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Designing School Systems to Encourage Data Use and Instructional Improvement: A Comparison of School Districts and Charter Management Organizations

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Abstract

Purpose: As state and federal accountability systems have increased demands for evidence of student achievement, the use of data to inform practice has become more prevalent. More research is needed to understand not only *what* organizational factors shape data-use efforts but also *how* these factors enable or constrain educators' use of data for instructional improvement. This article addresses this gap by examining how two types of education systems—school districts and charter management organizations (CMOs)—use data and allocate their organizational resources to this end. **Methods**: Data were collected from six secondary schools in two districts and two CMOs during the 2010-2011 school year. Over 70 interviews were conducted with teachers and school and system leaders.

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Patterns from within and across school systems are presented. **Findings:** Key contextual differences had a strong influence on data-use efforts: Accountability pressures shaped the patterns in data use, whereas other organizational conditions—structure and decision-making rights, size and growth trajectory, financial resources, and degree of regulation—restricted or facilitated the systems' mobilization of resources for these efforts. **Implications**: This study suggests that the school systems as a whole play a critical role in supporting schools and educators in using data, regardless of whether that system is district or charter. As this article is one of the first to offer a comparative look at data use between school districts and CMOs, it lays the groundwork for diffusion of promising practices across these systems for school and system leaders.

Keywords
data use, data-driven decision making, school district, charter management organization, instructional improvement

In the current policy environment, gathering, analyzing, and responding to data has gained much attention. No Child Left Behind mandates that states report data from end-of-year assessments to schools, parents, and state and federal governments for instructional and accountability purposes (Data Quality Campaign, 2011). The Obama Administration has demonstrated their commitment to data use, tying considerable federal funds to improving states' capacity to generate student-level information (U.S. Department of Education, 2009). The Common Core State Standards Initiative, along with the Smarter Balanced and Partnership for Assessment of Readiness for College and Careers consortia, intend to improve alignment of state standards, assessments, and student data within and across states (Porter, McMaken, Hwang, & Yang, 2011). Efforts to evaluate teacher quality now focus on how to link student achievement results to teacher evaluation and compensation (National Council on Teacher Quality, 2011).

As a result, there is a growing demand on educators to access, understand, and utilize student and school-level data (Mandinach & Jackson, 2012; Marsh, Pane, & Hamilton, 2006; Marsh & Farrell, in press; Piety, 2013). The availability of different types of data continues to grow through increased access to professional development, information systems, and other measurement tools (Goertz, Olah, & Riggan, 2009; Hamilton et al., 2009; Wayman & Stringfield, 2006). Educators at all levels—classroom, school, and district—are expected to use data to inform their practices

specifically and improve the organization more generally (Ikemoto & Marsh, 2007; Marsh, Farrell, & Bertrand, in press).

Despite the recent attention, considerable financial investment, and widespread support for this strategy, the research on data use remains largely advocacy-oriented. As Coburn and Turner explain in their 2011 literature review, "in many ways, the practice of data use is out ahead of research. Policy and interventions to promote data use far outstrip research studying the process, context, and consequences of these efforts." These authors and others claim that more theoretically driven research is needed to develop a conceptualization of data use that relates the factors that enable or constrain data use to one another (Coburn & Turner, 2011, 2012; Marsh, 2012).

One key limitation in much of the prevalent advocacy work is the assumption that school systems are currently organized in such a way as to promote data use, with structures in place to support educators' interpretation of and response to data (Marsh, 2012). However, a number of factors may limit school systems' ability to use data. Prior research on educational reforms suggests that a range of organizational influences regularly shape the work of school systems, including leadership, structure, and presence of external partners, among others (Mangin, 2009; Marsh, 2002; Rorrer, Skrla, & Scheurich, 2008; Spillane, 1998). As such, more research is needed to understand not only *what* contextual factors shape data-use efforts but *how* these factors enable or constrain educators' use of data for instructional improvement. Without it, efforts to promote data use are less likely to have the positive impact intended.

To explore the contextual factors that shape data use, I examined data-use efforts in two types of education systems: school districts and charter management organizations (CMOs). Through interviews and observations, I examined (a) the types of data utilized within the system, (b) the resources mobilized for their data-use efforts, and (c) the contextual factors that influenced these patterns. Findings from this study suggest that on the whole, different accountability demands faced by the two types of systems largely shaped the kinds of data emphasized and how they were used in decision making, whereas key organizational characteristics often explained how system resources were mobilized to these ends. By systematically addressing these conditions in future studies, researchers will have a better representation of how data-use processes play out in school systems, and the framework will enable educators and policymakers to consider the full range of contextual issues that may influence their data-use efforts. Finally, this article is one of the first of its kind to offer a comparative look between school districts and CMOs, laying the groundwork for diffusion of promising practices across these systems for school and system leaders.

