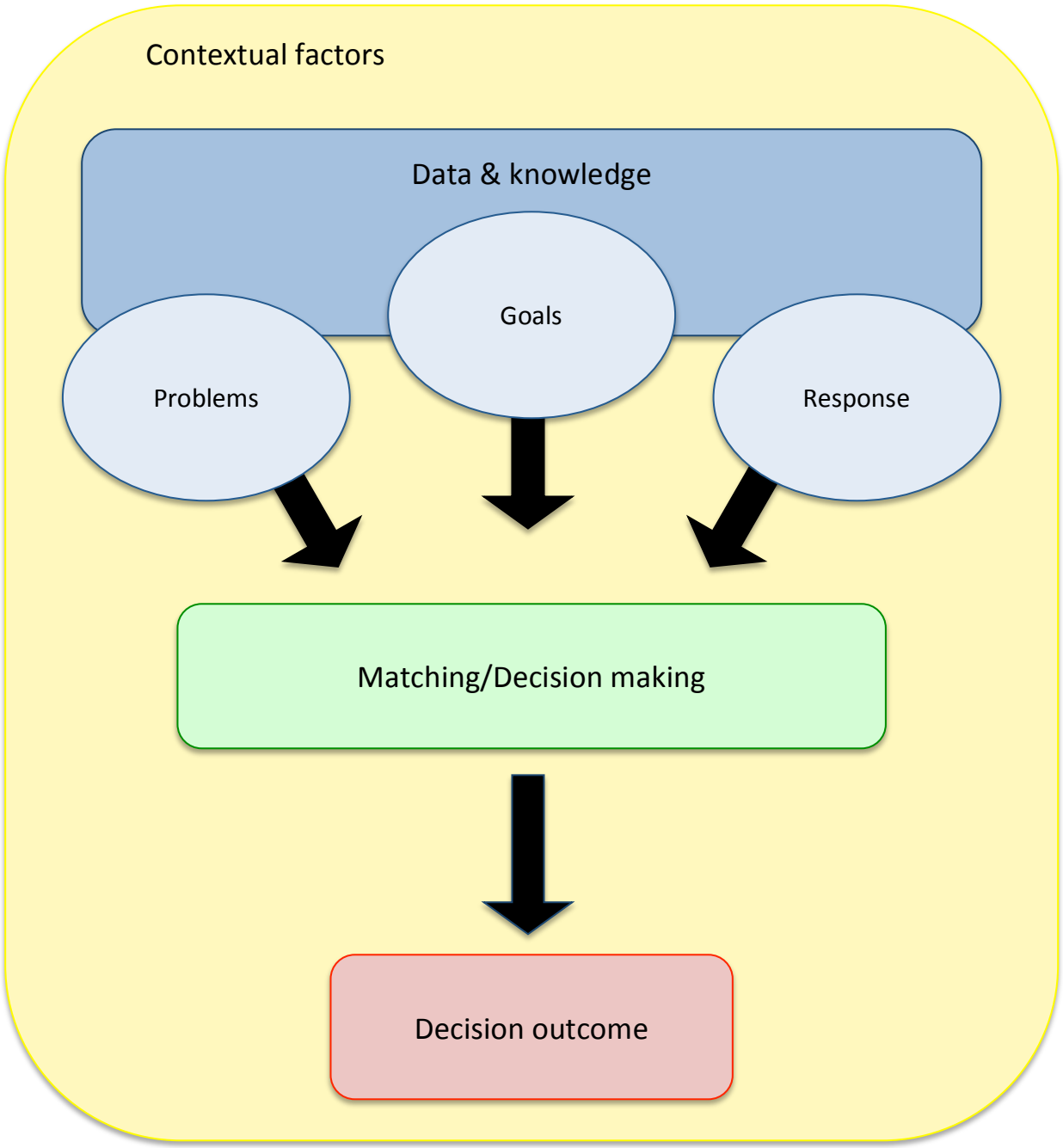

Figure 1 is a graphical representation of the process through which organizational decisions are made. According to March and colleagues, organizational decision making is an instrumental activity[2], or an activity where groups of decision makers who intend to address problems, match these problems and goals to responses (depicted in green at the center of the figure). Different forms of data and knowledge—gathered by decision makers—fuel decision makers' matching (depicted in blue), ultimately resulting in a range of decision outcomes (depicted in red). Finally, various individual, organizational, and environmental contextual factors influence how decision makers gather data and engage in decision making (depicted in yellow). In the following sections I first describe each of these sub-processes.

Organizational Decision Making as Matching

At the center of Figure 1 is the matching or decision making process. According to March (1994, 1997), decision outcomes are the result of a matching process where decision makers fit a problem, or some sort of event to be addressed, and goals, or the targets, goals, preferences, or identities the decision makers hope to enact, to a response, or a proposed solution, alternative, or course of action to be taken. Here, matching involves the decision makers predicting, estimating, or guessing whether or not the proposed response will address the problem at hand and meet the decision makers' goals. Although Figure 1 may suggest that these are sequential processes—in fact they frequently overlap, and can stop, start, or restart at any point, At times these process move backward, with responses preceding problems (Cohen, et al., 1972). These processes are often unconscious or routine—and as a result

[2] In this framework I focus on models where decision making is an instrumental activity, however March also developed models for decision making as a symbolic activity.

decision makers may not realize they have made a decision (March 1994). All of this suggests that organizational decision making is a complex, non-linear, often obscured process that can leave decision makers unclear as to whether or not they have made a decision. Further, the complexity of the process also calls into question the usefulness of self-report data when studying how school leaders use data in their decisionmaking processes. In the next section I further describe the matching components: problems, goals, and responses as well as the role of data in decision making.

Problems

Problems are questions or issues that the decision makers seek to address, and the origins of such problems for organizations are nearly endless. For example, in schools implementing DDDM, problems may be identified or "triggered" when school leaders analyze student data, but problems may also have other sources such as staff complaints or demands from school district central office staff.

Goals

Goals are the targets or results that the decision makers want to achieve by addressing the problem at hand. Goals can come from decision makers' preferences, identities, aspirations, rules, or values (March, 1994; 1998). In general, decision makers' goals are "incomplete and inconsistent" (March, 1994, p. 9) meaning that decision makers do not consider all of their goals at the same time and goals tend to change over time, often as a result of organizational performance or changes in the organization or decision makers' context. In the context of school-level DDDM this might mean that a principal's goal for one decision is to increase students' reading test scores, but after observing students' test scores not responding to

instructional changes, the principal may change her goal for later decisions to increasing staff compliance with the district reading pacing guide. Later, the principal's goal might evolve to wanting the school to be seen as an innovator in how it teaches reading.

Identifying goals is further complicated when groups of individuals are involved. Because each decision maker brings his or her own set of goals, these goals are often not consistent with one another. Therefore identifying goals in groups also involves developing consistency among decision makers' goals.

While aligning *all* goals among *all* decision makers is not necessary, or likely possible, there are three main ways in which decision makers can gain consistency in goals (March, 1994). First, groups can deter decision makers from disagreeing by threatening some form of punishment. For example, a group facilitator might suggest that a meeting cannot end unless the decision makers agree on a goal. A second approach to gaining consistency on a goal is to select decision makers on the basis of shared points of view. Similarly, the third way to gain consistency around goals is through socializing decision makers to hold the same goals. For example, a group of decision makers might spend time discussing their vision for their school or setting decision making norms. Through these main ways to create consistency in their goals an "initial conflict situation is converted into one in which there is agreement" (March, 1994, p. 109).

Responses

Responses are possible alternatives, interventions, strategies, or actions that address problems. Responses are often found through imitation, with decision makers adopting the form and substance of another organization. Contrary to rational models of decision making

where decision makers gather many responses, judge them simultaneously against criteria, and choose the option that maximizes their criteria, this theory posits that decision makers "satisfice" and select the first response that meets a minimum performance level (March, 1994, 1998; March & Simon, 1993). Here decision makers consider far fewer responses than in rational models, and they do not consider them simultaneously. For example, school leaders might select the first response they identify that will improve ELL students' reading abilities instead of gathering several different reading responses and comparing them to identify the response that is likely to improve ELL students' reading abilities the most.

Data and Knowledge

Fueling the matching process are data and knowledge (March 1994, 1998). Data are information, ideas, and rules that decision makers gather to inform decision making. On the other hand, decision makers do not need to gather knowledge, as it is the information, ideas, and rules that decision makers have already accumulated. These definitions reflect findings from research on DDDM from a sensemaking theoretical perspective that suggest decision makers use both data and personal experiences (see for example, Halverson, et al., 2007). However, these definitions differ slightly from the DDDM findings that suggest decisions makers use their personal experience as a lens that helps them to understand data—data that they can later use in decision making. In this theory, decision makers may use their knowledge to better understand new data, but they also can actively use their knowledge as part of the decision making process.

To illustrate how decision makers use both data and knowledge when making decisions, data, such as student test scores, may point to a reading problem and a decision makers'

knowledge of the school's student population may help the decision maker to further determine that English language learners (ELL) may face particular challenges. Decision makers' knowledge of their schools' past reading reform failures to improve ELL students' reading may shape their goals and they may survey other individuals in their school to determine their goals for addressing reading. Decision makers may seek out new reading curricula, responses that target struggling students, or information on the implementation requirements for different responses. They may also rely on their accumulated knowledge of reading responses to propose strategies to address the needs of their struggling students.

Matching: Uncertain and Ambiguous

Decision makers also use both data and knowledge when matching problems and goals to responses. When matching, decision makers engage in a form of problem solving where they decide whether or not a proposed response will address their problem and fulfill their goals (March 1988, 1994, 1997). Data and knowledge facilitate these predictions. Continuing the example above, when considering a response to provide afterschool reading tutoring to ELL students, a decision maker might gather data on the tutoring program's success rate with ELL students or draw on their knowledge of their ELL students to decide whether or not they would be able to participate in an after school program.

However, because decision makers face gaps in the available data and knowledge, or there is confusion about what data and knowledge to use or what they mean, the matching process is fraught with uncertainty and ambiguity. Uncertainty stems from a lack of data and knowledge. Ambiguity on the other hand results when data and/or knowledge are unclear, have multiple meanings, or are interpreted in different ways. The result of uncertainty and

ambiguity is that they can hamper decision makers' ability to understand the problem at hand, reconcile or prioritize conflicting goals, or predict likely outcomes for a proposed response. Ultimately, uncertainty and ambiguity complicate matching and make it difficult for a decision maker to determine whether or not a proposed response is likely to address the problem and fulfill their goal(s). As a result, matching is often more accurately described as guessing (March, 1994).

Decision makers confront uncertainty and ambiguity by drawing on their own knowledge of similar events or try to remove it by understanding what critical people in the environment want or need. Another—particularly salient to this dissertation—way is that decision makers collect additional data and/or knowledge. Decision makers gather data using two main approaches: they *search* their environment or they *mine* their existing knowledge. These two main processes for gathering data partially parallel the findings from DDDM research, with searching for additional data similar to the "data collection" process described in DDDM research. The concept of mining is not currently found in DDDM research. I further describe each of these in the following two sections.

Search. Decision makers may gather additional data, including performance metrics, reports and research, and feedback from external community members or colleagues, via search activities (Honig & Coburn, 2008; Kennedy, 1982; Levinthal & March, 1981; March 1988, 1994). Typically decision makers cull these from their broader external environment or decision makers may focus internally and gather data from within the organization (Honig & Coburn, 2008; Huber, 1991). To illustrate, school leaders may search outside their school to learn about new research on instructing reading to ELL students, or they may gather data on how reading

teachers currently tailor their instruction for ELL students in order to better understand the problem. Boundary spanners, or individuals who move between the organization and the environment or other organizations, typically play a critical role in collecting information from outside sources (Honig, 2006; March, 1994). Here, principals or itinerant central office support staff may function as boundary spanners and bring new data or knowledge, such as new reading interventions or curricula to share with school leaders.

Because decision makers do not know the outcomes prior to engaging in search, it is inherently risky (March, 1988, 1994; March and Simon, 1993). That is, decision makers do not know if they will find what they need to minimize uncertainty and ambiguity before they begin to look for new data and/or knowledge. As such decision makers who perceive their organization's performance as below their desired levels are more likely to engage in search because it is worth the risks involved. At the same time, decision makers who perceive their organization's performance as satisfactory will not see the risks associated with search worth it, and therefore more successful organizations will not engage in search. Organizations with "slack" or surplus resources are also more likely to engage in search processes. Similar to performance-induced search, organizations with slack resources will be more willing to take on a risky activity since their extra resources can support search that does not yield useful data and/or knowledge.

Mining. Decision makers also gather additional data by mining[3] their own personal knowledge for similar experiences, procedures, anecdotes, identities, preferences, skills, myths,

[3] The literature refers to this sub-process as "exploitation", meaning that decision makers exploit their existing knowledge when making decisions. Because "exploitation" carries with it

and rules for appropriate conduct, among others (Levitt & March, 1988; March, 1991, 1994, 1998). Decision makers' knowledge inventories are relatively known to the decision makers, take almost no resources to access, are always accessible, and therefore it is low risk to gather data by mining decision makers' personal knowledge. Decision makers typically gather more data via mining activities than data gathered via search. Relatedly, mined data are often used to supplement already existing data or to confirm other decision makers' data. School leaders might draw upon their experiences working with struggling ELL students when considering their goals for different responses. When trying to identify a response, school leaders may suggest an intervention that they heard another, successful school used to improve ELL students' reading.

When retrieving data, decision makers first try to identify their current problem or situation in order to retrieve the correct, corresponding data. In general, decision makers are biased toward retrieving their own experiences versus word-of-mouth experiences but this bias is especially powerful in high performing organizations. Similarly, word-of-mouth experiences from individuals similar to the decision maker are more likely to be recalled. Decision makers are also more likely to recall vivid and clear experiences.

In summary, organizational decision making theory suggests that decision making in schools is, at its core, a matching process where decision makers predict, estimate or guess whether or not a proposed response will solve the problem at hand and meet the decision makers' goals. In my study, this conceptualization helped to train my attention toward how school leaders identify problems, goals, and responses, as well as how they match these

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several negative connotations and it is a value-laden term particularly in education, I chose to call the process of using one's own existing knowledge "mining".

elements. This framework also suggests that when confronted with limited data on the problem, how the response will perform once implemented, or other sources of uncertainty and ambiguity, school leaders are likely to turn to gather data, either by searching external sources or by mining their personal knowledge. This conceptualization will allow me to examine how school leaders respond to inevitable gaps in available data. These conceptualizations of matching and gathering additional data help to address gaps in the extant research on how school leaders select responses and how they confront data shortcomings. In the next section I discuss this main decision outcome, and another outcome that examines type of change the response demands.

Decision Making Outcomes

A variety of outcomes result from decision making, and like matching processes, decision outcomes unfold over time (March 1994). Middle and long term matching outcomes include whether or not the response was implemented, how committed other organizational members were to the implementation of the response, or if the selected response improved organizational performance. Some outcomes show more immediate results, including whether or not the decision makers can make a decision by successfully matching a response to the problem and their goals. Or if a match is made, what scale of change to the organization's operations does the response call for. In this dissertation, I focus on these two shorter-term outcomes.

Did Decision Makers Make a Decision?

As the above discussion suggests, there are countless ways for decision processes to fall apart, stall, or otherwise not end in successfully matching a response to problems and goals. To

illustrate, as noted earlier decisions unfold over time, and as a result decision makers' goals evolve, as described above. Similarly, the longer a decision process carries on, the more likely that the organizations' personnel change and therefore the goals change. Over time, new problems emerge, and old problems are dropped from decision makers' agendas. Each of these make the matching process more complicated, and less likely that decision makers will be able to successfully match. Aside from time, uncertainty and ambiguity can pose such a significant barrier to decision makers that the matching processes stall. For example, decision makers may be unable through search or mining activities to identify a response that is a match with their problem or goals. Similarly, decision makers may not be able to gather enough data to be able to remove enough uncertainty regarding whether or not a response is likely to fulfill their goals once implemented.

For these reasons—the passing of time and persistent uncertainty and ambiguity—that decision makers can successfully match a response to the problem and goals is an important outcome in and of itself. Essentially, making a decision is a key outcome of decision processes. This outcome mirrors my findings from research on SBDM that found that many school leaders were not able to make decisions when implementing these policies.

What Scale of Change Did the Decision Call For?

If decision makers are able to successfully match a response to their problem and goals, a second main outcome of the matching process is the type of change for which the decision calls (March, 1994). Some decisions call for such small or superficial changes that they can only barely be called "changes". Other decisions call for such a significant change, that the likelihood of successful implementation is low. In the middle are decisions that call for significant changes,

but that are also sufficiently tailored to the school's resources and current operations. These decisions are less likely to encounter implementation problems.

To elaborate, at one end of the spectrum are decisions that are "superimposed" on an organization, or that call for large changes that are not sufficiently tailored to an organization. These decisions tend to emerge from decision processes where the matching processes over-emphasize search and under-emphasize mining to gather data. As a result, decision makers are likely to find that their decisions "suffer the costs of experimentation without gaining too many of its benefits. They exhibit too many undeveloped new ideas and too little distinctive competence" (March, 1994, p. 238). Essentially, matching processes that draw only on searched data are likely to appear superimposed on the organization, with little consideration taken for current operations, skills, or other assets.

At the other end of the spectrum are decisions that call for small or subtle changes, draw on existing resources, call for "more of the same", or otherwise maintain the status quo. These decision outcomes tend to emerge from matching processes that rely almost exclusively on mined data. As a result, decision makers may "find themselves failing to discover and develop new capabilities and new opportunities. In a changing world, they are likely to become obsolescent" (March, 1994, p. 238).

Between these two extremes, are decisions that call for a "balanced" amount of change. These decision are likely to emerge from decision processes that balance data gathered via search versus data gathered via mining. These decisions tend to call for significant changes, but they also build on staff aptitudes, organizational strengths and other resource and operational realities.

What counts as a "superficial", "balanced", or "superimposed" change will vary from organization to organization, but to illustrate what a "superficial" change might look like, school leaders might decide to respond to their ELL reading challenges by giving struggling students one additional lesson per week. A possible example of a "superimposed" change could be where school leaders adopt a new ELL intervention that requires moving staff around to different classrooms, adjusting the master schedule, and buying new curricula. One such example of the "balanced" decision is where school leaders adopt a pull-out tutoring intervention that draws on the schools' existing staffing and other resources and that is likely to support ELL students' reading.

To summarize, this dissertation tracks two, short-term decision outcomes: whether or not the school leaders were able to successfully match a response to the problem at hand and their goals, and if so, what scale of change did the decision call for. Further a focus on these outcomes suggest that my study should examine decision making over an extended period of time to be able to observe not only the decision making processes, but also how these process track with these outcomes. As noted earlier, extant research on DDDM and SBDM does not consider how data use of the decision makers' processes related to outcomes, therefore my study will help to address this gap.

Contextual Factors that Influence Matching Processes

Organizational decision making theory points to three levels of contextual factors that influence matching processes, including individual-, organizational-, and environmental-level factors (depicted in yellow in Figure 1). My study builds on and extends most extant DDDM and SBDM research that catalogues the contextual factors that teachers and school leaders report

influence their data use—the notable exception here being sensemaking studies that examine how individuals prior knowledge influences how they interpret data (See for example, Halverson, et al., 2007). Like these studies, organizational decision making theory considers different individual, organizational, and environmental factors, indeed several of the factors described below mirror those already cited in DDDM and SBDM research. However, this theory considers multiple contextual factors at once and goes on to elaborate *how* these different factors impact data use, matching processes, and decision outcomes. In the following sections I examine each level in turn.

Individual-level Factors

Individual factors can influence the ways in which an organization's matching and data gather processes unfold (March, 1994, 1997; March & Shapira, 1987). First, all data—whether gathered via search or mining—need to be interpreted by decision makers in order to give it meaning. To do so, decision makers use their "personally knowledge"—or what others have called their "lens", "identity", or "working knowledge"—comprised of their experiences, knowledge, values, identities, and goals. Their personal knowledge plays a critical role in how decision makers interpret data because decision makers exhibit predictable biases in the process. For example, decision makers are biased towards accepting information that fits with what they already know, and discount or ignore information that does not fit with their personal knowledge. Decision makers tend to interpret new data in ways that fit with their previous knowledge. Finally, decision makers also tend to overvalue data from events they have personally experienced and tend to attribute data from random events to human action. In essence, decision makers' personal knowledge can significantly influence what data gets

gathered during search and mining and what meanings data take on during the matching processes. For this reason, decision makers' personal knowledge is a key individual-level factor.

Individual decision makers also have different propensities toward risk. Because search can be risky, these individual-level propensities can influence the processes in which decision makers gather data. For example, levels of expertise or the amount of professional experience and training can influence decision makers' ability to estimate riskiness, with decision makers with more experience in a given area better able to estimate risk than those with less experience. Similarly, a decision maker's tenure with an organization can influence their risk tolerance, with individuals with more tenure being risk adverse.

Organizational-level Factors

A second set of factors that influence matching processes and data gathering are related to the organization itself. The availability of resources such as time and money can influence whether or not, and how, an organization engages in search to gather data since search takes time and money—hence why it is risky (March, 1997; March & Simon, 1992). On the other side, organizational history, particularly the staff's history of working with each other, may influence mining activities (March & Olsen, 2008). Organizations with relatively long histories, or a stable staff, are likely to have "mutually learned" from each other, experienced similar events, and otherwise developed similar personal knowledge. This shared personal knowledge can yield shared goals and interpretations of data and ultimately shorten the amount of time matching processes can take. Organizations with shorter histories, or staff that are new to the organization and each other, are more likely to have divergent personal knowledge and as a result matching processes can take longer—if successful matches are even possible.

Similarly, facets of organizational structure can influence patterns of social interaction, with more interaction leading to the development of shared personal knowledge. One such structure, meetings among decision makers—in particular the frequency and purposes of these meetings—can facilitate the development of shared personal knowledge among decision makers (March, 1997; March & Simon, 1992). Two other structures, the level of hierarchical ordering and departmentalization, can also influence the development of shared personal knowledge. More hierarchy and departmentalization mean less interaction between levels of individuals and therefore less time to develop shared personal knowledge.

Environmental-level Factors

An organization's environment contains countless things that could influence decision making and matching processes, but organizational decision making theory identifies two main factors as particularly consequential: the "supply" of data and other organizations.

The environment is replete with many different types of data, including responses, identities and rules for appropriate action, anecdotal knowledge and word-of-mouth experiences, and data on the organization's own performance. The availability of these data, and the ease with which decision makers can access these data can influence search activities, and ultimately—if the data exist—may decrease decision makers' uncertainty and/or ambiguity (March 1994, 1997). External messages about the organization's performance are another type of data that influence decision making. These data may come from performance metrics, constituent feedback, or other sources and shape how an organizations sees itself. One way that feedback data can influence decision making is that staff in an organization who receive positive feedback are more likely to view their personal knowledge as more worthwhile and

therefore these decision makers are more likely to engage in mining (March, 1997). Similarly, as noted above, individuals' risk-taking propensity varies according to their organizations' performance, with above-target performance leading to more risk-taking behavior, and under-target performance leading to less risk-taking behavior.

Other organizations, such as competitors or legislative bodies, are a second environmental-level factor that can influence an organization's decision making (March & Olsen, 2008). Competitors may be sources of information, ideas, or possible responses, with these traveling through networks of people. For example, when an organization hires a new employee from a competitor, they gain access to some of the ideas of their competitor. Legislative bodies also often set the parameters of decision making, including timeframe and processes. The amount of time an organization has to make a decision may influence whether or not an organization engages in search or mining. Shorter timelines may deter search since decision makers perceive searching for new ideas to be more time consuming than mining existing knowledge (March & Simon, 1992). Other parameters set by an external organization might include privileging particular responses (e.g. whole language reading curricula), setting the level of visibility for the decision (e.g. requiring school to publish their responses, programs, and other interventions in annual improvement plans) or mandating particular decision forums (e.g. holding public input meetings) (March & Olsen, 2008).

Implications for the Current Study

Organizational decision making theory suggests that school-level instructional improvement decision making is a complex process that defies the rational model where decision makers find problems, gather and evaluate solutions, and then choose a solution to

enact (Simon, 1993). DDDM policies and guides typically depict decision making in ways that follow the rational model, suggesting that school leaders analyze student test scores to identify problems, identify multiple responses to address these problems, and then select the responses that will increase student test scores the most (Bambrick-Santoyo, 2010; DQC, 2011). In contrast, this theory suggests that school leaders make school-level instructional improvement decisions by matching problems and goals to responses. They rely on multiple forms of data and knowledge to identify problems, their goals for addressing these problems, and to understand potential responses. School leaders also face gaps in available data, and as a result they must gather additional data or mine their personal knowledge. Further, various individual-, organizational-, and environmental-level contextual factors influence how decision makers gather data and engage in matching. Because this is a complex process, whether or not decision makers can make a decision is an important outcome in and of itself, as well as the scale of change the decision called for.

As noted earlier, the complexity of decision making suggests that my methods should include observations and focus on the types of data and personal knowledge school leaders use and how they confront gaps in these data, the extent to which they search for additional data versus mining their personal knowledge, how they match school-level problems and goals to potential responses, and the outcomes of these matching processes. Interviews should tap school leaders' personal knowledge and propensity towards risk taking, the schools' systems/structure and available resources, and the availability of data and policy messages in their environment. In the next chapter I further explain my research design and methods.

Chapter 4: Research Design and Methods

My study uses a qualitative, embedded case study of school-level instructional improvement decision making in two schools implementing DDDM policies, to investigate my research questions:

- What are the outcomes of school-level decisions about instructional improvement decisions that use data?
- To what extent do these outcomes vary according to the:
    - Types of data school leaders use?
    - Decision making processes in which school leaders engage?
    - Context in which decision making unfolds?

I chose a qualitative case study research design because both existing research on DDDM and organizational decision making theory suggest that the study of decision making necessitates a deep, prolonged investigation in order to track processes, interpretations, and moderating influences that occur over time. For similar reasons, observations of school leaders engaging in school improvement decision comprise a main data source. To facilitate comparisons between decisions, I selected an embedded case design where individual decisions nested within schools are my unit of analysis. I chose observations as a main data source since decision-making is often unconscious or routine and participants may have difficulty recalling details in interviews (Barley, 1990; Coburn & Turner, 2011; March, 1994; Patton, 2002; Weiss, 1980).

In this chapter I describe my research design, including my research questions and why I chose the two schools that participated in my study. I then describe how I collected the data

included in my study, followed by how I analyzed these data, including how I identified the individual decisions and formulated my claims. Finally, I end by discussing limitations of this study.

Site Selection

As my research questions suggest, my main site selection criterion was schools in which I could observe school leaders as they engaged in school-level instructional improvement decision making. To identify such schools, I engaged in an iterative process where I first identified a district that emphasized school-level DDDM and where I was likely to be able to observe school leaders as they made school-level instructional improvement decisions. I then identified schools that were likely to provide me with a relative range of contextual factors. This approach follows an intensity sampling strategy where I selected "information-rich cases that manifest the phenomenon intensely, but not extremely" (p. 243, Patton, 2002).

I chose this sampling strategy because it ensured I would be able to observe leaders who were not necessarily exemplars of DDDM as they engaged in school-level instructional improvement decision making. These "average" leaders were more likely to provide a picture of data use in school-level instructional improvement decision making that could help inform district and school leaders as they try to support school leaders' data use. I did not want to rely solely on sampling DDDM exemplars since these schools were more likely to mirror practices outlined in normative DDDM guides, and therefore would be less instructive to district and school leaders trying to understand how to support school-level data use. I elaborate each of my selection criteria below and describe the two schools that participated in my study.

A District with School-level DDDM Policies

To start, I identified an urban district in the western United States, that I refer to as District 1, that emphasized school-level DDDM. Like most other districts, District 1 does not have an explicit school-level data-driven decision making policy. However, it has adopted policies and developed systems to encourage and support school leaders as they use data to make school-level instructional improvement decisions. Currently the district has two main policies that support school-level instructional improvement DDDM in schools: formative assessments and a Continuous School Improvement Planning process.

To elaborate what these policies ask of schools, a few years prior to the start of my study, District 1 began to use a formative assessment program, called Measures of Academic Progress (MAP), with the expressed purpose of generating data that school leaders could use to "make data-driven decisions about instruction, staff training needs, and each school's annual Continuous School Improvement Plan". Because of the MAP formative assessment, school leaders have access to timely and frequent data regarding their student and school performance.

The second District 1 policy that supports DDDM is its annual School Improvement Plan (SIP) process. Recently revised, the SIP provides a structure and forum for school leaders to use data in their school improvement decision making. The SIP is "an action plan for each school that identifies the areas a school plans to focus on in the current and coming school year, the performance goals they want students to achieve, and how the school plans to collaboratively meet these goals". This policy is the closest to a traditional DDDM policy since it asks school

leaders to use data to set performance goals, in the identification of interventions for students, and in the ongoing assessment of these interventions.

Furthermore, as part of the district's collective bargaining agreement with their teachers union, District 1 requires that each school hold weekly school leadership team (SLT) meetings. These meetings "facilitate the collaborative decision making process… to identify how to support the needs of students and staff". More specifically, each schools' SLT makes decisions pertaining to the SIP, programmatic offerings, master schedule, school-wide professional development, and budget. Members of the SLT include the school's principal and five union members as voted by the school's staff.

Although not a DDDM policy, the existence of these meetings provide school leaders a venue to make school-level instructional improvement decisions, and ensured that I would have an opportunity to observe decision making processes in each District 1 school. The main difference between SLTs and most SBDM site councils is that the SLTs are explicitly assigned tasks that pertain to instructional improvement. As noted earlier, the SBDM site councils typically focused on areas of the school's operations not related to teaching and learning, such as facilities.

Study Schools

Together these policies suggested that I would be able to observe school-level instructional improvement decision making at the schools in this district on a fairly regular basis. Within District 1, I selected two middle schools because in this district middle schools are well situated to use data in their school-level decision making. First, unlike elementary and high

schools in District 1, all middle school students take the same assessments, including MAP[4]. Because all students take the same tests, middle school data are more complete and easier to analyze than are the data from elementary or high schools. As a result, middle schools are, at least theoretically, more likely to use these data in their school-level decision making. Second, some District 1 schools receive external financial and capacity building support through a local bond initiative and a local family philanthropy. Together the bond initiative and local family philanthropy offer financial support for interventions supporting at-risk middle school students, as well as coaching on using data to monitor student performance. Third, middle schools are, in general, less departmentalized than high schools and therefore more likely to use their BLT meetings as a forum for making decisions.

Ultimately I selected two schools for my study that varied in their student enrollment and demographics, district quality ratings/AYP status, and DDDM reputation among district and municipal staff. Because the exact data are potentially identifiable, I discuss these schools' data in relative terms. While School A enrolls half the number of students than School B, School A enrolls double the percentage of minority students and four times as many students who quality for free or reduced price lunch. School B also has a larger staff than School A, approximately 30% larger. School A had persistently low levels of student achievement, while School B did not.

From these numbers, School A tended to fit the stereotype of a struggling urban school, with high minority enrollment, high staff turnover and low student achievement test scores,

[4] Typically, only grades 3-10 take the same standardized assessments, with grades K-2 taking different tests, and grades 11-12 taking exit exams, if any.

while School B tended to fit the stereotype of a successful urban school, with low minority enrollment, low staff turnover, and high student achievement test scores. However, School A also had a reputation as a higher capacity DDDM school (e.g. use data broadly, school systems support data use) and received significant, and flexible, external support for its educational program. School B had a reputation as a lower capacity DDDM school and received almost no external funds or support for its educational program.

School Leadership Team Meetings

During screening interviews the principals in both School A and School B cited their SLT meetings as a venue in which they attempted to use data when making school-level instructional improvement decisions. The SLTs in each school met the membership requirements outlined in the districts SLT policy, but the SLT at school B was larger, especially considering that non-SLT teachers frequently participated as guests in the meetings. Both SLTs met weekly, and rarely cancelled meetings, but School B's SLT was scheduled for two hours, over twice as long as the SLT in school A. Table 1 lists the membership and meeting format at each school.

Table 1
SLT membership and format

School	Membership	Format
School A	Principal 6th grade representative 7th grade representative 8th grade representative Office professional Paraprofessional representative Part-time administrator	Weekly 45 minutes Before school
School B	Principal 6th grade representatives (2) 7th grade representatives (2) 8th grade representatives (2) Special education representative Paraprofessional representative Parent representative	Weekly 120 minutes After school

Data Collection

During the 2011-12 school year (October 2011-June 2012), I observed 51 leadership team meetings for a total of 73 observation hours, and conducted 31 interviews with SLT members in both School A and School B. Throughout the course of the study I collected over 100 documents, including SLT meeting agenda and minutes, documents distributed during SLT meetings, school improvement planning documents, school performance reports, and district satisfaction survey results. I describe each of these data sources more completely in the following sections.

SLT Meeting Observations

Non-participant observations were critical to this study since many decision making processes are unconscious or routine, and therefore cannot be easily tapped through interviews since interviewees may not be aware of their engagement with the processes (see

for example, Weiss, 1980). Instead decision making must be observed by watching event unfold in real time (Patton, 2002). For these reasons, I significantly invested in collecting observational data from the schools' SLT meetings. During these meetings I took verbatim notes on my laptop[5]. Shortly following each meeting I cleaned my notes and added any additional details I did not capture during the meeting. Verbatim notes by their nature focus on language and communication patterns as "sensitizing concepts" but remain relatively low-inference (Patton, 2002). By not looking for high inference sensitizing concepts such as "matching", "data use", or "identity" I was not distracted from the real time decision making taking place and minimized the overlap between the data collection and data analysis portions of my study. These low-inference meeting observation notes predominantly provided data on the outcomes of school improvement decisions, the data school leaders used, and the decision processes in which they engaged including, gathering data via mining and search and matching problems, goals, and responses.

Semi-structured Interviews

In addition to observations, I conducted semi-structured interviews with each SLT member to gather data on their personal knowledge, identities, preferences and other factors that my conceptual framework suggested would influence school leaders' engagement in decision making. I interviewed each SLT member two times over the course of the study and each interview was tape recorded and transcribed.

[5] For the three meetings I could not attend, I made arrangements with SLT members to provide me with documents and meeting minutes.

The first interview probed the respondent's personal knowledge through a series of questions about their training and experiences, philosophies, and core beliefs. I asked about their history with and perceptions of being a SLT member. I also asked questions about data use in the school, the role of the SLT in school-level decision making, and SLT processes. During the second interview, I asked each SLT member to recount their data usage and decision making processes for three of the main decisions the SLT addressed over the course of the year, and one of the topics that the SLT spent less time discussing. I also asked about the SLT members experience with the different topics the SLTs addressed over the course of the year and about barriers and supports for the SLT and their school improvement decision making. Interviews predominantly provided data on contextual factors, search and mining activities, and members' goals.

Documents

The third main data source I utilized in this study was documents. Throughout the study, I collected numerous documents to support sample selection and to provide a written record of many of the SLTs' decisions, among other purposes. I collected district-generated documents, including DDDM and related policies, school performance reports, and district satisfaction survey results. I collected several school-generated documents, including annual school improvement plans, SLT meeting agenda and minutes, documents distributed during SLT meetings, SLT guidance documents, and various administrative documents. I also collected documents regarding municipal and philanthropic grant programs. These documents predominantly provided data for sample selection and on contextual factors and outcomes.

Data Analysis

My data analysis process included three main phases: coding all of my data to identify the 13 individual decision discussions which functioned as my unit of analysis, coding within each decision discussion for data, processes, outcomes and other concepts from my conceptual framework, and identifying patterns and generating claim using matrices.

Phase 1: Identifying Decision Discussions

I conducted an initial scan of the data corpus to identify the topics each SLT discussed and types of SLT participation for the different topics. The level of SLT involvement varied according to each topic. Notably, the SLTs did not make, or intend to make, decisions for each topic. I differentiated between topics where the SLT generated, recommended, or selected response proposals from those where the SLT simply provided formative feedback to the schools' administration on an issue or response proposal (not generated by the SLT). In general, I found that the SLTs involvement in these topics lasted only one meeting and was comparatively shallow. I classified those topics where the SLT generated, recommended, or selected a response as those in which the SLT engaged in decision making, or as I refer to below "decision discussions." SLT involvement in these topics typically stretched across several meetings, and was much deeper than the "feedback" conversations. In all, I identified 13 main decision discussions (seven at School A, six at School B) in which the SLT made, or attempted to make, a school improvement decision.

Phases 2 & 3: Coding and Matrices

Once I identified my unit of analysis—the decision discussion—I began a second round of coding using broad codes derived from my conceptual framework, such as "data",

"matching", and "problem", as well as codes for mediators of the decision making processes such as "personal knowledge", "resources", and "external organization".

I used my conceptual framework for working definitions of each concept—with the exception of the different data types, where I relied on my DDDM review for definitions. Even with these definitions, I found that I still needed to carefully examine the data coded into each category. For example, I read the contents of the "data" code and developed categories for the types of data SLT members used throughout their decision making processes. I refined these categories, looking for examples of data that did not fit in existing categories, or examples that overlapped categories. Eventually I refined my definitions of each data type to four, mutually exclusive, data types that I describe in Chapter Six. I followed a similar process of coding and refining codes, definitions, and categories for "search", "mining", "problem", "goal", "response", "matching", " outcome" and the various context codes. I describe each concept more fully in Chapters Six, Seven, and Eight.

Outcomes of school-level decision about instructional improvement. To answer my first research question, "What are the outcomes of school-level instructional improvement decisions that use data?," I used a variation on the process described above since the outcome codes required examining all of the data for each decision discussion to identify what the outcomes were. In some cases the outcomes were not easily identifiable, and I describe how I differentiate each outcome below.

The first main outcome was whether or not the SLT made a decision to adopt a proposed response during the decision discussion. Most decision discussions included this overarching "adopt" decision as well as multiple sub-decisions regarding what the response

would look like if implemented at the school. In this dissertation, I focus on the "adopt" decision for each decision discussion.

I coded each decision discussion where the SLT decided to adopt a response as a "YES", and the discussions where there was no commitment as a "NO" [6]. There were two ways that I coded "YES" decisions: where the SLT received verbal approval from the members during a meeting or where the adoption of the response was listed in the meeting minutes distributed to the whole staff. In three cases the SLT did not hold a vote, but I coded them as "YES" decisions because the SLT provided non-verbal or tacit agreement on the decision to adopt. In these cases, when a response was proposed some SLT members nodded in agreement and no one offered a dissenting opinion. Further, once the responses were adopted, no SLT members voiced discontent about the adoption of the response.

Four of the SLTs' decision discussions did not end in a decision to adopt a response. I coded these decision discussions as a "NO". For these decision discussions, the SLTs discussions stalled and at no point during the year did the SLT decide to adopt—or decide not to adopt—a response, although in several cases they continued to discuss the topic. I probe the reasons why these decision discussions stalled in Chapter Seven.

I coded each of the nine decision discussions that resulted in a "YES" commit decision for a second main outcome: whether the adopted response called for a superficial, balanced, or superimposed change to the school's educational program based on the definitions presented in Chapter Three. During this process I found it difficult to differentiate between "balanced"

[6] There were no instances where the SLT made a decision to *discontinue* a program. If there had been, I would have coded these as a "YES" decision.

and "superimposed" responses without data on the implementation of these programs to determine whether or not the adopted responses drew on staff aptitudes or organizational strengths. As such, I collapsed these two codes into a single code of "deep" change, defined as a response that calls for a fundamental shift in the ways students and teachers relate to each other and one that requires subsequent decisions during implementation.

I coded five decision discussions as "superficial" because these responses called for minor changes to the school's educational program, or a change based off of something that had previously been part of the school's educational program. One example of a response that I coded as calling for a minor change was when School A adopted a response to add additional pages to the school's student planner. The reason I coded this discussion as a superficial change was because the school had provided planners to its students in the current and previous school years, and the extra pages were a small change to their current model. All but one of these decisions were obviously superficial decisions (School B's decision regarding what professional development to provide for the next year).

I coded four decision discussions as "deep" because these responses called for a fundamental shift in the ways students and teachers related to each other, and they necessitated subsequent decisions during implementation. One example of a response that I coded as calling for a deep change was School B's new advisory program because it created a new monthly course in the schedule where all teachers, including some administrators and instructional assistants, would teach a new advisory curriculum partially developed by the school's teachers. A key goal of the new advisory program was to provide an opportunity for teaching staff to help students develop ownership over their own learning. This marked a

departure from the school's emphasis on having staff focus on students' academic skills and doing so would require the teaching staff to support students as they begin to take ownership over their learning, as opposed to focusing on grades.

Data usage and school-level decision about instructional improvement. For my second research question, "To what extent do these outcomes vary according to the data school leaders use?" and to generate my claims about how school leaders used data during their school improvement decision making, I developed a series of matrices that tracked the frequency with which the SLT members used the different types of data. Because I my verbatim note taking approach did not include time stamps, or other markers of time, I could not precisely examine the amount of time each SLT used each type of data. However, I created a matrix tracking the data the SLT members used for each decision discussion for each meeting. This allowed me to assess the frequency with which each SLT used each type of data as well as the centrality of each data type for each decision discussion.

To generate my findings regarding how SLT members confronted data gaps, I coded "gaps" in their data usage during my third round of coding. Once I identified these instances I reviewed the meeting observation preceding and following the instance to see how the SLT members responded. Again, while doing this I looked for disconfirming evidence and adjusted my claims about how the SLT members responded to data gaps as necessary.

Matching processes and school-level decision about instructional improvement. For my third research question, "To what extent do these outcomes vary according to the decision making processes in which school leaders engage?", I again used a series of matrices to identify patterns and generate claims about how the SLTs' matching processes lead to different decision

outcomes. Building on my "meeting" matrices tracking data usage, I added summaries of the SLTs' engagement in each of the matching processes, including problems, goals, and responses. Disaggregating the decision discussions across meetings allowed me to track the evolution of the processes over time, however, I eventually re-aggregated the processes into a single summary to add to a matrix tracking each of the decision discussions' outcomes. From this matrix I was able to look for patterns in how the decision process lead to different outcomes.

Context and school-level decisions about instructional improvement. For my third research question, "To what extent do these outcomes vary according to the context in which decision making unfolds?", I reviewed my context level codes, "individual", "school", "environment" and recoded with sub-codes derived from my conceptual framework, such as "personal knowledge", "resources", and "external organization" as well as codes that emerged from my initial scans of the data, such as "department", "meeting routine", and "philanthropy". From these codes I created matrices summarizing the codes for each individual and school in the study, I also summarized the three levels of contextual factors into my matrix tracking each of the decision discussions' outcomes. From this matrix I looked at how different contextual factors might have influenced the data school leaders used or the processes in which they engaged. To derive my claims about how individual level factors influenced school-level school improvement decision making, I added a column to my individual-level matrix to track the main goals each school leader suggested during the decision discussions. This allowed me to examine how individual-level factors such as personal knowledge or position influenced the goals these individuals brought to the matching processes.

Validity

I took five main measures to ensure validity of my claims. The first relates to the design of my study, and its heavy reliance on observational data. As noted above, observational data are less prone to some of the problems found with self-report data gathered via survey or interview (e.g. misremembering, rationalizing after the fact, error from unclear survey or interviewer terminology). Second, during interviews I probed repeatedly for examples to further clarify and substantiate the respondent's responses. This approach helped to minimize some of the problems with interview data listed above, in particular unclear terminology.

The third approach I took to ensure the validity of my claims was to look for disconfirming evidence when moving data into the matrices. While I created my summaries based on my buckets of coded data, I looked for data that did not fit with my summary. When I found evidence that did not fit I either adjusted the summary to fit the disconfirming evidence, or returned to my conceptual framework to see if the evidence fit with another concept. Fourth, when developing claims I triangulated my evidence across data types whenever possible, and especially when using interview data. For example, if during an interview a school leader reported gathering additional data, I would look to ensure that the data had been used during a SLT meeting.

My fifth approach to ensure the validity of my claims was to conduct a form of "member check" by presenting a memo to each SLT summarizing my main findings about their use of data in school-level instructional improvement decision making. This memo functioned as a "give-back" for their participation, but also as a discussion point during the second interviews

where I asked the school leaders the extent to which they felt my findings reflected their SLT experiences over the previous school year.

Limitations

This study has two main limitations. The first limitation is a result of its qualitative design. The study is descriptive in nature and therefore the findings are not generalizable to broader populations of schools. That is, I do not intend for my findings to apply beyond the schools in this study. However, my findings may apply to theories of school-level DDDM or organizational decision making theories. Similarly, the study cannot establish a causal link between the school leaders' data use and/or decision making processes and the decision outcomes I observed. Instead, I took steps in designing my study and during data collection to test the extent to which the use of different types of data, engagement in different decision processes, or different contextual elements influenced the decision outcomes. The findings described in the following chapters suggest a relationship, but they do not establish causation between data usage, decision making processes and/or context and the decision outcomes.

A second main limitation of this study stems from its timeline. Because of the one-year timeline, I could not observe longer term outcomes relating to how particular responses were implemented at the schools. Such outcomes could further demonstrate how different decision sub-processes related to decision outcomes.

Chapter 5: Outcomes of School-level Decisions about Instructional Improvement

What are the outcomes of school-level decisions about instructional improvement that use data? In this chapter I answer my first research question by describing the outcomes of the 13 decision discussions in which the SLTs engaged over the course of this study. I argue that, unlike SBDM site councils of the past, the SLTs spent the vast majority of their time making—or attempting to make— school-level decisions about instructional improvement and that the outcomes of these decisions varied.

To derive the findings in this chapter, as elaborated in my methods chapter, I identified all the topics each SLT addressed over the course of the study, and then differentiated between those that were administrative tasks and those that were school-level instructional improvement decision discussions. For these decision discussions, I began the outcome coding by first reviewing all of the data for each decision to identify outcomes. I coded each decision discussion for whether or not the SLT decided to adopt a response. For the decisions to adopt a response, I coded these for the depth of change for which the adopted response called. In the following paragraphs, I describe patterns in the decision discussions and the types of outcomes in which their decisions resulted.

SLTs Participated in Administrative Tasks and School-level Decision Making About Instructional Improvement

The SLTs in both schools attended to both school-level administrative tasks and school-level instructional improvement decision making over the course of the study. In a departure from SBDM research that found school leaders rarely made decisions because they got bogged

down in their own processes and lacked the necessary authority, the two SLTs in this study spent the vast majority of their time making school-level instructional improvement decisions.

The SLTs had two main types of participation during the meetings. One type was participating in administrative tasks. Here the SLTs provided feedback on different proposals developed by the principal or other administrators or listened to announcements so that they could later communicate them to their constituents in grade-level meetings. School A's SLT spent approximately 30% of their time and School B's SLT spent approximately 18% of their time providing feedback on existing proposals or listening to announcements that they were meant to later relay to their grade-level colleagues. The remainder of their time was spent on SLT procedures such as electing new members or determining SLT decision making authority. Both schools SLTs spent approximately 5% of their time on SLT processes.

The second main type of participation for the SLTs was in school-level decision making about instructional improvement. I refer to the SLTs' discussions around topics in which they engaged in decision making as "decision discussions" as defined in my methods chapter. During decision discussions the SLTs' participation was much deeper and prolonged than their participation in administrative tasks. To elaborate, topics came to the SLTs—often from SLT members themselves—as a problem for which the SLTs had to develop and select a response, not simply provide feedback on proposals developed by the principal. Because the topics started with problems, the SLTs members typically also gathered additional information on the problem, generated and discussed response proposals, and ultimately made a decision about which response the school would adopt and implement. Over the course of the year, School A's SLT spent approximately 65%, and School B's SLT spent approximately 77%, of their time in

school improvement decision discussions—the topics in which the SLT made, or intended to make, a decision. Table 2 lists the SLTs' participation in each topic the addressed over the course of the study.

Table 2:
SLT Participation in Administrative Tasks and School-level Instructional Improvement Decision Discussions

	Administrative Tasks			School-level Decision Making About Instructional Improvement
	Feedback	Communication	SLT Procedures	
School A topics	- Budget - City-wide grant program	- Attendance contest - District discipline policy	- District SLT policy - Meeting norms	- What advisory program to adopt - How to address staff communication problems - How to spend a SEA grant - How to improve the school's antiquated technology - How to distribute new computers - How to improve the school's PLCs - How to support students' test taking skills
School A % time spent	15%	15%	5%	65%
School B topics	- Budget - Annual school improve-ment plan - City-wide grant	- District benchmark test schedule - Student discipline policy - District interim progress report policy - District plagiarism discipline guidelines	- SLT decision making authority - New member election and orientation	- How to standardize grading - How to establish a common study hall format - What PD to provide in the next school year - How to address poor student behavior during study hall - How to implement standards-based grading - What advisory program to adopt
School B % time spent	10%	8%	5%	77%

In a second departure from the findings from SBDM research was that the SLTs' decision discussions were directly related to instructional improvement. As the topics listed in Table 3 indicate, these two SLTs predominantly discussed topics related to their schools' curriculum (advisory), instruction (PD), or educational program (master schedule, grants). These topics are

much more closely related to the "technical core" of schooling compared to the SBDM findings that when site councils actually made decisions that they were on topics *not* related to teaching and learning at the school (e.g. school beautification projects). Further, for decision discussions that were not directly related to instructional improvement, the SLTs tended to focus on the aspects of the topic most closely related to instruction. For example, School B's discussion of how to implement the district's new Pledge of Allegiance policy focused on how to maximize student learning time and how to develop lessons to introduce the pledge to students. The topics addressed by both SLTs were also typically school-level issues, or issues that stretched across multiple classrooms or across the school as a whole.

Outcomes of School-level Decisions Varied

For the school-level decision discussions about instructional improvement, defined as the discussions in which the SLTs engaged in decision making about the curriculum, instruction, or educational program for multiple classrooms or the whole school, there was an overarching outcome of whether or not the SLT made a decision to adopt a response. As defined in Chapter Three, responses are possible programs, alternatives, strategies, interventions or actions that address problems. For the decision discussions where the SLT decided to adopt a response, there was a second outcome: whether or not the response called for a deep or superficial change. Table 3 lists the outcomes for each of the 13 decision discussions, identified by their presenting problem.

Table 3:
Decision Discussions: Presenting Problems and Outcomes

	Decision Outcomes	
	Did the SLT make a decision?	Did the decision call for a deep or superficial change?
School A Decision Discussion Presenting Problem		
What student advisory program to adopt	NO	
How to address staff communication problems	NO	
How to spend a state education agency (SEA) grant	YES	SUPERFICIAL
How to improve the school's antiquated technology	YES	SUPERFICIAL
How to distribute new computers	YES *	SUPERFICIAL
How to improve the school's professional learning communities	YES *	DEEP
How to support students' test-taking skills	YES	DEEP
School B Decision Discussion Presenting Problem		
How to standardize grading	NO	
How to establish a common study hall format	NO	
What PD to provide for next school year	YES	SUPERFICIAL
How to address poor behavior during study hall	YES	SUPERFICIAL
How to implement standards-based grading PD	YES *	DEEP
What advisory program to adopt	YES	DEEP

Note. * = Decisions that the principal later overturned, unilaterally.

Four of the decision discussions did not result in an "adopt" decision (marked as "NO" in Table 3). For these decision discussions, at no point during their discussion did the SLT make a decision to adopt, or a decision not to adopt, a response to address the problem. Instead, during these discussions the SLTs stalled or got stuck on one of the sub-discussions and as a result they did not make a decision to adopt, or not to adopt, a proposed response. School A's staff communication problem illustrates the decision discussions that did not end in a decision to adopt a response. Although the SLT discussed the school's staff communication problem during five meetings, the SLT members could not reach agreement about the nature of the problem and instead continued to offer new or conflicting conceptions of the problem over the course of the year. Their lack of consensus regarding the problem is further discussed in Chapter Seven. While the SLT members occasionally proposed responses, including that they hire a third party to lead the staff in team building exercises, create a system to solicit staff complaints during staff meetings, or that they reiterate the importance of monitoring email for notifications. None of these proposed responses gained traction with the group and none were ultimately adopted. Similarly, at no point did the SLT decide that addressing the staff communication problem was something that they should not make a decision on, essentially deciding not to make a decision. If they had decided to not make a decision, I would have counted this as a "YES" decision.

In contrast, nine of the decision discussions did result in a decision to adopt a response (marked as "YES" in Table 3). During each of these decision discussions, the SLT made an overarching decision to adopt a proposed response.

Of the nine decision discussions where the SLT decided to adopt a response, five of the decisions called for a superficial change to the school's educational program. As defined in Chapter Three, superficial changes are small or subtle changes to the school's existing educational program and that draw on existing resources or structures. These responses often mirrored existing programs at the school, or programs the school had previously used. Further, these decisions did not call for shifts in the ways teachers worked with each other or with students. For example, School A's SLT decided to use their SEA grant to provide planners[7] to students although the school already provided, albeit lower quality than those the SLT proposed to provide, planners. Thus, the planners represent a superficial change because they are a small amendment to an existing part of the school's educational program and they did not aim to change the way teachers and students related to each other. School B's decision discussion regarding their reading professional development for the coming year also represents a response that called for a superficial change. As noted in my methods chapter, this was the one response that was not obviously a superficial change. This response represented a superficial change because it drew heavily on the school's current model for providing professional development and amended only the topic and breadth of teachers involved in providing the professional development lessons and did not otherwise change the underlying ways that teachers were to relate with one another. Further evidence that this decision called

[7] The "planners" are spiral bound notebooks that include standard material, such as calendars, homework trackers, and multiplication tables, as well as material tailored by the school, such as school rules, important dates, and study tips. Third parties produce the planners, and schools typically distribute one to each student at the start of the year.

for a superficial change was that, a couple of years prior to the study period, the school addressed the same topic (reading) as part of their professional development.

The four remaining adoption decisions called for a fundamental shift in the ways teachers worked with each other or with students, or what I call deep changes. These changes included the creation of new structures that disrupted the underlying premises of instruction at the school and during implementation would require teachers to interact with each other, or with their students, in new ways. School B's student advisory program represents a deep change because the adopted response called for a new the structure to be added to the school's educational program, in the form of a new monthly course where all teachers, and some administrators and instructional assistants, would teach an advisory course partially developed by the school's SLT members. A key goal of the advisory program was to provide an opportunity for the teaching staff to help students develop ownership over their own learning. This feature marked a departure from the school's underlying premises of instruction because the staff had to shift from an almost exclusive focus on delivering academic content to students, to a focus on teachers supporting students as they developed study and life skills, began to track their own progress learning key standards, and otherwise take ownership over their learning. The following excerpt from a SLT meeting illustrates the depth of change that the proposed response required in the ways teachers related with students,

> TEACHER REPRESENTATIVE: … But while I was looking into it [advisory programs], this thing clicked with me that over the four past years with our work on common formative assessment… to realigning and looking at grading… So this transition of having the kids and community look at learning, not grades, was the important and missing piece. I see

> the student-led conferences and advisory as a way of closing the loop… I don't see the kids thinking more about learning, I don't see grades going away. But in the conferences, the kids can be looking at learning targets and parents and kids will be talking about learning… So if we do this halfway decently, we have something to build this emphasis on learning. Advisory is an excellent way to close the cycle to look at learning as the outcome, and have kids and parents looking at learning rather than grades.

School A's decision to support students' test taking also illustrates a deep change because it also created a new structure that required a fundamental change in how teachers worked with one another. Here the SLT decided to have staff in non-tested subjects work together to develop mini-lessons that would help support students in the tested subject areas. To illustrate, during the discussion, one of the SLT members suggested that the physical education teachers should work to develop lessons, drawing on sports examples, to teach kids math concepts. Staff at this school had not previously worked across-department lines, and they had not worked to explicitly support student learning not only in other teachers' classrooms, but across departments as well. Both of these decisions represent deep changes because they called for a fundamental shift in the way teachers related to students, as in the case of School B's student advisory program, or in the way teachers related with each other as in the case of School A's student test taking response.

Chapter Summary

In this chapter I addressed my first research question: What were the outcomes of school-level decisions about instructional improvement that use data? I argued that over the course of this study the SLTs actually engaged in school-level instructional improvement

decision making, and that the outcomes of their decision making activities varied, with some decision discussions not resulting in a decision to adopt a response. For the decision discussions where the SLT decided to adopt a response, these decisions called for either a deep or superficial change to the schools' educational programs.

These findings mark a departure from the SBDM research that found that site-based councils rarely made decisions, and when they did make decisions that they tended to be relegated to non-instructional realms. In this study, the SLTs actually spent a significant majority of their time engaged in decision making discussions that often resulted in decisions, and that these decisions were related to matters of teaching and learning at the school. These findings contribute to research on DDDM in that, to date, very few studies consider the outcomes of decisions, and as such the outcomes identified in this chapter (Yes/No, deep or superficial change) constitute a possible typology of possible outcomes for DDDM decisions.

In Chapters Six and Seven I focus on the 13 school-level instructional improvement decision discussions and consider how the types of data SLT members used and the types of decision making processes in which they engaged contributed to the differential outcomes described in this chapter. In Chapter Eight I focus on how the organizational and environmental contexts influenced each SLTs' data use and decision making processes.

Chapter 6: School Leaders' Data Use and Decision Outcomes

In this chapter I begin to address the question of why the school-level instructional improvement decision discussions resulted in different outcomes as described in the previous chapter by focusing on one key factor that my conceptual framework suggests fuels the entire decision making process: the data school leaders used while making school-level instructional improvement decisions. In doing so I address my second research question: To what extent do decision outcomes vary according to the data school leaders use?

I argue that school leaders used four main types of data when making decisions and that their use of these data were relatively consistent across the 13 decision discussions. I explored the patterns of data use and did not find that these patterns varied according to the decision outcomes. However, I did find that despite heavy emphasis in DDDM policies, guides, and extant research, SLT members used student test scores least frequently across decision discussions. Second, I observed patterns in how the SLT members addressed the gaps in available data. When confronted with a gap in available data, SLT members mined their personal knowledge to use as data more frequently than they took time outside of their weekly meetings to search for additional data. Third, when SLT members used their personal knowledge as data, they often engaged in a form of triangulation to check whether or not their personal knowledge was representative of broader patterns at the school.

While these patterns did not vary according to the patterns in the decision outcomes, the findings are noteworthy as they reinforce existing research on DDDM that suggest decision makers use multiple forms of data in their decision making, and that personal knowledge has an

important role as well. Furthermore, my findings extend DDDM research, by suggesting ways in which decision makers confront gaps in data and how they use their knowledge as data. My findings regarding the latter suggest that the emphasis in DDDM policies to avoid personal knowledge when making decisions reflect a misunderstanding about how personal knowledge actually facilitates the use of other more objective forms of data the policies emphasize.

To derive the findings in this chapter, as I detailed in my methods section, I started by scanning all my observation data to track the multiple types of data, evidence, and information SLT members used over the course of the study. From this list, I inductively developed the data typology, and then coded all observation data using this typology. I also coded instances of SLT data use with how the data was gathered (i.e. searched or mined). I then created matrices to track data type and gathering process, as well as the decision outcomes described in the previous chapter, for each of the 13 decision discussions. These matrices allowed me to look for and identify patterns in data usage and gathering related to the different decision outcomes. In the next section I describe the four main types of data the SLT members used.

Patterns in SLT Members' Use of the Four Main Data Types

In this section I describe the four main types of data that I observed SLT members use over the course of the study: outcome, resource, implementation, and response. I then argue that the use of these data was very consistent over the 13 decision discussions, with SLT members relying most heavily on data on their schools' resources and operations—resource and implementation data, respectively—and evidence on potential programs or strategies—response data. In contrast, SLT members used relatively little outcome data such as standardized test scores.

To answer the research question motivating this chapter, I did not find the pattern of school leaders using more resource, implementation, and response data—and less outcome data—varied according to the different outcomes. However, I argue that this pattern of data use is still significant since it reinforces the findings from the research DDDM that school staff use more than just student test scores when making decisions. The pattern is also significant because the SLT members' use of resource, implementation, and response data may be a fundamental part of how they identify the root causes of problems and identify and select responses. Further this finding highlights the disconnect between DDDM policies and guides that focus almost exclusively on using student outcome data.

Four Main Data Types

During interviews, SLT members reported using "very little data" in their school-level instructional improvement decision making, however my observations suggested that SLT members actually use four main types of data throughout their decision making processes. To elaborate, when asked in interviews SLT members reported using mostly student achievement data, or they reported not using data at all, when making school-level decisions. The principal at School A described in an interview how the SLT had not used very much data because a lot of the school's work with data happened outside the context of the SLT meeting, "I just think that really most of the work [with data] is already done before we even get to [the SLT meeting] …" Similarly, during an SLT meeting at School B in the spring, the principal remarked to me, "I don't know how much you have [for your study on data use]. We haven't used much data."

Despite SLT members' proclamations that they used little data, my observations of their meetings indicate that SLT members actually used a broad array of data when making school-

level decisions[8]. Indeed, SLT members used multiple forms of data in each of the decision discussions and during every SLT meeting. Throughout this dissertation I define "data" as systematically collected information with the potential to inform school improvement. I define "data usage" as the act of discussing, instrumentally or symbolically, data as part of the broader decision discussion that took place during SLT meetings. Table 4 summarizes the four main data types, and in the following paragraphs I describe and provide examples for each. I also included additional examples for each data type throughout the subsequent sections of this chapter.

[8] The disparity between interview and observation data is likely the result of leadership team members' defining "data" as test scores and therefore overlooking their use of other types of data. As noted earlier, I define broadly data to encompass both the test scores commonly associated with DDDM policies but also the data that SLT members may use on their schools' resources, operations and other conditions.

Table 4:
Types of Data Used in School-Level Instructional Improvement Decision Making

Data type	Definition: Data used to answer the question	Example
Outcome	What happened?	- Student standardized test scores (state, district, school) - Non-test score student outcome data (attendance, grades, discipline referrals)
Resource	What resources do we have?	- Student enrollment #s/ demographics - Resource data (financial, staff willingness, skills, facility)
Implementation	What are we currently doing?	- Data on current operations/ program implementation - Staff, student, and community satisfaction data
Response	What should we do to address this problem?	- Elements of potential interventions, programs, strategies - Implementation requirements for potential interventions, programs, strategies

Outcome data. During SLT meetings, members used outcome data, or data that described "what happened", when making school-level decisions. Student achievement test scores are arguably the first type of data individuals think of when asked about data, and over the course of the year SLT members used student achievement test scores as well as other forms of student outcome data, including grades, attendance and late arrival/tardy rates, retention rates, and discipline referral rates.

In an example of the type of student outcome data the SLTs used, School A's principal used disaggregated annual state achievement test scores to highlight an achievement gap between various subgroups of students, including race/ethnicity, ELLs, free and reduced price

lunch, special education, gender, and grade level. School A also examined discipline referral rates using data on compiled by an assistant principal, as this quote illustrates,

> ASSISTANT PRINCIPAL: I didn't make copies, but this is the attendance and discipline data for our two largest student groups, African American and Asian students. What we have is the number of students disciplined that has resulted in an… [entry in the district's discipline system]. So we have had 80 African American students, or 26% or one in every four African American students being disciplined in a way that results in an … [entry in the district's discipline system]. For Asian students, a similar sized population, there are far fewer such incidents, about 11 out of 300, compared to 80. For Native American students it is 30%, or 4 out of 13 students. That is suspensions, and only one expulsion this year, for the gun incident earlier this year.

The SLT in School B used student grades, disaggregated by grade and subject, as well as by student sub-group. School B's SLT also examined attendance rates, particularly rates of first period tardiness and absences from classes that occurred simultaneously with lunches. As these examples suggest, SLT members typically used data disaggregated by student sub-groups, but they also examined AYP and school-level test score trends across multiple years, as this quote from a mid-year SLT meeting demonstrates,

> PRINCIPAL: If you look at these printouts from OSPI, you will see that we did not meet AYP in reading for [student groups], and in math for [student groups]. You'll also see that the 6th, 7th, and 8th grade for reading, reading scores took a dip.

Resource data. SLT members in these two schools used a second type of data: resource data. Resource data are data that can answer the question of "what resources do we have?" Financial resources, technology assets, staff skills, student enrollment projections, and student demographics were all forms of resource data that SLT members used over the course of the school year. SLT members also used data on "softer" resources such staff buy-in or willingness to implement proposed responses.

To illustrate resource data, both schools considered the number of computers available when weighing different advisory curricula, some of which necessitated students to access online lessons and surveys. Similarly, both SLTs also examined staffing resources as form of resource data. For example, SLT members in both schools considered the number of teaching staff, administrators, and counselors that could be potential resources to support school advisory programs and School A generated their own resource data by surveying staff on whether or not they planned to continue to work at the school during the next school year. SLTs also surveyed their colleagues regarding their experience and willingness to implement new advisory programs because they felt that staff support was a resource critical to the program's success. For example, School B's SLT held a discussion and surveyed all teaching and support staff to gauge whether or not they would be willing and able to implement the different elements of a proposed grading program.

Implementation data. A third broad category of data SLT members used in these two schools was implementation data. Implementation data are data on current operations and program implementation at their school—essentially data that answer the question "What are we currently doing?" Main forms of implementation data for the SLTs in these two schools

were different types of survey data, such as district satisfaction surveys, staff feedback collected via whole-faculty votes or grade-level meetings on what teachers were doing to implement current programs, student feedback on the utility of these programs, and professional development/study group exit tickets.

To illustrate the types of survey data the SLTs used, School A started their first SLT meeting of the year reviewing results from the district's staff satisfaction survey from the previous school year (they did not examine results from the parent or student satisfaction surveys). Both schools' SLTs also repeatedly surveyed staff for feedback on current practices and programs, and students on their experiences in current programs. For example, to inform their discussions of the school's master schedule, SLT members at School B verbally surveyed teachers during their grade-level meetings about their experiences with the current homeroom schedule. SLT members asked teachers for data on how they were currently implementing the school's homeroom program and then brought these data to the next SLT meeting where they were reviewed by the whole SLT. SLT members also occasionally asked students—typically during regular class time— for their thoughts on current programs and then reported back to the whole SLT what they heard.

Response data. The last type of data used by SLT members in these two schools were response data. Response data are the programmatic elements or strategies, and implementation requirements, for different interventions, programs, or strategies. They answer the question "What should do to we address this problem?" These data came either as whole packages, such as "canned" advisory curricula or programs designed to increase attendance, or as individual or generic strategies, such as supplying students with tablet computers or creating

posters to remind students of specific test taking skills. Another form of response data were the implementation requirements, such as how many minutes of PD teachers need per year or how many classrooms are available for advisory groups.

To illustrate, School B used data on a standards-based grading response from O'Connor's *A Repair Kit for Grading: Fifteen Fixes for Broken Grades* (2011). The SLT relied on this book for data on new models for grading students academic work and classroom behavior and how their report card should change to accommodate these grading approaches. When SLT members had an unresolved question regarding how to implement the program for special education students, they emailed the author for clarification beyond what was available in the book. In an example from School A, when the SLT was redesigning the school's PLCs they used response data from multiple sources on individual strategies, such as how another middle school tracked each PLCs progress over the course of the year, DuFour's research on strategies for developing PLC topics and matching staff to PLCs, and district provided resources for strategies on how to support PLC leaders.

The Patterns in SLT Members' Data Use: No variation by decision

To answer the research question: To what extent do decision outcomes vary according to the data school leaders use? I looked across the 13 school improvement decision discussions and did not find that the patterns of school leaders' data use corresponded to the different decision outcomes. I did however observe a relatively consistent pattern across all 13 decision discussions: the SLTs used resource, implementation, and response data more frequently than they used outcome data. While this pattern does not help to explain why different decision discussions resulted in different outcomes, it is none the less interesting because the pattern

extends existing research on DDDM that suggests school staff use more than just test scores when making decisions. Further, this pattern contradicts the emphasis placed on outcome data in many DDDM policies and guides. The findings in this section, and in the following chapter, suggest that while outcome data are important to identifying problems with student achievement, resource, implementation, and response data are critical to school leaders as they select the responses to address these problems. Table 5 lists the instances of data use for each type of data for each decision discussion.

Table 5:
Instances of Data Use by Data Type

	Outcome	Resource	Implementation	Response
School A				
What advisory program to adopt				
How to address staff communication problems				
How to spend a SEA grant				
How to improve the school's antiquated technology				
How to distribute new computers				
How to improve the school's PLCs				
How to support students' test taking skills				
School B				
How to standardize grading				
How to establish a common study hall format				
What PD to provide for next school year				
How to address poor behavior during study hall				
How to implement standards-based grading PD				
What advisory program to adopt				
Note. Colors denote the number of instance of data use throughout decision discussion	0	1-2	3-4	5+

As Table 5 depicts, SLTs used outcome data least frequently and resource, implementation, and response data most frequently. This general pattern held across the decision discussions, with no pattern emerging between the types of data the SLT used during the decision discussion and the decision outcome.

School A's decision discussion regarding what advisory program to adopt provides a typical example of how the SLTs relied more heavily on resource, implementation, and response data, while only occasionally using outcome data. This example illustrates how SLT members used resource and implementation data to probe the root causes the problems, to identify their goals for new responses, and to assess whether or not proposed responses would address these goals. This example also illustrates how the SLT members compiled response data from multiple sources to develop new response proposals.

To elaborate, One of School A's first discussions of an advisory program occurred while the SLT members were looking at some the school's student discipline data—a form of outcome data—although the actual impetus to take up advisory came from data on problems with the implementation of the school's current advisory program. On three occasions, SLT members tried to better understand why teachers were not implementing the advisory program by collecting data from teachers on how, if at all, staff were implementing their current advisory program and what challenges they were having. In the following excerpt SLT members at School A decide to collect implementation data on how teachers were currently implementing advisory,

> TEACHER REPRESENTATIVE #1: Can we talk in our grade-level teams or can we do a poll about how people are currently using their advisory time? How are you

using your advisory?

...

TEACHER REPRESENTATIVE #2: We have our 7th grade team meeting tomorrow. So we will tell [our part-time administrator], "We are going to put it out to our teams".

The following week, the teachers brought data they collected on teachers' current advisory implementation. The SLT members used these data by relaying what their teachers in their respective grade levels had told them. In the words of one SLT teacher representative, "When I asked about the current advisory in the 6th grade meeting, the conversation was that people weren't doing it. They quickly openly admitted that they weren't doing it…" These SLT members repeatedly used what I call implementation data such as these over the course of their decision discussion. For example, at a later point in time, one of the SLT members recalled how poorly a short but daily advisory program had worked since teachers typically rolled this additional time into their regular lesson time. She brought this data up to suggest that the SLT not adopt an advisory proposal with a similar schedule. At another point, two SLT members drew on data regarding how the teachers currently use the schools effort and citizenship grades to suggest that these should be included as part of the advisory program.

TEACHER REPRESENTATIVE #1: We haven't talked about this much in our discussions, but do we need to do some work on assessing citizenship and effort, so we are all doing that in a similar way… It is one thing to say that it is reflective of effort, but if everyone is going to be giving a citizenship grade, we need some consistency about what that would translate to.

TEACHER REPRESENTATIVE #2: Different teachers use effort in different ways.

Here teacher representative #2 uses implementation data to posit that teachers are using the effort grades in different ways.

School A's SLT members also used response data from multiple sources to propose an advisory program. In this interview excerpt, the part-time administrator on School A's SLT describes the different sources he used when developing the SLTs advisory proposal,

> Since I'm not in the classroom right now it's important that I have classroom teacher input. And so the advisory committee at least gave me that opportunity. And then over the summer I worked with a teacher at [another middle school in the district] who's very interested in this. And felt her classroom really needed an advisory to sort of make sure everybody was on the same page... So I had help [from teachers]. And there's been a lot of work done nationally which you can find out pretty much on the internet... [Another middle school in the district] has been doing it for years and they had a big notebook, which they shared with me, of their lessons and their scope and sequence. So I got to look at that. That was very helpful. [Advisory curriculum] … it's a program a free program the state bought for everybody… So that's another resource. There's fifty websites that are helpful and most of them have free stuff that you can do. The Southern Poverty Leadership thing is sending me something free—that is their deal—around tolerance, so there's stuff there.

In this excerpt this SLT member reports using response data from the school's teaching staff, teachers from other schools implementing advisory programs, educational research and

prescriptive information on different advisory programs, and other online resources for student advisory programs.

The SLT members used resource data when assessing proposed responses by determining whether or not their school had either adequate technology or staffing resources, and if the school's teachers had the instructional skills necessary to successfully implement their advisory program. During their advisory decision discussion SLT members used resource data when considering if they had the budget to purchase tablet computers to support a particular advisory curriculum.

School A's advisory decision discussion provides a typical example of how instrumental resource, implementation, and response data were to the decision discussions and how outcome data played a relatively small, and often symbolic, role in the SLTs' decision discussions. Across the decision discussions, the SLT members used resource and implementation data to better understand problems, identify goals for proposed responses and to assess whether or not proposed responses would meet their goals. They used response data from all different sources to customize response proposals to meet their school's needs. All of these different uses for these data types necessitated that the SLT members use resource, implementation, and response data more frequently [9].

In contrast, SLT members used outcome data less frequently. Furthermore, when they did use outcome data the SLT members tended to use the data symbolically to make rhetorical points or to create a sense of urgency around a problem. They tended not to use the data in a

[9] I continue to examine how the SLT members used these data types throughout the decision making process in Chapter Seven.

way that was directly part of the decision making process, such as analyzing data to identifying problems with student learning to address via their school-level decision making. To illustrate how outcome data were often used in more symbolic ways, on two different occasions at each school the principal brought outcome data to the SLT and used it to justify a previous position or decision. During these outcome data sessions, the principal distributed hand outs of student outcomes (grades, discipline rates, state achievement test scores) to the SLT members. The principal then walked the SLT members through the data with the following steps: principal presents hand out summarizing data and asks SLT members to take a few minutes to look over the data. The principal then asks members to report what they see in the data, and following a small number of comments (often questions clarifying the nature of the data) then the principal offers her own interpretation. Principals in both schools followed this analytic pattern on two occasions each. The following excerpt from a meeting observation illustrates this pattern,

> PRINCIPAL: [Distributing three grade-level handouts listing the number of students receiving a "D" or an "E" (a failing grade) by demographic subgroup and subject.] What the first block is telling you is the percentage of those kids in the grade with D and Es at the end of the quarter – so, 8% of our Native American kids have D & Es… We are looking at this with a lens for equity and consistency. So take a few minutes and look at it by grade, or what ever is resonating with you. Look at this and identify any inequalities that are standing out to you, and I want you to think about why is that, and do you have any solutions… So what you are going to need to do is to spend some extra time looking at it. Do we see

> anything in here that is inconsistent? That is equitable? Can we think of any reasons why that might be? And what are some solutions to rectifying these?
>
> [After fielding a few questions about the nature of the data and observations of patterns in the data, including "if you go from grade level to grade level, who has the most failures?", "Does Spanish have the most Ds and Fs?", the principal says,]
>
> PRINCIPAL: We fail the same kids across grades, and every year. The data year to year would likely look the same. The trend that we are going to be able to see here is that these aren't different from other years.

This excerpt illustrates the broader pattern that SLTs typically used outcome data in symbolic ways.

Similarly, SLT members often quoted widely known statistics or performance data about their school's students, typically in service of a broader point. In this typical example, the principal at School A uses outcome data to respond to a teacher representative request to develop a shared mission at the school, "We have a mission. It is that we have a huge gap between Asian and black students in this building. That only 30% of black 8th graders are at grade level. That is what our mission is." In this and similar examples, SLT members use of outcome data constitute a symbolic use of data as they do not directly contribute to the decision making.

To summarize, SLT members used four main types of data in their decision making, and the frequency with which they used these data types was relatively consistent across each of the decision discussions, with SLTs using proportionally more resource, implementation, and response data. The consistency in this pattern does not help me identify differences that may account for the differential outcomes reported in Chapter Five, but the SLTs' relatively heavy reliance on, and importance of, these data types illustrates how critical they are to school-level instructional improvement decision making. The finding that resource implementation, and response data were so instrumental throughout the process of decision making suggests that DDDM policies and guides should not overlook these data. In the next section I examine a second pattern overlooked in many DDDM policies and guides, as well as in the extant research on DDDM: how SLTs confront gaps in readily available data by gathering additional data or mining their personal knowledge.

Patterns in How SLT Members Confronted Gaps in Data

My findings regarding the SLTs using outcome data less frequently are somewhat surprising, considering SLT members had access to multiple forms of compiled, analyzed, or otherwise accessible forms of outcome data, including annual standardized test scores, benchmark assessment scores, attendance and discipline rates, and grades and retention rates. In most cases these data were disaggregated by demographic sub-categories, classrooms, and in some cases they were disaggregated by student participation in existing programs or interventions. In contrast, the SLT members faced many gaps in available resource, implementation, and response data yet they still used it more frequently.

The extended example of School A's advisory above provides a typical example of how SLT members lacked the necessary data to make school-level instructional improvement decisions. In that example, the SLT members wanted access to data on: how the school's teachers were currently implementing their advisory program, the challenges staff had with the advisory program, whether the school had adequate instructional staff and technological resources, and potential advisory programs and their implementation requirements. Because the SLTs generally lacked data on their school's resources, what was happening in their school, or what responses were available, for each of these data types the SLT members had to engage in data gathering activities to procure their own data.

In this section I discuss the ways in which SLT members worked around these gaps by examining the two main approaches SLT members used to gather additional data: first by taking time outside of their weekly meetings to search for additional data and second by mining their personal knowledge to use as data. I argue that SLT compared to searching, members mined more data because mining their personal knowledge took far less time. SLT members acknowledged the limitations of using their own knowledge as data, and engaged in three approaches to gauge the representativeness of their own experiences. These findings extend DDDM research that, to date, has largely ignored how decision makers confront inevitable gaps in data. Furthermore, these findings suggest that decision makers used their personal experiences not only as a filter to understand existing data, but also as actual data instrumental to decision making. Using their personal knowledge as data was hardly the negligent act policies suggest it to be when they indicate it should be avoided.

SLT Members Searched for Additional Data

As my conceptual framework suggests, one of the ways SLT members gathered additional data to fill gaps in available data was to take time outside of their weekly SLT meeting to search for data to use in their school-level instructional improvement decision making. Typically they searched either within their school for resource or implementation data, or outside of their school for response data. Occasionally, SLT members would search for data and find sources that had data already compiled for their use such as student test scores from district maintained data warehouses, annual staff and community satisfaction surveys from district websites, or data the school had previously gathered (e.g. discipline or PD satisfaction exit tickets). For example, during School B's discussion of how to address poor student behavior during study hall, SLT members searched for data on student tardies and found that the school enrollment specialist had already collected and tabulated these data from study hall teachers.

However, on most occasions, SLT members collect new data. Some of the collection strategies they used to collect resource and implementation data included, surveying staff on current their practices and approaches to implementing programs, creating exit tickets for PD sessions, emailing staff to request feedback on proposed responses, tallying the number of functioning student and teacher computers, and surveying students regarding their experiences in current programs. For example, to inform their discussions of the school's master schedule, SLT members at School B surveyed teachers during their grade-level meetings about their experiences with the current homeroom schedule. SLT members asked teachers for their general impressions of homeroom and then brought these data to the next SLT meeting where they were reviewed by the whole SLT. SLT members also occasionally asked students for their

thoughts on current programs—typically during regular class time—and then reported back to the whole SLT what they heard.

SLT members also had to search for and compile response data and one of the main ways they did so was to engage in online research. Members of both schools SLTs engaged in online searches for possible advisory programs, as well as data on the implementation requirements of the different programs. School A's SLT members searched for program data on different student planner options and implementation requirements for PLC programs. School B's SLT members searched for new grading programs, master schedule data, and implementation requirements for a standards-based grading intervention. SLT members also searched for response data by asking colleagues in other schools. For example, during School A's discussion of how to improve students' test taking skills, a question arose regarding whether or not the school's teachers should collaborate across subjects or work with in their subject areas. To gather additional response data the principal of School A consulted with another principal for additional data on how that school's staff worked to support students. Similarly, School B's SLT members called on colleagues in other schools for data on other advisory programs.

SLT Members Mined Their Personal Knowledge to Use as Data

While the SLT members gathered data via search, they far more frequently gathered additional data by mining or referring to their personal knowledge, experiences, perceptions, or histories to use as data. Because the ways in which SLT members used their personal experiences mimicked the ways they used data (see below for examples) hereafter I refer to this type of information as 'mined data'. In all decision discussions and for almost all data types,

the SLTs used mined data more frequently than used data they gathered through search. I did not find evidence that SLT members tended towards mining data because they were risk averse, meaning they were concerned that they would not find the data they were going to search for, as my conceptual framework suggested might be the case. Instead in these two schools, the SLT members' preference for mined data seemed to stem from its convenience or, relatedly, a desire to save time.

To illustrate how readily available led the SLTs to filled gaps in searched data with their mined personal knowledge, members of School A's SLT started their advisory decision discussion with their personal experiences to fill gaps. In the following excerpt, the SLT members are discussing an advisory proposal distributed prior to the meeting via email. Here the SLT members use implementation data mined from their knowledge of how teachers are currently implementing the advisory time (implementation data), as well as their knowledge of student behavior (outcome data), to suggest that the 15 minute advisory time period is not a sufficient amount of time,

> TEACHER REPRESENTATIVE #1: …I just don't see 15 minutes in the morning as enough time to do a curriculum.
>
> TEACHER REPRESENTATIVE #2: Half of that time is taken with announcements… or kids coming in late.
>
> TEACHER REPRESENTATIVE #1: I just feel like if we are going to do this, it should not be half assed. I just feel like you can't do it 15 minutes.

…

TEACHER REPRESENTATIVE #2: They are asking: Do you have that planner filled out? …

TEACHER REPRESENTATIVE #1: If I'm a teacher teaching science, with labs, the likelihood of me doing this is low [because I need as much time as possible for labs]… This is a lot to put on us now, and it isn't enough time to do it right, the 15 minutes. I'm not even getting to checking on their planners…

…

TEACHER REPRESENTATIVE #2: It should be a 50 minute class where you pull the 10% of the kids that actually need it. There are a lot of kids who already know how to treat people. But for some kids there is some serious, social emotional stuff.

TEACHER REPRESENTATIVE #1: All of mine know how to treat people, some of them [motioning to indicate other students at the school] know and don't really know how to treat people, but we kids who are… not in the right classes... What is the first thing you do when you don't know or can't access the content? Then they start to break down.

…

TEACHER REPRESENTATIVE #2: We do social lessons in … [subject area] around… [subject area] and in their group work. In my… [subject area] work, I'm not doing special lessons around that. But when you have kids that aren't prepared to participate in the curriculum, and it causes a breakdown in the system.

Later in this meeting the SLT members decided that they should survey their colleagues to better understand how they were using their advisory time (searched implementation data). I describe the pattern of searching following mining in greater below, but here the fact that the SLT eventually decides to spend time outside their meeting to gather additional implementation data highlights how mined data was more efficient in terms of time.

Another example from School A illustrates how SLT members were able to quickly mine their personal knowledge for response data. When confronted with a technology problem that they felt needed to be addressed immediately by the district's school board, an SLT member at School A suggested an approach that she had successfully used earlier in the year when requesting action from the school board: write a letter on behalf of the school to ask the board to act. The SLT members adopted this proposal during the meeting and left the meeting with plans to draft the letter and get it off to school board members within two weeks.

In a third example, the SLT members at School B use mined data from their knowledge of students to discuss the problem of students who arrive late to first period. Here the principal and teacher representative use mined outcome data about the number of tardy students (connected to their broader decision discussion of how to address poor behavior during study hall) and then the principal offers implementation data mined from her knowledge from working on student discipline as to the reasons why they are arriving late,

> PRINCIPAL: I think that we need to address the kids who are here at 7:30 and still aren't getting to class on time… Is this just a scam that kids are pulling? Some kids negotiate with their parents who let them pick which bus to take. Is it that it [all of these kids being late] is a home problem? Some arrive and they go in to the cafeteria to chit chat.

…

TEACHER REPRESENTATIVE #1: … I know that people have brought issues, like how … [teacher name] is frustrated with how many kids are tardy and it is impacting his first period.

TEACHER REPRESENTATIVE #2: Could we have the homeroom identify, the first period teachers identify which are your consistently late kids, and target a program around them?

PRINCIPAL: I'll ask… [administrative staff name] if she can run a report of the kids who are tardy.

In the next section I describe how the SLT members worked to assess whether or not their personal knowledge represented broader patterns in their school.

SLTs Members Tried to Gauge the Representativeness of Their Personal Knowledge

Relying heavily on mined data does not fit within normative DDDM models that urge decision makers to move away from relying on their personal knowledge when making decisions. However as noted above, eliminating mined data from the decision process may be overly simplistic or even not desirable due to time constraints. In this way, personal knowledge may actually enhance the decision making process. In this section I describe three approaches that the SLT members took to "test" whether or not their data mined from their personal knowledge were representative of broader patterns in their schools.

To elaborate, SLT members occasionally echoed the sentiments in the DDDM policies

and guides and acknowledged that their personal knowledge may not reflect the broader conditions in the school. For example, at School A, when the SLT started a discussion on the school's poor state of technology, one of the members remarked,

> TEACHER REPRESENTATIVE #1: "I was thinking that we could find out from all the teachers what their technology problems in their room. We should ask them, "What is you computer like in your room?" Otherwise we are just talking and we won't have any evidence to demonstrate [in our letter to the board] that "here are all the teachers that have computer problems."

Here the teacher representative urges the SLT to move beyond exchanging their own stories of computer problems to gather data to demonstrate how this was a school-wide problem. In another example building on the excerpt above from School B's discussion of tardy students, one of the SLT members responded to another member's reason with, "It is just stories. We don't have data and it is still an issue of kids not getting to school on time." Here the SLT member suggests that they needed more systematic data on the topic to better understand what was going on for their students. Whether they did so intentionally or unintentionally, SLT members addressed the shortcomings of mined data by engaging a form of triangulation. They used three main strategies to pool or triangulate their personal knowledge, including searching for additional data, using the breadth of experiences on SLT as a somewhat representative sample of the school's staffing population, and offering countervailing experiences.

One approach the SLT members used to "test" the representativeness of their mined data was to engage in search practices. Both SLTs on occasion realized the limitations of their personal knowledge and decided that they needed to search for additional, more

representative, data. To illustrate, using an example from School B, when discussing late in the school year whether or not to present lessons to students at the start of the next year on how to behave in middle school, several staff recalled that how popular the lessons were and suggested that they should use repeat them in the coming school year,

> TEACHER REPRESENTATIVE #1: I have a question. For the opening days of school lesson, are we doing just [advisory curriculum], or are we doing the behaviors, too? [Several SLT members respond verbally that they will do the behaviors and others nod in agreement.]
>
> TEACHER REPRESENTATIVE #2: In past years, there was great feedback on it, and for this year we need to tweak it to include information on [advisory curriculum]. So, Thursday, we will go over things like, 'please wipe your hands, don't throw wads of toilet paper in the sink'…

At this point in their discussion, a third SLT member recalls that there was actually a "compliance issue" with some staff not teaching all of the lessons to students and causing confusion for the kids. Another SLT member seconded this statement. Another SLT member asked if they should collect feedback from the staff,

> TEACHER REPRESENTATIVE #3: Do we want to ask for feedback from houses on how the opening days went?
>
> TEACHER REPRESENTATIVE #4: We got it last year, I remember going over it in SLT.

TEACHER REPRESENTATIVE #3: Right, we all turned it into [administrator's name... He might have feedback about it. But I remember that it was really positive.

TEACHER REPRESENTATIVE #5: I believe that the consistent feedback that I heard was that it was hard to teach all of the lessons, and if departments could each take a lesson to focus on so you could teach just one of them.

TEACHER REPRESENTATIVE #3: So, should we get the feedback from [administrator's name]?

TEACHER REPRESENTATIVE #5: Yeah, I barely remember it, and since we have feedback we should probably look at it.

In this example, the SLT members realize from their discussion that their personal experiences with the "behaviors" lessons might not reflect those of the school and that their recollections may have faded over the intervening months. In light of these realizations they engage in search to gather more data, in this case a written staff survey, on how the implementation of the lessons went earlier in the school year.

A second way the SLTs "checked" their mined data was to ask all SLT members to offer their knowledge or experiences as a kind of make-shift barometer for the experiences at the school. These "whip arounds" became one way that SLTs "tested" whether or not their mined personal experiences matched the broader trends in the school. In the following observation excerpt from School B, the SLT is in the middle of discussing whether or not they can reach

consensus on a new grading model. Instead of surveying the whole staff, a member asks that each SLT member say whether or not they support the proposal,

> TEACHER REPRESENTATIVE #1: … Because… [teacher name]'s email has triggered some thoughts about if do we really have a consensus about what grades mean. So, do we agree that the academic grade should be just skills or also skills and growth?... I want to know what we think. What should an academic grade measure?

After each SLT member stated their opinion, that this teacher representative characterized as "all agree or sort of agree" he or she went on to ask, "Do we accurately reflect the staff's feelings on this?" and three SLT members suggested that they thought their opinions were representative of the whole school. In this and other examples of "whip-arounds" from the School B SLT, the co-chair always asked for the opinions of everyone in attendance, even staff who attended as guests and were not members on the SLT. The SLT at school A was much smaller and therefore "whip arounds" were not necessary since all members typically voiced their opinions, but the SLT members did on occasion solicit the experiences of SLT members who had not yet offered them. For example, when debriefing a particularly contentious meeting, one SLT member asked another who had remained quiet throughout the discussion what she thought, adding that she wanted to know since she represented a segment of the staff not represented by the other SLT members.

The third way the SLTs "tested" their mined data was to offer their own, or hypothesize about possible, countervailing experiences. In a typical example from a SLT meeting at School B regarding the unpredictable homeroom schedule the first member suggests that a flexible

approach is workable, and the second member suggests that based on his/her experiences, such an approach would be detrimental to the students,

> TEACHER REPRESENTATIVE #1: You have to be a bit flexible, I think that teachers get so stuck in their routines that they [have a hard time being a little flexible].
>
> TEACHER REPRESENTATIVE #2: My students have a hard time being flexible. They need consistency.

In another example from the same topic, three members suggest that their experiences point to three different root causes as to why homeroom has not been working as designed,

> TEACHER REPRESENTATIVE #1: …Part of the issues is that there is no communication, or big plan [for what homeroom is meant to do]. So people go, "This is a great opportunity to do what ever. If it sounds great, let's do it during homeroom."
>
> PRINCIPAL: Part of the problem is that these are the same kids that need to make up labs, [tutoring], reading assistance. I think that we need to also have alternative ways to have kids to make up work. We need more opportunities in the week and it can't just be study hall. The science teachers at the junior high I taught in, we said ["I'll have these labs set up on this day, come in after school to do the make up."
>
> TEACHER REPRESENTATIVE #2: We also need consistent expectations [about when study hall will take place]... So when I have kids come to my study hall, some of them are trying to be responsible and are counting on using the time to get things done. They

> say, "I'm going to do this now, or I'm planning on this time to do this" and then there is an assembly. It is the responsible kids that get punished in this situation.

In this example, members offered several different personal experiences as individual data points to broaden the representativeness of the conversation.

In another example, when the SLT at School B realized that their members were not representative of the staff on all issues they took to hypothesizing about countervailing opinions. For example, this quote is from an SLT conversation on how to amend their grading policy,

> TEACHER REPRESENTATIVE #1: I noticed that we don't have any math people here, and in working with humanities teachers they tend to be ok with these ABCDE grades… but I know that [math teacher name] has talked with me, and I don't know if he is representative of the whole department, but at least some think that an "A" is meeting standard.

This example demonstrates how SLT members occasionally seemed to resist generalizing from their own knowledge of conditions at the school level by offering countervailing experiences to those discussions.

To summarize, SLTs encountered many gaps in available data, and to fill those gaps SLT members tended to search sources external for response data, and searched sources internal to their school for resource and implementation data. In general, because searching took more time to execute, SLT members tended to mine more data from their own personal experiences. Finally, SLT members occasionally acknowledged the downside to using personal experiences as data and took steps to triangulate their data to determine whether or not their experiences

were representative of those throughout the school.

Chapter Summary

In this chapter I addressed the research question: To what extent do decision outcomes vary according to the data school leaders use? I argue that the SLT members in these two schools used four main types of data when making school-level instructional improvement decisions, with the patterns of data use remaining relatively consistent across the decision discussions. Therefore, to answer the research question motivating this chapter, I did not find a pattern of data use that was consistent with the decision outcomes described in Chapter Five. Instead, the remaining findings I present in this chapter contribute findings from existing DDDM research, while others call into question some of the assumptions of DDDM policies and guides.

My findings on the frequency and centrality of resource, implementation, and response data to school-level instructional improvement decision making processes, how school leaders addressed gaps in the available data, and how they used their personal knowledge as data reinforce and extend existing research on DDDM in three ways. First, my typology of data used in school-level instructional improvement reinforces existing research on DDDM that suggests decision makers use multiple forms of data in their decision making. However, my typology also extends existing typologies found classroom-level DDDM research in that it adds response data as a category of data. Earlier typologies do not include this form of data – essentially details about responses and elements required for implementation—and policy and research on DDDM has yet to fully examine the role that this form of data plays in the decision making process.

These findings also highlight how critical resource, implementation, and response data are to school improvement decision making. While these two types of data are often mentioned in classroom-level typologies they are typically defined vaguely and under conceptualized. In this chapter I describe each of these three data types, demonstrate how they were frequently used, and illustrate how they were instrumental to the SLTs' school improvement decision discussions.

Similarly, existing research on DDDM has yet to probe how decision makers confront inevitable gaps in available data. In this study, the SLTs had relatively little readily available data on what was going on in their schools, or data on programs and responses that might address challenges they faced. I operationalize two concepts from organizational decision making theory—search and mining—that help explain how decision makers gather additional data.

Third, this chapter extends to existing research on DDDM that suggests decision makers use their personal knowledge as a filter through which they make sense of data. Here I argue that decision makers use their knowledge as actual data when they confront a gap in available data or evidence, and that they occasionally take steps to triangulate their personal knowledge to determine the extent to which they function well as school-wide evidence.

My study also highlights the value in studying the implementation of DDDM in schools using observational methods and illustrates why some researchers have increasingly called for "practice" based studies (Coburn & Turner, 2011). As I noted early in this chapter, school leaders reports in interviews of the data they used were much different than my observations. Further, this chapter highlights the "hidden" processes of data use, such as mining personal

knowledge to use as data, that would be difficult or impossible to study relying solely on self-report data.

The findings I present in this chapter also call into question the reliance of DDDM policies and guides on student outcome data, as well as its distrust of personal knowledge as a valuable and important part of decision making. In this chapter, I describe how SLT members relied heavily on resource, implementation, and response data throughout their decision making processes, with outcome data playing a non-instrumental role. Amending policies and guides to acknowledge that resource, implementation, and response data are critical to decision making is the first step in supporting school leaders in using these data as part of the school-level decision-making processes.

DDDM policies and guides typically ignore, or warn against using personal knowledge when making decisions. My study illustrates the important role of personal knowledge in school-level decision making processes where time constraints seriously limit school leaders ability to collect all of the data they need throughout the decision making process. If removing personal knowledge from school-level decision making is not a possibility, my study suggests that decision makers may take, or could be trained to, steps to triangulate, pool, or otherwise "check" the representativeness of their personal knowledge.

In the next chapter I examine the decision making outcomes from another perspective: how the *processes* involved in decision making influence the decision outcomes.

Chapter 7: School Leaders' Decision Making Processes and Decision Outcomes

In this chapter I continue to address the question of why the school-level instructional improvement decisions resulted in different outcomes by answering my research question: To what extent do the decision outcomes vary according to the school leaders' decision making processes? I examine the decision making processes and find that how the school leaders identified the problem, selected goals, and generated responses varied across the 13 decision discussions. Furthermore, I find that the patterns in the school leaders' matching processes correspond with the patterns in outcomes (whether or not the SLTs made a decision and whether the decision called for a superficial or deep change). While my research design does not allow me to establish causality between the matching processes and outcomes, the consistency of the findings, my observations of the full decision making process, and substantiating these patterns with theory lend support to my claim of a relationship between the matching processes and decision outcomes.

Before discussing these outcome findings, I explain the SLTs' matching process to help anchor the outcome discussion. Therefore in the next section I discuss the general matching process and how it involved the SLT members making at least three sub-decisions to identify the nature of the problem at hand, their goals for addressing the problem, and potential responses to the problem. I also highlight how data played a role throughout. As noted I take time to discuss the general process to anchor my discussion of how variations in matching corresponded with outcomes, but also because none of the extant DDDM research focuses on how school staff select responses using data.

I argue that the patterns in this chapter are noteworthy because they extend DDDM findings in two ways. First, these findings provide the first known account of how school staff make matches, or decisions, about which response to adopt. Second, these findings suggest ways in which the decision making processes relate to different outcomes. These findings are also noteworthy because they suggest the emphasis in DDDM policies and guides to use data to identify problems may be limiting, as I find that data are integral to how the school leaders identify problems, generate responses, and make matching decisions.

To derive the findings in this chapter, as I detailed in methods chapter, I coded all of the decision discussion data using concepts identified in my conceptual framework, in particular, problem identification, goal selection, response generation, and matching. I then created a series of matrices to track the decision processes as they evolved over time. From these I created summaries for each of the sub-processes, and then merged these summaries with the outcomes identified in Chapter 5 to identify any patterns between the two. The resulting table is included in this chapter.

Decision Making as Matching

Many DDDM policies or guides, and some research on data use in classroom-level decision making, portray data use in decision making as a consecutive process starting with teachers either accessing data from a main data warehouse or collecting data from their own students, analyzing these data for problems, and then responding with an intervention or strategy (Bambrick-Santoyo, 2010; DQC, 2011; Institute for Educational Sciences, 2009). In this conceptualization, the balance of decision makers' work with data takes place when they analyze data to identify problems. Similarly, most of the extant DDDM research focuses on how

teachers and other staff analyze student data to identify problems. Contrary to this model, my conceptual framework suggested that data would play a significant role throughout the process, not only in the identification of problems, but also when decision makers identify goals, generate responses, and when matching each of these elements.

Indeed, for the two SLTs in this study, I argue that data played an integral role throughout their school-level instructional improvement decision making processes—or what I refer to in this chapter as their 'matching processes'. Here, matching involved the school leaders making sub-decisions regarding the problem, their goals, and proposed responses. During these sub-decision discussions, the SLT members relied on outcome, resource, implementation, and response data to better understand the problem, to identify their own and their colleagues goals, and to generate strategies, programs, and other responses. Gaining clarity and agreement around these sub-decisions ultimately facilitated the matching process, where the school leaders again used data to determine whether or not a response was likely to address the problem at hand and fulfill their goal(s). If the three elements "matched", the SLT members would adopt the proposed response, essentially making a decision. When the SLT members determined that the three elements did not match, they would typically identify a new response, and often new goals, until they found a match. In the following paragraphs, I describe the SLT members' sub-discussions of the problems, their goals, and potential responses and then return to further describe how these three sub-discussions fuel the matching process.

Problem Identification

To make the problem identification sub-decision, the SLT members talked through the problem at hand and tried to identify, clarify, or agree upon what, exactly, the nature of the problem was that they were trying to address. In most cases there was more than one possible problem to address and the SLT had to decide among them. While trying to determine the problem, the SLTs typically used outcome and implementation data, gathered both through search and mining activities.

School A's decision discussion of how to support students' test taking skills illustrates how the SLTs often had to decide among several possible problems. This discussion started when the school's administration decided that they should temporarily suspend the PLCs and devote the time to have staff in tested subjects plan for how to best prepare students for the test. Many staff members, including three SLT members, were not happy with the decision to suspend the PLCs, and at the start of meeting to discuss how to proceed, the part-time administrator started the meeting summarizing the different problems the SLT members saw,

> ADMINISTRATOR: So the agenda for today is to talk about the issues that were created by suspension of the PLCs. We need to figure out how to make people that felt that the PLCs were cooking along, feel OK. And figure out if the PLCs were the proper thing to do in our school given our population and the high stakes classes. And figure out how to address the dual worlds in the school [with some subjects subjected to high-stakes testing and others not]. That is not good for unity… We need to think about if our model is good enough to respond to our needs of staff and students. And we should talk about the equity between teacher of tested and non-tested subjects… And then overriding all

> of this is the real need to show that we are making progress in meeting the needs of our students, and on the MSP [Measures of Student Progress, the State achievement test]. Everyday … [the principal has the district or a foundation] asking, "What are you doing, why isn't it working and what are you going to do differently?" So with this urgency, the old model of sticking with it [the PLCs] and changing it at the end of the year doesn't work for …[our school].

In this preamble, the administrator suggests that the SLT *could* address each of the following problems: why the administration suspended the PLCs, how to help the staff who were especially invested in the school's PLC to feel better about the PLC suspension, how to organize PLCs during the suspension and for the next year, how to create unity when half of the staff is evaluated on their students test scores, how to support students growth on tests, and how to ensure the school's students make sufficient progress on the annual state achievement test. This excerpt illustrates how the SLT members often had to move from many potential problems to identifying a single problem, and how outcome data played a role in helping them to make these determinations.

During these sub-decision discussions the SLTs often used outcome or implementation data to suggest a particular take on the problem. To illustrate using the above example from School A, during the ensuing discussion one of the teacher representatives suggested that they should address the problem of how to create unity among the staff by focusing on a mission, and in response the principal cited outcome data, mined from her personal knowledge, to suggest that they should instead focus on supporting students' academic growth,

> TEACHER REPRESENTATIVE #1: It is like we need a mission.

PRINCIPAL: We have a mission. It is that we have a huge gap between Asian and black students in this building, that 30% of 8th graders are at grade level. That is what our mission is.

During other problem identification discussions, SLT members expressed that in addition to the data they were able to mine from their personal knowledge, they needed to gather additional implementation data from their colleagues to further understand the problem at hand (search). School B's study hall discussion illustrates how SLT members used both approaches to gather data to better understand the problem at hand. When School B's SLT started to talk about study hall, one SLT member repeatedly probed why the SLT was taking up the study hall topic by asking: "why are we talking about this?", "I'm wondering if it makes sense having this is up for negotiation?" and "I guess I would want to know what people are currently doing with the homerooms?" From her prompts, School B's SLT members relayed their knowledge and experiences with study hall, and found that they had a wide variety of experiences with study hall, with some SLT members reporting that they had problems with study hall, and others having no knowledge of the problems. After approximately 45 minutes, the SLT members still did not agree on the nature of the problem, so the SLT members decided to collect data from their colleagues on their experiences with study hall to further probe what was the nature of the problem. At the next SLT meeting the SLT members shared the data they had collected during a grade-level meeting and they ultimately agreed that poor student behavior during study hall was predominantly a 6th grade problem. This example not only demonstrates how the problem identification sub-discussions tended to probe the nature of

the problem, it also illustrates how the SLT members both searched for and mined their personal knowledge for implementation data to help enhance their understandings and help them to reach consensus about the nature of the problem.

Goal Selection

A second sub-decision I observed in these two SLTs was goal selection. Here SLT members talked about what they hoped would result from addressing the problem at hand. These hopes, visions, targets, or goals became implicit criteria against which SLT members could assess responses. Of the three sub-decisions, the SLTs used the least amount of data during goal selection. Instead goals seemed to be related to the school leaders' values and previous experiences. I further explore this pattern in Chapter Eight. Below I discuss the most common goals and how the SLTs tended to converge around two or three goals for each decision discussion.

By far the three most frequent goals mentioned were: addressing unmet student needs, adopting a response that teachers would buy into, and adopting a response that the school had the resources to successfully implement. Examples of goals that addressed unmet student needs included helping students to "own" their learning, providing time during the day for students to complete missing tests or assignments, increasing student test scores or other outcomes, improving literacy skills, and establishing adult relationships with students. Examples of goals that addressed ensuring teacher buy-in included, ensuring responses are well organized/planned, ensuring responses include professional development, ensuring responses do not disrupt existing and successful programs, and ensuring responses take full advantage of time available. Examples of goals that addressed sufficient resources for implementation

included ensuring adequate computers or other technology, ensuring adequate staff skills, and ensuring adequate time for planning the response.

Unlike the problem identification sub-discussions where SLTs reached consensus around a single conception of the problem, during most goal identification sub-discussions the SLT members converged to support two to three goals. For example, when discussing a possible advisory program, SLT members from School B converged around a goal to have advisory help students take ownership of their learning over the course of eleven meetings. At the beginning of the discussions, many SLT members' primary goal was to create an advisory program that staff could implement with ease (e.g. convenient curricula, minimally disruptive to their current program). One SLT member, on three separate occasions, stated his goal of using advisory as a way to help students take ownership of their learning. In the following excerpt this SLT member shares his/her goal for the advisory/student-led conferences program,

> TEACHER REPRESENTATIVE #1: I'd like to share something—Four or five years ago I attended a conference on common formative assessments. And there I had a big dose of the Kool-Aid; it really hit home with me. There is a model out there where the kids shift from caring about the grade to caring about their learning… So far we aren't having the families buying into that, and the kids aren't either. I still find myself doing what I don't want to do [to change my grading practices] and I'm not getting them to say, "You know what we are learning." The piece that makes sense to me with student-led conferences is that, ideally, the kids can demonstrate what kids are doing. And here it is [wave hands to mimic a student presenting his/her portfolio of work at a conference]. It would be really pie in the sky, but I think that this could be a strong way to complete that cycle

> from getting kids to care about grades, to caring about learning. And in my mind, for me personally, if I'm going to buy in to it [advisory and student-led conferences], is the piece that I can help kids communicate to their families and what they are doing to show that learning.

Over time more SLT members also adopted his/her goal of adopting a response that would help students take ownership over their own learning. As demonstration of the full SLT's adoption of this goal, at the last meeting on advisory, the SLT unanimously nominated this member to relay his "students taking ownership of their learning" goal to the whole staff.

Response Generation

A third sub-decision I observed was response generation. In the previous chapter I described how the SLT members gathered response data by searching outside their immediate meeting context or by mining their personal knowledge for response data. During this sub-decision discussion, SLT members discussed these data to better understand the specific strategies, programs, and interventions of the response proposal, as well as its implementation requirements. For example, in this excerpt early in School B's discussions of what advisory program to adopt, the SLT members stress how important it is to specific what exactly the "advisory" program will entail,

> TEACHER REPRESENTATIVE #1: Advisory, has anyone defined what that is? People can have a lot attached to that word. What was said [at an earlier meeting] was that there would be lessons on a couple of Tuesdays or Thursdays a month.

PRINCIPAL: We can call it what ever we want. It has got to include a curriculum that is career and college readiness focused …

TEACHER REPRESENTATIVE #1: Some people might have some baggage about what advisory means, so we might just put that [our definition of advisory] out there.

PRINCIPAL: It is college and career readiness. And it has to happen a couple of times a month.

TEACHER REPRESENTATIVE #2: And we aren't locked into [advisory curriculum package] or anything else at this point.

Besides probing what the response proposals entailed, SLT members also offered additions and small changes to proposed responses during these sub-discussions. The additions or changes SLT members suggested almost always reflected one of their goals. For example, during School B's advisory discussion, the SLT members suggested ways that they could adapt the "canned" advisory curriculum. Here a SLT member with the goal of adopting a response that teachers would buy into suggested that they should retype the advisory lessons from unchangeable PDF files into changeable word processing files. This would ensure that teachers could easily adapt lessons as they saw fit, and would therefore be more likely to be willing to implement the program. Another SLT member with a goal of helping students connect with the teaching staff suggested that they adapt the advisory program so that teachers could "loop" or remain with students over multiple years. Another SLT member suggested that they combine

multiple lessons into a single, monthly advisory class so that they could maximize the advisory time. Eventually the SLT created an adapted advisory program by combining parts of the canned curriculum with strategies suggested by SLT members.

Matching

When matching the SLT members try to determine whether or not the proposed response would address the agreed-upon problem and fulfill their goal(s), and they predominantly used resource, implementation, and response data to make these determinations. As described in the previous chapter, they tended to draw on mined forms of these data, although they did at times search for additional data.

The following extended excerpt from School B's discussion on how to address poor behavior during study hall illustrates how the SLT members mined their personal knowledge to use as resource, implementation, and response data to determine if several responses would address their problems and goals.

Before the meeting excerpted below the SLT discussed the problem and further clarified that student behavior was especially a problem during the 6th grade study hall period. They had also discussed goals for the adopted response. First, the SLT agreed that the study hall should allow adequate time for students to receive tutoring, special education services, and other tailored interventions. Second, the principal proposed, and the rest of the SLT agreed, that study hall should maintain a number of specific scheduling criteria such as three student lunches and the minimum number of instructional minutes per week. Third, a minority of the SLT members wanted the adopted response to help alleviate the number of student late arrivals.

This excerpt starts with a SLT member—Teacher Representative #1—proposing a response that would change study hall from 90 minutes, two times a week, to 25 minutes daily to allow teachers to see their study hall students daily. Immediately, another SLT member rejects this proposal because it does not meet the goal of providing time for student interventions,

> TEACHER REPRESENTATIVE #1: … I think that the daily study hall is back on. I think that we need figure this out.
>
> ….
>
> TEACHER REPRESENTATIVE #2*:* I think that we need to hold on to the Tuesday-Thursday schedule so that we can have [interventions for students]. We wouldn't be able to do this with the shorter, daily schedule.
>
> TEACHER REPRESENTATIVE #1: … If we move the time of day around [for study hall] that might help with some of the problems.
>
> TEACHER REPRESENTATIVE #2: Can you say why the time of day isn't working? Since it is working for me.
>
> TEACHER REPRESENTATIVE #1: There are kids in some study halls that just walk out and go to lunch. They say, "You can't stop me". And there is no one available to do discipline since the admins are on lunch duty. Today, I had to kick a kid out and I called for an escort and eventually two TAs showed up. And I asked were they were going to take her,

> and they said to the they were taking her to the lunch room. Since that is where [assistant principal] is, to sit at the lunch detention table. So study hall is a big time for discipline and no one available to do it, but if it [study hall] was at a different time, they [administrators and counselors] could be doing small group interventions with students during study hall… If it [study hall] was first thing in the morning, that would help with some of the attendance issues with first period, kids could use that time to study for quizzes later that day. If it was at the end of the day, then kids could do homework and wrap up for the end of the day.

Here, the SLT members reject the daily, 25 minute, study hall proposal by drawing on their personal knowledge that having students move between classes and then delivering extra supports requires at least 30 minutes. This knowledge helped them to determine that this response proposal did not meet their goal. Then Teacher Representative #1 proposed an entirely new response, that the twice-weekly study hall could be moved to a different time during the day. Teacher Representative #2 then probes for how this response would match with the problem of alleviating poor student behavior. Teacher Representative #1 responds by again drawing on his/her personal knowledge to introduce another dimension of the problem, that the timing of study hall during lunch might be exacerbating some poor behavior, and explaining how the proposed response—moving the time of study hall—would match both of these problems and another goal held by a minority of the SLT members—minimize first period late arrivals. In this final segment the SLT members suggest small, time changes to the proposed response, based on their personal knowledge of student behavior, to help craft a proposal that would address the problem and two main goals,

TEACHER REPRESENTATIVE #2: So I think that there would be more discipline problems at the end of the day.

TEACHER REPRESENTATIVE #3: It [the current time of study hall] works for me. They are in the here in the middle of the day, they are awake, they have stuff to do.

TEACHER REPRESENTATIVE #2: It is great to have them prepped, they aren't falling asleep…

….

PARENT REPRESENTATIVE #1: I can see where [Teacher representative #1] is coming from at lunch. There are kids who ask for a pass and then there are so many temptations for them to go somewhere else. I see kids for all three periods of lunch.

…

TEACHER REPRESENTATIVE #2: The two options are to have study hall at either end of the day. In the morning I see problems for the best of our students who will not have work to do, since they will have done it the night before. At the end of the day, it is so crazy anyway. I mean I know my 5th and 6th periods are wild and I hear this from other people too. To have a less structured thing then could create lots more discipline problems. The teachers who are already complaining about it being unstructured might be really unhappy with it at the end of the day…

TEACHER REPRESENTATIVE #2: I would prefer to have it in the morning…. If our kids who don't need the time for interventions or homework can read or can do longer term projects. We are doing this to support our kids who aren't meeting standards. I'd rather have them asleep in study hall, than in math.

….

PARENT REPRESENTATIVE #2: Would it be possible to have it in the middle of the day, but not during lunch? You could have 4th period lunch, and then go to study hall before 5th period. Or have study hall before 4th period.

Here SLT members debate the two proposals (morning versus afternoon study hall), illustrating how they do and do not match the problem of student behavior in study hall, or the goals of providing time for interventions and minimizing lunchtime misbehavior. The parent representative offers another small change to the proposed response—to shift study hall to right before lunch (as opposed to during)—that addresses the problems and meets the goals. The following week the SLT proposed this response to the principal and she responded by searching for additional data to ensure the proposed response's scheduling requirements provide sufficient time for food preparation. The SLT later adopted this response.

This example illustrates how the discussions generally did not follow the collect-analyze-act progression common in DDDM literature, as well as how data played an integral part through out the process. School B's study hall discussion showed decision making patterns that emerged across the 13 decision discussions including, how the SLT members used resource, implementation, and response data that they gathered by mining their personal knowledge to make judgments about whether or not a proposed response would address their problem and

fulfill their goals. This example also illustrates how the SLTs occasionally searched for additional data when they encountered a gap in their knowledge. Finally, this example shows how SLT members tended to consider responses one at a time, or in succession, until they identified a match, as well as how new responses occasionally gave rise to new goals (in this case, improve student behavior during lunch).

To summarize, through their problem identification, goal selection, and response generation sub-decisions the SLT members clarified each component so that they could determine whether or not the proposed response was likely to address the problem at hand and fulfill their goals. If the three elements "matched", the SLT members would adopt the proposed response, essentially making a decision. If the three elements did not match the SLT considered a new response, and sometimes new goals, until they found a match. Unlike the model put forth in DDDM policies and guides, SLT members used data throughout the sub-decisions and matching processes to determine the nature of the problem at hand, to compile responses, and whether or not the proposed response was a match. In the next section I examine how the SLTs' processes influenced the different decision outcomes described in Chapter Five.

Patterns in the SLTs' Sub-Discussions Were Consistent With Patterns in the Decision Outcomes

In the preceding section I described a general model of the three sub-decisions and the SLTs' matching processes. In this section I describe the variations in how the SLTs engaged in these sub-decisions, and how patterns in these variations correspond with patterns in their decision outcomes. To elaborate, the SLTs varied in the extent to which they: were able to

reach consensus about the nature of the problem, were able to reconcile "late arriving" goals, and relied on mined and searched data to develop responses. Table 6 lists the two main decision outcomes and shows how patterns in the SLTs sub-discussions correspond with patterns in their decision outcomes, specifically a lack of problem consensus or an inability to reconcile late arriving goals corresponding with the SLT not making a decision or having a decision overturned, successful matches corresponding with the SLT making a decision, using only mined data to develop response proposals corresponding superficial changes, and using both searched and mined data to develop response proposals corresponding deep changes.

In this section I explain these variations and the outcomes because, as noted in the previous section, DDDM policies, guides, and research tend to focus on how teachers analyze data to identify a problem, and overlook the processes in which they engage when selecting a response for the problem. I argue that part of the reason why examining how school leaders make decisions about responses is important because I found consistencies between the SLTs' sub-discussion patterns and the patterns in the decision outcomes. My dissertation's methods do not allow me to establish a causal link between how the SLTs engaged in the matching sub-processes and their decision outcomes, but the consistency of these findings and the backing of a robust theoretical framework suggest that there may be a connection.

Table 6:
Patterns in Decision Outcomes and Decision Making Processes

	Decision Outcomes		Matching Sub-processes		
	Did the SLT make a decision?	Did the decision call for a deep or superficial change?	PROBLEM: Did the SLT reach consensus about the nature of the problem?	GOAL: Did the SLT reconcile late arriving goals?	INTERVEN-TION: Did the SLT use searched and mined response data?
School A					
What advisory program to adopt	NO		NO	***	YES
How to address staff communication problems	NO		NO	***	***
How to spend a SEA grant	YES	SUPERFICIAL	YES	YES	NO
How to improve the school's antiquated technology	YES	SUPERFICIAL	YES	YES	NO
How to distribute new computers	YES *	SUPERFICIAL	YES	NO	NO
How to improve the school's PLCs	YES *	DEEP	YES	NO	YES
How to support students' test taking skills	YES	DEEP	YES	YES	YES
School B					
How to standardize grading	NO		YES	NO	NO
How to establish a common study hall format	NO		NO	***	***
What PD to provide for next school year	YES	SUPERFICIAL	YES	YES	NO
How to address poor behavior during study hall	YES	SUPERFICIAL	YES	YES	NO
How to implement standards-based grading PD	YES *	DEEP	YES	NO	YES
What advisory program to adopt	YES	DEEP	YES	YES	YES

Note. * = Decisions that the principal later overturned, unilaterally.

*** = No or very little discussion.

Lack of Problem Consensus Corresponded with "NO" Decision Outcomes

For three decision discussions—School A's advisory and staff communication and School B's common study hall format—the SLT members did not reach a common conception of the problem during the entire decision discussion. Instead of converging over time around a problem to address, these problem identification sub-discussions extended throughout the whole discussion, with SLT members continuing to offer new or conflicting conceptions of the problem at hand. The lack of consensus compounded the SLTs' difficulties in identifying potential responses since the SLT members continued to offer responses that were designed to address a wide range of problems instead of focusing on finding a response that matched on specific problem. The three decisions with this pattern in their problem identification sub-discussions were also three of the decisions where the SLT did not make a decision to adopt a response.

For example, at the first SLT meeting of the year, School A's principal passed around a results from the previous year's school satisfaction survey showing lower than the district average performance on several measures related to teachers' feelings regarding the school's professional culture. While passing the results around the principal suggested that the SLT could work on improving these low results. Immediately, one SLT member suggested that the underlying problem was that school's teachers did not buy-into the schools mission or the school's community, "I see how these four things influence [the survey items with especially low marks] the level of buy-in that we have… I think that we could see more growth if we had more chance to build community." Another SLT member responded by suggesting that the

reason teachers were not positive about the school's professional culture was due to a lack of systems to support students,

> "Every conflict I've had [with another teacher] has been around that [the survey item 'We implement a clear plan of action when a student struggles academically']… if I have the perception that we aren't meeting our students' needs, but I know that we both our care for our students, and we don't have as much of a conflict…"

At a subsequent meeting where the SLT again addressed the topic, an SLT member suggested that a lack of skills to handle conflict professionally was the root of the problem with staff communication,

> "We are going to have to teach each other how to speak to each other…" communication is such a huge thing here. I've had a number of interactions with teachers where they have yelled at me in front of students. Why do we have a building like that? Why do I hear about people complaining, and no one will talk with each one on one?"

Another SLT suggested that the problem might encompass several challenges:

> "It was notable that the percentage of staff that-- there were some low marks [referring to the staff satisfaction survey] in relation to how decisions are made and how we communicate. And it seemed to deal with info sharing, buy-in and being respected as a professional."

And, at the last meeting of the year, when staff communication was discussed again, a SLT member who had yet to offer her opinion on the topic suggested that the communication challenges stemmed from a lack of venue for staff to bring up concerns,

> "There is to me, there needs to be a time when we have meetings for people to talk about what is bothering them. Instead people keep it to themselves, or they only tell certain people. They don't say it out in the [staff] meetings…"

These examples all illustrate how the SLT members continued to offer competing explanations of the problem, and could not reach agreement about the nature of the school's communications problems over the course of the whole school year. As a result of this lack of consensus seen in this example, SLT members did not have a common problem to address and therefore tended to suggest response proposals that addressed a correspondingly wide range of problems. Over the course of the year, SLT members suggested the following responses: team building exercises to build a shared sense of mission, hire an external consultant to help staff learn to be professional, develop new meeting norms to allow staff to air complaints, make sure that all staff know how to use their email systems so that they can keep up to date, and fire staff who do not believe in the schools' mission. During these three decision discussions, the SLTs did not have difficulty identifying a response, but rather they could not match a response since they had not agreed upon a problem.

An Inability to Reconcile Late Arriving Goals Corresponded with "NO" or Overturned Decision Outcomes

For almost all decision discussions, new goals emerged relatively late, either when the SLT had established a response to which it was trying to match problems and goals, or even after the SLT had decided to adopt a response. Most of these goals matched the proposed response and problem, and provided further justification for adopting the proposed response. But for four decision discussions—School A's new computers and PLCs, and School B's

standardize grading and standards-based grading—the new, late-arriving, goals precluded existing goals held by several SLT members and were not a match to the response. For each of these decision discussions, the SLT could not resolve the new goals with their existing goals and response.

Besides sharing a similar goal selection sub-process, these decision discussions also overlapped in their decision outcomes. School B's standardized grading discussion ended with the SLT not making a decision to adopt a response, and for School A's new computers and PLCs and School B's standards-based grading decision discussions, ended with the principal overturning the SLTs decision to adopt a response.

To illustrate, during School A's decision discussion regarding how to distribute new computers, a member of the SLT proposed a response to identify the classrooms without functional computers and distribute the new computers accordingly, and other SLT members agreed that this would match their goal of getting new computers into the classrooms with the greatest technological need. However, during a subsequent meeting the principal stated that her goal would be to do a quick and "clean install", implying a response where the new computers would be distributed to a few classrooms all of which were located in the same part of the building. The SLT remained divided among the two goals and corresponding responses.

This example highlights how the new, late arriving goals did not match the already decided response, but also how the new goals often precluded the existing goals. Here, a response could not satisfy both goals of distributing the computers to the classrooms with the greatest need and distributing the computers quickly, easily, and closely. This decision discussion ended with the principal asking the school's technology administrator the OK to

distribute the computers "cleanly", essentially overturning the SLT's decision to distribute the computers based on need.

Similarly, School B's SLT was not able to integrate late arriving goals during its decision discussion on how to standardize grading. The SLT had reached consensus around a goal to adopt a grading intervention that ensured departments gave grades in a consistent matter and that all grades were "equitable", which this SLT operationalized as not penalizing students who do not have as much parent support to help them in getting their homework done on time. Further the SLT wanted to adopt a response that the school's faculty would be willing to implement. As part of the SLT's debate about whether or not a proposed response met these goals, the SLT members decided to survey the school's faculty to gauge their willingness to implement the proposed response. After reviewing the survey results, the SLT realized that a significant proportion of the school's faculty was only willing to implement a grading system that matched other schools', parents, and colleges' expectations that late assignments receive reduced grades. As a result of this, the SLT could not reconcile the goal of finding a response that the faculty was willing to implement and that fit their definition of "equitable". Ultimately this decision discussion ended with the SLT not adopting a response.

Successful Matches Corresponded with "YES" Decision Outcomes

For the remaining six decision discussions, the SLTs were able to successfully match a response to the problem and goal(s). For some of these, all SLT members were able to identify and agree upon the problem at hand and their goals for addressing the problem. School B's decision discussion regarding how to address poor student behavior during study hall, excerpted above in the matching section, provides an example of how the SLT members cycled

through multiple response proposals before finding one that fit the problem and goals held by the SLT members.

In some cases, there was not agreement among SLT members regarding goals, but in contrast to the "NO" decision discussions above, the different goals were not opposing and did not preclude each other. School A's discussion of how to support students' test taking skills illustrates how SLT members were still able to find a match when they held different goals. When discussing how teachers in non-tested subjects should spend their time while the PLCs were on hiatus, half of the SLT members in School A subscribed to a goal that the whole staff should band together to support student learning. They thought that non-tested teachers should collaborate with teachers in tested subjects so that they could support the test taking skills that teachers in tested subjects were trying to build in their students. The other half of the SLT members subscribed to a goal to get the teachers in tested subjects the maximum amount of time possible to collaborate and plan for the upcoming state test. These SLT members worried that having non-tested teachers collaborate would distract tested teachers, and instead non-tested teachers should work within their own content area "on their own craft." Eventually, the SLT agreed on a response where the non-tested teachers worked together to develop lessons to teach broad test taking strategies to students during their non-tested subject classes.

This example illustrates how the SLTs were able to identify a response that they determined would address the problem at hand and fulfill their identified goals. For each of the six decision discussions that fit this pattern, the discussions also had a "YES" decision outcome.

Developing Responses Using Only Mined Data Corresponded with Decisions That Called for a Superficial Change

For five decision discussions—School A's SEA grant, antiquated technology, and distributing new computers, and School B's next school year's PD and poor study hall behavior—the SLT members only used response data they mined from their personal knowledge. For example, when School A's SLT was discussing how to update their antiquated technology, the SLT members mined their knowledge for ways to get new computers into the school including, submitting grants to the state's teachers union, writing a letter to the school board alerting them to the school's difficulties, and inviting school board members to see the school's technology for themselves. Each of these responses had been previously used by, and successful for, at least one of the SLT members. In the end the SLT decided on writing a letter to the board explaining the state of technology at the school and inviting school board members to visit their school. The outcome for this decision qualified as a superficial change because it did not call for a change in the school's educational program.

Another example from School B illustrates how SLTs crafted responses using only mined data. During their discussion of what professional development to provide to staff during the next school year, SLT members made two main suggestions that drew on mined response data. First, several SLT members suggested that, based on earlier attempts at the school to implement new programs, the professional development for the next school year should be devoted to supporting staff in implementing their new advisory program. Upon hearing this proposal, other SLT members proposed that the professional development should address the school's declining test scores and focus on providing teachers with ways to build students'

literacy skills. Both proposed responses would have continued the school's current model of delivering monthly professional development as part of their professional learning communities. Ultimately, the SLT decided that the professional development should focus on an instructional topic, literacy, because it matched with a goal held by all SLT members that the professional development should also provide instructional clock hours. Ultimately this response called for a superficial change to the schools educational program since the professional development program required very small changes (professional development subject).

Developing Responses Using Both Searched and Mined Data Corresponded with Decisions That Called for a Deep Change

For four decision discussions—School A's improving PLCs and supporting students' test taking skills, and School B's standards-based grading PD and advisory program—the SLT members used response data they gathered both by mining their personal knowledge and through search activities[10]. In these decision discussions, SLT members typically started by searching outside their meeting contexts to identify data on new programs or strategies to address the problem at hand. With these data in hand, the SLT members then mined response data from their own knowledge to further develop their response proposals. For example during School B's discussions about what advisory program to adopt, the SLT members started by searching online resources and surveying colleagues for data on different advisory curricula

[10] School A's advisory decision discussion did not include a commit decision, and therefore I did not code it for a type of change. During their discussion the SLT developed a response that would have called for a deep change, keeping with this pattern where a combination of response data gathered from search and mining lead to a deep change.

(e.g. lesson content, student-led conference plans, technology requirements). Once they identified a curriculum, the SLT members mined from their own knowledge ways to organize students and staff (e.g. looping students with teachers over multiple years, having non-instructional staff lead advisory groups, scheduling) as well as professional development for staff to lead advisories. From the searched and mined data the SLT compiled a full advisory program proposal that included an advisory curriculum, student-led conference schedule, student-instructor groupings, a new course schedule, and monthly PD for instructors. This response represents a deep change to the school's educational program because it created two new structures at the school, the monthly advisory course and the student-led conferences, that were designed to shift the goals of instruction from academics to helping students develop ownership over their own learning.

School A's decision discussion of how to support students' test taking skills also illustrates how the SLT used both searched and mined response data to "build" a complete response proposal. Before the SLT's main meeting to discuss ways to support students' test taking skills, School A's principal talked with a principal at another school on how they organized their teaching staff to plan and share student testing supports. This principal shared that their teachers meet weekly and work within their own subject areas to develop specific instructional approaches to support student test taking. When the principal at School A presented these response data to the SLT, some SLT members expressed dissatisfaction with aspects of the proposal. While they agreed that staff should meet weekly to plan and share ideas on how to support students, they mined their knowledge of teachers worked across subject areas for an alternative strategy for organizing teachers. These SLT members proposed

a response where teachers in non-tested subjects worked with—and in support of—teachers in tested subjects. In the end the SLT decided to adopt a response that was a hybrid of the two proposed responses. This example from School A demonstrates how the SLT staff used response data gathered via search and mining in the course of their decision discussion, and how the resulting response benefited from the two data sources. The adopted response called for a deep change because it created a new forum for teachers to work together in new ways by collaborating across departments to support the all students' performance on the state achievement test.

To summarize, in this section I described how the SLTs' matching sub-decisions varied, and how the patterns in the sub-decisions corresponded with patterns in the decision outcomes described in Chapter Five. I argue that the SLTs' lack of problem consensus or an inability to reconcile late arriving goals corresponded with the SLTs not making a decision or an overturned decision outcome. Matches that were successful corresponded with the SLTs making a decision to adopt a response. For the decision discussions where the SLT made a decision to adopt, developing a response using only mining data corresponded with responses that called for superficial changes, while developing responses using both searched and mined data corresponded with responses that called for deep changes. I argue that while the relationships between these patterns does not indicate causality, it does suggest a relationship between decision processes and outcomes that is worthy of additional research.

Chapter Summary

In this chapter I addressed the research question: To what extent do the decision outcomes vary according to the school leaders' decision making processes? I started the

chapter by describing the matching process and I argue that these SLTs' decision making was essentially a matching process where the SLT members used multiple forms of data to make three sub-decisions: problem identification, goal selection, and response generation. When matching, the SLT members used data to determine whether or not the response was likely to address the problem at hand and fulfill their goal(s). Furthermore, I find that the patterns in the school leaders' matching processes—whether or not the SLT members were able to agree on the nature of the problem, reconcile "late arriving" goals, and draw on both search and mined response data –correspond with the patterns in outcomes.

As one of the first observation-based studies of how school staff identify and select responses to address their problems, the findings in this chapter highlight the complexity of school-level instructional improvement decision making. In many ways they contradict the models of DDDM often portrayed in policies and guides, models where DDDM is primarily an exercise in data analysis to identify problems. Similarly, most DDDM studies have focused on how school personnel analyze data to identify problems (See for example, Anderson et al., 2010; Englert et al., 2004; Means et al., 2009; Marsh, et al., 2006). In this chapter I focus on the whole decision making process, including how school leaders identify problems, but also how they determine their goals, and select responses. These findings suggest that school-level DDDM involves several integrated and overlapping sub-discussions, only part of which (problem identification) is typically addressed in DDDM policies, guides, or existing research. Furthermore, my findings on the correspondence between the patterns in these sub-discussions and the patterns in the decision outcomes suggest a relationship between the two—one that warrants further examination to more fully understand the implementation and outcomes of DDDM

policies. In the next chapter I continue to examine the decision making process and its outcomes by looking at how the SLTs' context influenced how the SLT members gathered data and their matching processes.

Chapter 8: Context Influenced the SLTs' Data Use and Matching Processes

The previous two chapters examined, respectively, the patterns in SLT members' data use and matching processes and their relation to the decision outcomes. In this chapter I examine my third research question: To what extent do decision outcomes vary according to school context? My conceptual framework called my attention to how various factors in the schools' context could influence the SLT members' data use and matching processes. Here I discuss the main elements of the two schools' district and school context, as well as factors related to the individual SLT members, that influenced SLT members' data use and matching processes. I argue that the general lack of support for school-level DDDM from the district magnified the influence that the school-level factors had on the SLTs' data use. I examine how the schools' existing systems facilitated either internal or external search. I then describe how two individual-level factors—the SLT members' values and personal knowledge—influenced the types of goals they pursued during decision making.

As noted earlier, I cannot establish a causal link between these factors and the SLTs' decision making, but the consistency of my findings and theoretical basis support my claims that the factors and decision processes are related. Nonetheless these findings suggest several avenues through which policy makers, district central office administrators, and school leaders may be able to exert influence the ways in which school leaders use data in their school-level instructional improvement decision making.

To derive the findings in this chapter I started by coding all of the data for each decision discussion into very broad codes for each level of context that my conceptual framework

suggested would influence data use and matching in the two SLTs: individual, school, and environment. I then examined the data in each of these codes for patterns of specific factors, such as "personal knowledge", "tenure", "time", "routines", "data supply", "policy" and "philanthropy". I then created matrices to track, where appropriate, these factors by school and individual SLT member. These matrices allowed me to look for patterns in how these factors influenced SLT members data use and/or decision making processes.

A Lack of Models and Data Influenced SLTs' Data Use and Matching Processes

The district context within which the SLTs operated included numerous factors that could have influenced the SLT members' data-use and matching processes. I argue that what was most influential was actually what the district context was missing, in particular a lack of supports for school-level instructional improvement decision making in the policies, and a lack of accessible and ready-to-use data pertinent to school-level decision making. As a result, the school leaders in both of these schools had to spend their own resources, typically in the form of time, to determine how to work together to make school-level instructional improvement decisions and to gather additional data and knowledge.

To elaborate, the district had two main policies that encouraged the school leaders to use data in their school-level instructional improvement decisions, but these policies were typically minimal, meaning that they consisted of mandates for school leaders to use data in their decision making but did not include guidance on what types of data school leaders should use or how to use them. Further, district policies sometimes worked against each other in ways that limited the school leaders' ability to use data in their school-level instructional improvement decision making. To illustrate, the district's SLT policy mandated that the SLTs

develop an annual school improvement plan for their school. A second district policy, the policy mandating school leaders use data in creating their annual school improvement plan, required that the annual plan be submitted within the first month of school. Neither SLT in this study was "up and running" prior to this deadline—School A's SLT had not even met. As a result neither SLT addressed their schools' annual improvement plan—let alone used data in the process.

The district's DDDM policies also did not provide models or professional development on how to use data when making school-level instructional improvement decisions. The district's guidances for the SLTs encouraged school leaders to differentiate responsibility for the school's operations between the administration, school leadership team, and whole staff or faculty, but did not suggest processes that the SLTs could use for making decisions as a group of school leaders.

The lack of available and accessible data pertinent to school-level instructional improvement decision making was a third factor in the district context that influenced these two SLTs school-level DDDM. While the district provided the SLTs with some accessible and usable outcome data in the form of annual student tests scores and implementation data in the form of the district-administered annual satisfaction survey, these data were too general to be useful to the SLTs decision making. For example, the annual satisfaction survey data included teacher responses to 22 questions about their school's leadership, professional culture, and instructional supports. While the questions had the potential to highlight problem areas, the results were difficult to interpret because they were aggregated to the school-level, reduced to the percent of positive responses, and the results of individual items often contradicted one

another. As a result it served only to prompt more questions (see for example, School A's staff communication decision discussion described in Chapter Seven).

Aside from this survey and student outcome data very little of the resource, implementation, and response data that the SLTs used in their decision making had been systematically collected and made available to SLT members. As a result, the two SLTs encountered frequent gaps in the data (as described in Chapter Six) and both SLTs had to expend significant resources, typically in the form of time, to gather nearly all of the data they used during their decision discussions.

This overall lack of models, support, and data for school-level DDDM in the district, meant that the SLTs largely engaged in school-level instructional improvement decision making on the fly. They had to negotiate with each other to establish decision making processes, as well as rely on the diligence of their SLT members to gather the additional data necessary for their decision making. In the next section, I describe how the school's existing systems helped and hindered SLT members as they attempted to gather these additional data.

Existing School Systems Facilitated Different Data Gathering Activities

Because outcome, resource, implementation, and response data sources were not readily available in this district, SLT members needed to gather data as described in Chapter Six. Both schools used their available resources to establish and maintain systems that facilitated certain forms of data search over others. So while both schools' SLTs engaged in search, School A's SLT members more frequently searched outside of their school for response data because their school used its extra resources to fund flexible staff and administrative positions who could spend part of their time investigating external resources for response data. School B's SLT

members more frequently searched inside their school for resource and implementation data because their school used their extra resources to hold frequent staff and department meetings that facilitated not only the communication of information from the administration to the staff and faculty, but for SLT members to survey staff for resource and implementation data. Both schools lacked systems to generate the forms of outcome data they needed for school-level decision making.

To elaborate, School A's SLT had two members whose time was not completely occupied with teaching or other school duties, one teacher with a partial teaching load and a part-time administrator who took on special projects for the school. The school used its philanthropic grant funds to fund their positions, and in turn, these SLT members used at least some of their extra time to search for response data on behalf of the whole SLT. For example, the teacher with a partial teaching load, searched for models of PLCs that would help to increase the amount of staff unity at the school. The part-time administrator who developed the school's first, and failed, advisory program, engaged in repeated searches when revising the program on behalf of the SLT. These two SLT members spent a significant amount of time engaged in these searches. For example, during an interview, the part-time administrator reported taking over 40 hours to research potential advisory programs on behalf of the SLT.

School B's SLT members all had full teaching loads with little time to devote to searches for response data. However this school had a significant resource in the form of its long established tradition of weekly grade-level and department meetings that facilitated the SLTs internal searches for resource and implementation data. These meetings were well attended and an update from the SLT representative was part of the meeting's standing itinerary. This

update allowed SLT members to frequently and easily survey staff for resources (e.g. skills, willingness, available classroom resources) and implementation data (e.g. current operations, implementation of existing programs, current practices).

The systems in these schools also influenced the extent to which the SLTs used different forms of mined data. School A's SLT members relied more on mined resource and implementation data, partially because grade-level meetings were cancelled or not well attended at their school and that SLT members did not have a standing spot on the agenda. Gathering resource and implementation data from their colleagues was relatively more difficult. Similarly, School B's SLT members relied more on mined response data, at least in part because the SLT members time was occupied with frequent, and lengthy, grade level and department meetings—School B's after-school meetings tended to be longer, sometimes as much as twice as long, as the School A's before-school meetings (see Chapter Five for further discussion). Again, both schools' SLTs used both search and mining to gather resource, implementation, and response data, but the school systems facilitated some data gathering approaches over others.

In contrast, both schools had access to school-level and student-level outcome data, but lacked systems to collect, compile, and/or analyze program-level or program evaluation data. SLT members in both school expressed their desire for systems to disaggregate student test scores according to participation in different programs or academic interventions so that they could better identify which programs were "working" at their schools. In this meeting excerpt, the SLT members from School B discuss whether or not a math intervention program is worth preserving while implementing the new advisory program,

ADMINISTRATOR: In talking about our… [math intervention program], how do we know it is successful? Has the program been assessed? Has there been any kind of data collected?

TEACHER REPRESENTATIVE #1: I think that [the department head] might be able to answer that. It sounds like that our assessments of the program have been based on his observations. So we have anecdotal data…

TEACHER REPRESENTATIVE #2: For one of my 8th grade kids, it has been beneficial for him to be [part of the program].

TEACHER REPRESENTATIVE #3: They [math teachers] go in and look at the MSP and MAP scores for kids participating.

ADMINISTRATOR: I just ask because if it really is successful, it would be good to know and have evidence, since there is more money out there for these kinds of programs. Can we get the… [state achievement test] scores, and then compare 5th and 6th grade?

TEACHER REPRESENTATIVE #3: We can get data back to first grade.

TEACHER REPRESENTATIVE #1: But the [math intervention program] was in

affect only since last year…

ADMINISTRATOR: I didn't mean to [doubt that the program is effective]– it is just nice to have data.

In this example, the SLT members and the administrator acknowledge their need for program evaluation data, but without the school systems to generate it, they fall back on mining their own observations of student outcomes after participating in the academic intervention.

To summarize, these two SLTs had different school-level systems that influenced how they gathered data. School A's flexible staff positions privileged external searches for response data, while School B's well-established meeting and communication channels privileged internal searches for resource and implementation data. Finally, neither school had adequate systems for collecting, compiling, or analyzing outcome data.

SLT Members' Values and Personal Knowledge Influenced Their Goals

As described in Chapter Seven, SLT members' goals played a critical part in matching, and they influenced the responses the SLTs adopted. In examining the individual factors highlighted by my conceptual framework, I noted two patterns in the goals SLT members brought to their decision discussions. First, the SLT members who repeatedly expressed a particular value or core belief, also expressed goals consistent with this identity across decision discussions. That is, these SLT members' goals did not change in response to different decision discussions. Second, personal knowledge gained through first hand experiences also shaped SLT members' goals, but these SLT members' goals varied across decision discussions.

To elaborate, both schools' SLTs had members who repeatedly articulated core values throughout the school year. Further, these SLT members translated these values into goals that they brought to multiple decision discussions. For example, School B's principal talked in several SLT meetings and in interviews about her personal value to support *all* of the students in the school, especially the underperforming students the school had not done as good of a job serving in the past. During the SLT's standards-based grading, the next year's PD, and advisory decision discussions, she talked about goals that matched this value. To illustrate one of this principal's goals that related to her broader value,

> I firmly believe that we should be doing this [standards-based grading program]. I definitely, definitely do. I think it is an equity issue…. And I get worried about kids who don't have [parents who help them do homework]. It's a haves and a haves-not [problem]…

Later, during an interview discussing the SLTs' work on advisory, the principal talked about a similar goal she had brought to this decision discussion,

> But systematically, I think it [the advisory program] is a nice big step. I think in terms of what we're going to be doing for kids. But I also think it's a nice big step in our ability to say, 'We work hard in buildings to serve the needs of kids. And all kids. And in another way besides being their academic teacher.'

Similarly, a teacher on School A's SLT discussed during multiple decision discussions how she valued a strong community among the school's teachers and students, and how she felt that the school environment should be nurtured and supported. For example, during an

interview she talked about how she saw the school's PLCs as an opportunity for the staff to come together as a community in support of the school,

> "At the first staff meeting when I presented this, my goal [for the PLC program], like I remember planning for that and having a good breakfast. I really wanted to get across to the people: 'Let's not think this is bad anymore, let's not leave early, let's not avoid them, let's actually meet together and enjoy it and we get to pick our topics. This is our chance to have some power here and to really do something to benefit you and your job and your environment so that the kids are better and that's what it's supposed to be about.'"

This SLT member articulated similar goals during School A's advisory, staff communication problems, and how to support students' test taking skills decision discussions.

A second pattern I observed was when SLT members talked about their goals they often referred to specific events or experiences that lead them to their goals. These experiences contributed to their personal knowledge and mirrored the goals they brought to the decision discussions. For example, one SLT member at School B suggested on multiple occasions that the poor implementation of other interventions at the school led him to a goal for their advisory intervention to be planned ahead, well organized, high quality, and generally well implemented. The following excerpt from an interview illustrates his experiences and how they lead to his goals of advisory,

> "And I think it's really important that the lessons be well planned and well implemented. We've just had so many years of activities like this being, "Here's the PDF file… Here's copies in your mailbox" and you didn't get them until 7:30 am, the day before you have

> to do it. Or here's a PowerPoint lesson and all it is, is a cartoon to kids. You show them this political cartoon and then there's a reflection question and it's like, "This is a fifty minute lesson?" I guess I could imply that we're intended to discuss this reflection question. So I think that's really important because in order for staff to be that involved with kids—consistently across the board, I mean there are plenty of staff who will—but in order for almost everyone to do it I think it really needs to be well implemented from the start…. I'm hoping we can start the year off really positively with this and … not … hide in the corner the day before and wait for this terrible lesson in our inbox and at the last second scramble to make it not be too bad.

In this quote the SLT member recalls earlier experiences with interventions that were poorly planned and low quality to derive his goal for the advisory intervention to be well implemented.

Similarly, another member of School B's SLT recalled attending professional development sessions prior to this study that influenced his goals for both the standards-based grading and advisory decision discussions. The professional development sessions focused on multiple strategies to help students become stewards of their own learning, including developing lessons, learning targets, assessments, and grades. These sessions led this member to a goal for both advisory and standards-based grading decision discussions that these interventions should help students shift from caring about their grades, to instead focus on their own learning. Here he describes the professional development provider's position, "And they have this whole sort of vision … and part of it is around getting kids' families, teachers, everybody into this vision of looking at learning targets and learning rather than grades. They see the focus on grades on several levels of being maybe not the most effective way to

structure learning." The SLT member goes on to describe how he hoped to realize this vision through the school's standards-based grading intervention,

> "The thing is to get people motivated, get everyone motivated by learning rather than grades. It's not a pipe dream, it's not pie in the sky, but we're not there yet either… There's this big picture, we want to change the motivation schema but we're not there yet."

Similarly, this member later described how this same goal carried over to his thoughts on the school's advisory intervention,

> "I'm excited about the idea of advisories because the kids are going to be keeping portfolios, they are going to be communicating with their families about their learning, all these things that we've been getting little bits of, this paradigm shift from a letter grade to tracking your learning, I think the ideas of kids having a structured conference with their parents showing them. If we do a good job setting that up it really can pull this whole thing full circle where parents can see, "Oh! Here's the learning target, this is what they did to show this learning target. Oh, they're not talking about why I got an 'A,' they're talking about how they showed the learning target." It has the kids more reflective about what they're learning rather than the grades they're getting."

In another example of how an experience influenced an SLT members' goal, here the principal of School A discussed, in response to an interview question as to why her goal for the school's PLCs changed after talking with mentors, visiting another school with a different PLC model, and her own experiences with PLCs at the school,

> "I think A) talking with mentors, and B) seeing the work that's happening, the intentional work that's happening at other schools and then just thinking about our next steps for our building and how we're going to get there. Really, I think, that has changed the thought process. So it's been a couple years that we've been kind of doing this other [PLC] model of kind of letting people self select and doing that. But I think it's time to do something different."

Here, not only did the experiences lead to this principals' new goal of using the PLC time to directly support classroom instruction, but they actually caused her to actually change her goal.

To summarize, the SLT members brought goals to the decision discussions that mirrored their individual-level factors of personal values and knowledge gained through experiences. Personal values that contributed to goals tended to be consistent across decision discussions, whereas goals stemming from personal knowledge and experience varied across decision discussions. Both of these patterns substantiate and reinforce ideas found in organizational decision making theory, however the frequency with which these SLT members' recalled experiences as consequential to their goals, suggests a stronger pattern here than in the theory. The patterns also reinforce and extend existing DDDM research that suggests teachers' experiences are important to how they analyze data; here SLT members' experiences seem to influence the goals and ultimately the responses they favored.

Chapter Summary

In this chapter I addressed the research question "To what extent do decision outcomes vary according to school context?" I identified district-, school-, and individual-level factors that appeared to influence the SLT's school-level instructional improvement decision making. At the

environment-level, the lack of data and decision making models meant that in order to use data when making school-level instructional improvement decisions, the SLTs had to expend their own resources to figure out how to make decisions as a group, as well as to gather the necessary data for school-level instructional improvement. At the school-level, the way that each school used their resources to establish systems predisposed the SLT members to searching either outside or within their school for additional data. Similarly, both schools lacked systems to gather a specific form of outcome data for which SLT members in both schools expressed a need: program-level or program evaluation data. At the individual level, each SLT members' personal values, knowledge and experiences influenced the goals they brought to their meetings.

These findings reinforce and extend existing research on DDDM in two main ways. First, these findings demonstrate the ways in which the absence or presence of resources can influence the data school leaders use when making school-level decisions. Existing research on DDDM suggests that teachers often lack the resources necessary to implement DDDM in their classrooms—in particular non-test score data and data analysis expertise. However few studies have gone beyond cataloguing these resource shortcomings to demonstrate the real influences they have on the decision making processes—in the present case compelling decision makers to improvise their processes and gather their own data.

Second, the findings on how decision makers' values and personal knowledge influence the goals they bring to decision making extends existing DDDM research that highlights the ways in which personal experiences influence the ways in which teachers analyze data. Here,

school leaders' values and personal knowledge actually shape the decision making processes by influencing the goals they employ when selecting responses.

Perhaps more importantly than the research implications, these findings suggest ways in which policy makers, DDDM advocates, district central office administrators, and school leaders can support the use of data in school-level instructional improvement decision making. In the next chapter I discuss these and other implications from this dissertation.

Chapter 9: Summary and Implications

Increasingly, educational policies include mandates that school leaders use data to "drive" their school-level decisions about instructional improvement (DQC, 2011; Marsh, 2012). These policies and guides tend to suggest that school leaders, teachers, and other staff should carefully examine student outcome data, typically student test scores, to identify unmet student needs, obstacles, or other problems in order to improve teaching and learning (Bambrick-Santoyo, 2010; Institute for Education Sciences, 2009; Loeb, 2012; Marsh, 2012).

Extant research suggests that school leaders are trying to use data in their school-level instructional improvement decisions but also that decision making at the school-level is a challenging, multistage process that often may not end in a decision. Existing research provides little guidance to policymakers about the types of data school leaders use and how they use them when making school-level decisions. Developing a better understanding of school-level DDDM is timely and important because these decisions are relatively high-stakes in terms of impact and resources to implement, and because districts are increasingly devoting substantial resources to developing data warehouses and dashboards designed specifically to support school leaders' and teachers' data use (Marsh, 2012).

My study begins to address these gaps in knowledge by examining the full breadth of data school leaders use, as well as how they use them, in two schools operating under at least two district policies that encouraged school-level DDDM. Aside from focusing on school-level decisions, my study departs from extant DDDM research in that I employ a decision making framework as my lens, as opposed to the much more commonly used lenses that focus on how

individuals process information or implement reform policies. This lens helped me to focus on the whole decision making process including problem identification, data gathering and analysis, response selection and decision outcomes. A third way my study departs from extant research is through my heavy reliance on non-participant observation for my data collection. Because definitions of what counts as data vary significantly and decision makers may not realize all of the processes that go into their decision making, I chose to invest heavily in observational data collection to avoid these potential downsides. In this final chapter, I summarize my findings and discuss the implications of these findings for research and practice.

Summary of Findings

My study has three overarching findings. First, I found school leaders used a broad array of data, including personal knowledge, when implementing DDDM at the school-level. To elaborate, I found that in these two schools the school leaders—the principals, teacher leaders, parents, and other school staff who were members of their schools' SLT—used four main types of data, including student test scores and other forms of outcome data, data on their schools' resources, data on the implementation of current programs and school operations, and data on potential strategies, programs, interventions, and other responses to their problems. Because these data, especially the types they used most frequently (response, implementation and resource data), were not readily available in their school or district context, the SLT members had to expend time and resources to gather the data they needed to make decisions. To do so, the SLT members relied on their schools' existing systems to facilitate the collection of data on potential responses from sources outside of their school. They also relied on their schools' systems to survey their colleagues about their practices implementing current programs, their

ideas for potential interventions or programs to adopt, or their level of buy-in or skills to support new program implementation. SLT members also gathered additional data by mining their personal knowledge to use as data, and at times, engaged in forms of triangulation to check the extent to which their personal knowledge represented broader patterns in the school.

My second overarching finding was that not only did the school leaders collect and use a broad array of data, but these data were essential to the entire decision making process. In these two schools, school-level decision making involved at least three sub-decisions: one to identify the problem, one to select goals, and one to generate a response. The SLT members used data in each of these sub-decisions, as well as when making predictions about whether or not the proposed response was a match to their problem and goals. During the matching phase, the SLT members relied most heavily on data mined from their personal knowledge—typically out of convenience.

Third, I found that the patterns of how SLT members engaged in the process of matching responses to problems and goals correlated with the patterns in their decision outcomes. This finding, combined with my data tracking the full decision process and being substantiated by theory, suggests an underlying relationship between the SLTs' decision making processes and the decision outcomes. When the SLT members could not agree on the problem or reconcile late arriving goals, these discussions stalled and the SLT did not make a decision to adopt a response. For the decisions where the SLT members successfully matched a response crafted only from mined data, the adopted response called for a superficial change to the school's educational program. For the decisions where the SLT members used both searched and mined data to generate a response proposal, these discussions called for a deep change. I

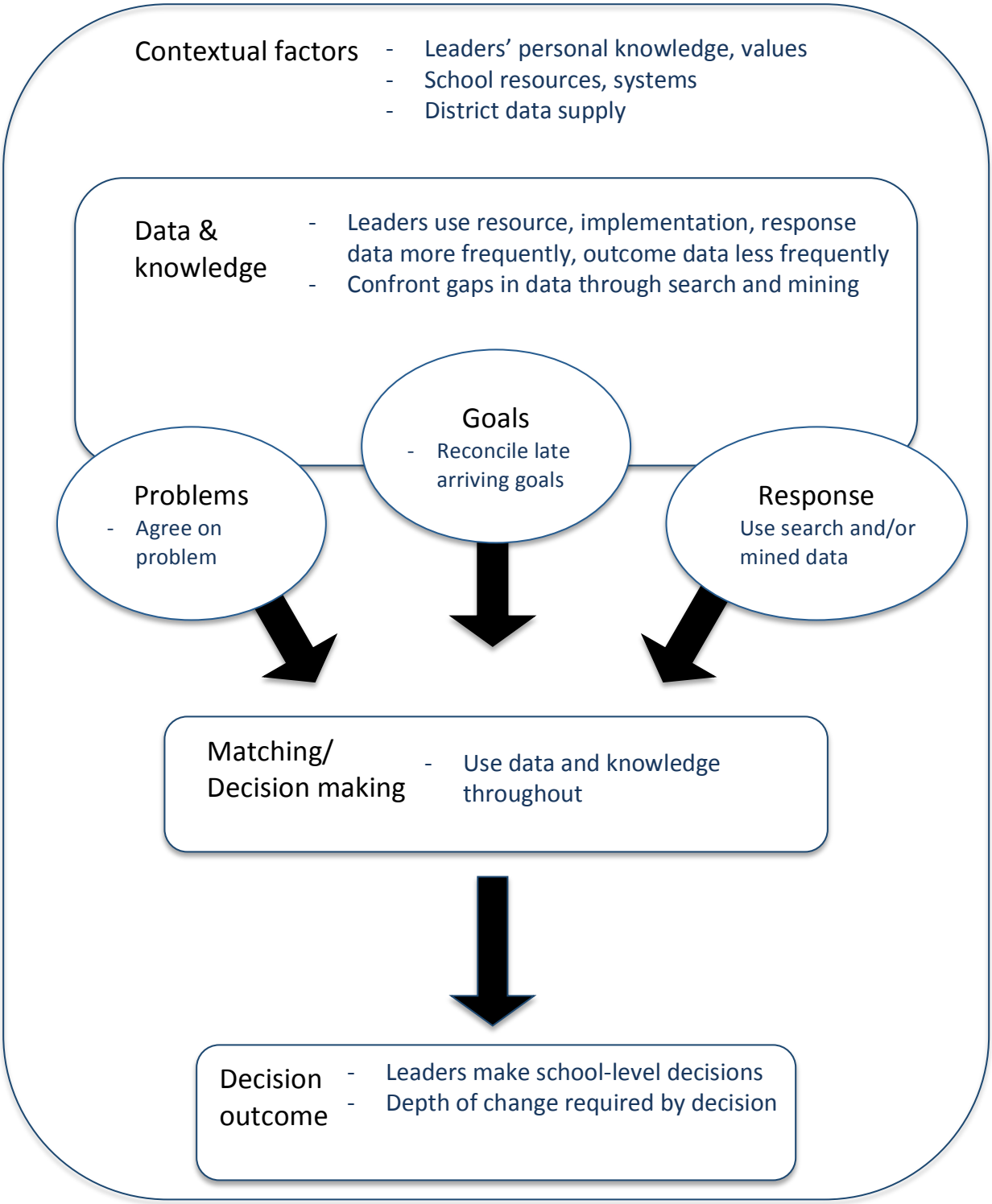
did not find that the patterns in the SLTs' data use across decision discussions correlated with the patterns in decision outcomes.

Conceptually, these findings reinforce and extend research on organizational decision making under conditions of uncertainty and ambiguity. Figure 2 arrays the findings according to my conceptual framework. This study not only illustrates how leaders use data and knowledge throughout the decision making process, but it also demonstrates how the leaders relied on different types of data and knowledge at different points in the process. This study shows how leaders use search and mining tactics to confront the uncertainty and ambiguity created by gaps in the available data and it also extends research by demonstrating how leaders employed tactics to triangulate or pool their personal knowledge as a way to address the ambiguity of their own knowledge.

Secondly, this study also demonstrates that how school leaders make the sub-decisions—how they determine problems, goals, and responses—can influence the decision outcomes of whether or not leaders were able to make a decision or the depth of change for which the decision called. Further this study suggests that, in these two schools, the matching process had less impact on the decision outcomes as compared to the sub-decisions.

Thirdly, these findings demonstrate how elements of the context influenced data use and decision making, Interestingly, several contextual factors predicted by my conceptual framework did not prove to be influential, including leaders' propensity towards risk, tenure of the SLT members with the school, SLT routines, school performance, and the influence from the central office or other organizations.

Figure 2
Conceptual Array of Dissertation Findings



These school leaders engaged in several practices that fly in the face of existing DDDM policy and guides. They used resource, implementation, and response data more frequently than they used outcome data. They addressed problems based on external demands as well as their own analyses of what was happening in their school. They gathered additional data by surveying, or even simply asking, their colleagues about their current practice or for ideas about how they should respond to a problem. When the inevitable gaps in data arose, they responded by using their personal knowledge as data. And, all of these data fueled an improvised decision making process that was, at times, imperfect.

All of these practices might suggest that these school leaders were not implementing DDDM, but I argue that this is what DDDM looks like in practice. Test score data are necessary, but not sufficient, to make school-level instructional improvement decisions. In order to use outcome data the leaders needed to combine it with data on school resources, the implementation of current programs, and potential responses. These school leaders used all of the data they could access, and then some, at multiple points in a complex and overlapping decision making process. Ultimately, the outcomes of these decision making processes are the outcomes of DDDM at the school-level.

This dissertation's findings on the practice of data use in school-level instructional improvement decision making suggests next steps for research, as well as several ways policymakers, advocates of data use, and school and district leaders can support school leaders' use of data in their decision making. I present these in the following sections.

Implications for Research

My study has at least three implications for researchers studying DDDM at the school- and classroom-levels. First, I found that patterns in how the SLTs agreed on problems, reconciled dissenting goals, and used data when proposing responses correlated with whether or not they made a decision and the depth of change for which the decision called. This finding suggests a relationship between school leaders' decision making processes and their decision outcomes. Given the preliminary nature of this finding, a key implication for research is that how school leaders select responses—a process generally overlooked in DDDM research—warrants further study because these decision outcomes are directly related to DDDM policies' ability to improve teacher and learning outcomes.

My conceptual framework proved a useful tool for looking at decision making processes and outcomes because it is a theory of organizational decision making, as opposed to a theory of how individuals process information or how schools implement reforms. Future researchers may find this or other theories of decisionmaking such as sociological institutionalism or bounded rationality to be useful. However, because the latter is an individual theory it may obscure some of the group dynamics I found impacted the outcomes. As such, bounded rationality might be better suited to classroom-level studies where teachers make unilateral instructional decisions.

A second implication for research stems from my finding that the patterns in the types of data the SLTs used and how they gathered data did *not* vary according to patterns in the decision outcomes. My starting hypothesis was that the type of data decision makers used, and the frequency with which they used them, would influence decision outcomes. And while my

analysis did not suggest a reason for a lack of relationship between data and decision outcome, subsequent studies could make different methodological decisions to further investigate this somewhat anomalous finding. For example, my study focused on two schools both with average reputations for DDDM with access to relatively similar data types. Subsequent studies could select schools with access to different forms of data (e.g. student outcome data disaggregated by intervention participation) or different systems for collecting data (e.g. systems to track how teachers implement current interventions) to determine if access to data influences the relationship between data and outcome.

A second possible approach to investigate the relationship between data use and decision outcomes would be to collect more fine-grained observation data to facilitate the creation of more precise measures of data usage. While my observations allowed me to see decision making processes that would have been hidden if I only used interviews, the observational approach I used in this study did not allow me to move beyond estimates of use by data type. Had I employed a note-taking approach that included time stamps or other measures such as audio or video recording I could have compared the amount of time the SLTs spent using each type of data, and ultimately examined whether or not a more sensitive differentiation in time spent using each type of data corresponded to different decision outcomes. Future studies could employ such observational methods.

A third methodological change that could help to further investigate the relationship between data type and gathering with decision outcomes—as well as build knowledge in general about decision outcomes—would be to extend the data collection period and gather data on more distant decision making outcomes. My study focused on the relatively short-term

outcomes of whether or not the SLTs made a decision to adopt, and the depth of change for which the decision called. Subsequent studies could examine outcomes, such as the implementation of adopted interventions or school leader satisfaction with decisions, to determine if patterns in the types of data used or how school leaders gather data correspond to patterns in longer-term outcomes.

Third, my findings on the role that personal knowledge plays throughout the DDDM process suggest that it will continue to be a fruitful topic for research. Extant research on classroom-level DDDM demonstrates how teachers use their personal knowledge as a filter when interpreting, or making sense of, data during analysis phases of DDDM. In the few instances that I observed the school leaders analyze available data, I also observed them use their knowledge as a filter to make sense of data. However, much more frequently I saw the school leaders mine their personal knowledge to use as data when addressing gaps. I also observed personal knowledge play a role throughout the decision making process, not only as data, but also in that it influenced the goals that the leaders brought to the decision making or matching process.

Further research could continue to examine the role that personal knowledge plays in the decision making process by examining the interplay between personal knowledge as filter versus personal knowledge as data. For example, when implementing DDDM in schools with plenty of available data, do school leaders continue to use their knowledge as data?

Implications for Practice

My study also has several implications for policymakers, advocates of data use, district leaders, and school leaders attempting to use data to "drive" their decisions. First, this study

demonstrates what others have suggested (see for example, Coburn & Turner, 2012; Loeb, 2012; Marsh et al., 2006), that test scores are necessary, but not sufficient, to make school-level instructional improvement decisions. The school leaders in this study had access to many forms of student outcome data, including state standardized test scores, benchmark test scores, attendance and discipline rates, and student grades. But in many cases, the leaders already knew these data inside and out, as demonstrated by School A's principal reciting, from memory, the school's achievement gaps during a SLT meeting. So while these school leaders had access to abundant amounts of outcome data, they encountered frequent gaps in the data they needed—resource, implementation, and response data—to be able to more fully understand the problems they faced, to gauge their own and their colleagues' goals, and to develop responses to address these problems and fulfill their goals.

As such, this study suggests that policy makers and advocates of data use should consider amending data use policies to highlight the importance of these other types of data and to illustrate how useful they can be beyond just identifying potential problems to address. Similarly, advocates of data use should consider creating guides and models for how to use additional types of data beyond just identifying potential problems to address. Central office administrators might consider augmenting their data warehouses so that school leaders can also access non-test score data such as data on teachers' practice implementing current programs, directories of teacher and other staff's skills, and catalogues of potential programs, strategies, and interventions.

My study also suggests that adding all the non-test score data school leaders need when making school-level instructional improvement decisions to centralized repositories would not

be possible since their data needs are likely to change depending on the problem, goals, and intervention at play for each decision discussion. As such, policy makers and central office administrators should consider providing resources in the form of time, training, and money to support leaders to gather their own data to use in decision making. School leaders looking to use data in their school-level decisions might also consider developing systems within their schools to support the gathering and storage of resource, implementation, and response data.

This study similarly suggests that, unless the pace and urgency of schooling changes dramatically, the time it takes to gather data might not always be available. Therefore supporting leaders to know how to use their personal knowledge, and developing techniques to help leaders triangulate, or otherwise double check the representativeness of their personal knowledge, could help to alleviate some of the stigma associated with using personal knowledge as part of decision making.

A second set of implications for practice stem from two of this study's findings on the importance of data throughout the decisionmaking process. Similar to the focus on test score data, data analysis is often the focal activity in DDDM policies and guides (Marsh, 2012). But this study demonstrates that not only are data critical to identify problems, but they also facilitate school leaders' judgments about whether or not a proposed response is likely to address their problem and fulfill their goals. Further, I find that the types of data school leaders use when generating responses corresponds with different decision outcomes. Together these findings suggest several ways to support an expanded view of data usage in decision making.

First, policy makers and advocates of data use could consider articulating an expanded definition of "data use" to include the actions above, thereby setting the expectation that data

may be useful for more than just problem identification. Second, central office administrators and school leaders might consider professional development on how to use data beyond analyzing data to identify problems. While the results here are too preliminary to guide professional development, there are existing normative models of how to use data and other evidence when selecting responses for problems that may prove informative (see for example, Courtney, Lovallo, & Clarke, 2013; Watanabe, 2009). Relatedly, because I found that the SLTs' decision processes stalled when they could not agree on problems or late arriving goals, SLTs may want to establish group decision making process and ensure that each member is clear about his or her role in the process.

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