Understanding the System's Role in Data-Use Efforts

Within the education policy arenas, much recent discussion focuses on how evidence, broadly defined, can be used to inform decisions in education (Honig & Venkateswaran, 2012; Mandinach & Jackson, 2012). One area of this work is data-driven decision making, defined as "teachers, principals, and administrators systematically collecting and analyzing data to guide a range of decisions to help improve the success of students and school" (Ikemoto & Marsh, 2007, p. 108). Data use may be the "mantra of the day," but it is not a new idea. Outside of education, it can be tied back to theories from the business and management world on continuous improvement in organizations (e.g., Deming, 1986).

The research on data use to date paints a mixed picture about its impact. On one hand, scholars suggest that data use in school systems can be a factor in improvements in school and student achievement (e.g., Snipes, Doolittle, & Herlihy, 2002; Zavadsky, 2009). Research suggests specific types of data use (e.g., using data from formative assessments to improve instruction through reteaching strategies) improve students' learning (Black & Wiliam, 1998). Data use can also be a tool for achieving larger organizational goals (Supovitz & Klein, 2003) and help to create a "culture of inquiry," one which supports open communication of stakeholder groups (Earl & Katz, 2002). On the other hand, there has been minimal causal evidence that data use leads to improvements in student achievement or in turning around low-performing schools (Hamilton et al., 2009; Herman et al., 2008; Huberman et al., 2011). The authors of these systematic reviews noted that the minimal evidence was largely due to the kinds of studies that exist on data use. Most studies are atheoretical, descriptive, or based in advocacy work and how-to guides.[1] Even in the small, but growing, body of "gold standard" research, application and implementation of data-use initiatives have been uneven (e.g., Slavin et al., 2013).

Despite its promise for academic improvement, this mixed evidence around data use might be because of issues with implementation. A lack of time to examine data and engage in data use has been identified as a problem (Ingram, Louis, & Schroeder, 2004), as has limited access to timely, high-quality data (Lachat & Smith, 2005). Educators, although they have access to a wide range of data sources, may not have the knowledge and skills to identify questions, select appropriate metrics, analyze results, and create actionable solutions (Mandinach & Gummer, 2013; Marsh, 2006; Marsh & Farrell, in press). Recognizing these barriers, states, districts, and schools have used a variety of strategies to support data use (Marsh, 2012). These interventions

target the educators and their knowledge and skill sets (e.g., Chrismer & DiBara, 2006); the tools used for accessing and interpreting data, such as accessible databases (e.g., Means, Padilla, & Gallagher, 2010); or organizational routines, policies, and norms (e.g., Anderson, Leithwood, & Strauss, 2010). Taken individually, these solutions intended to redesign the work of educators have met with mixed results or limited sustainability (Marsh, 2012).

There are many compelling reasons to attend to the role of the system in data-use initiatives. Scholars have argued that, for data use to be implemented evenly and with fidelity, a systemic strategy is needed that includes alignment across multiple levels (Coburn & Talbert, 2006; Datnow & Park, 2010; Kerr et al., 2006, Supovitz, 2006; Wayman, Jimerson, & Cho, 2012). For instance, Anderson et al. (2010) found that districts shape data use for school leaders, and school leaders shape data use for their teachers, so misalignment of support across levels can lead to major challenges. Several scholars have noted the importance of organizational context in guiding whether data are used for inquiry and professional learning purposes or toward goals of monitoring, compliance, and accountability (Datnow, Park, & Kennedy-Lewis, 2012; Diamond & Spillane, 2004; Moss & Piety, 2007; Nelson, Slavit, & Deuel, 2012). Existing research also suggests educators at the school level not only need support but also enough decision-making authority to make site-level decisions on the basis of data (Datnow, et al., 2008; Wohlstetter, Datnow, & Park, 2008).

Despite the fact that researchers have identified organizational context as a critical component to effective data use, surprisingly few studies look comparatively or deeply at the impact of differing organizational contexts on data use. To date, scholarship in this area tends to focus on single case studies of school districts (e.g., Supovitz, 2006); an alternative governance model, like the for-profit educational management organization Edison Schools (e.g., Marsh, Hamilton, & Gill, 2008; Sutherland, 2004); or studies that include different types of education systems but do not explicitly examine the impact of key organizational dimensions (e.g., Datnow et al., 2007). Recent attempts at developing a unifying framework for data use have underspecified the role of organizational and environmental factors in the models, largely because of the lack of research in this area (e.g., Coburn & Turner, 2011, 2012). It is this gap that this study aims to answer.

Conceptual Framework

The relationship between organizational context and data use is largely unexplored. Figure 1 presents an integrated framework of data use in school

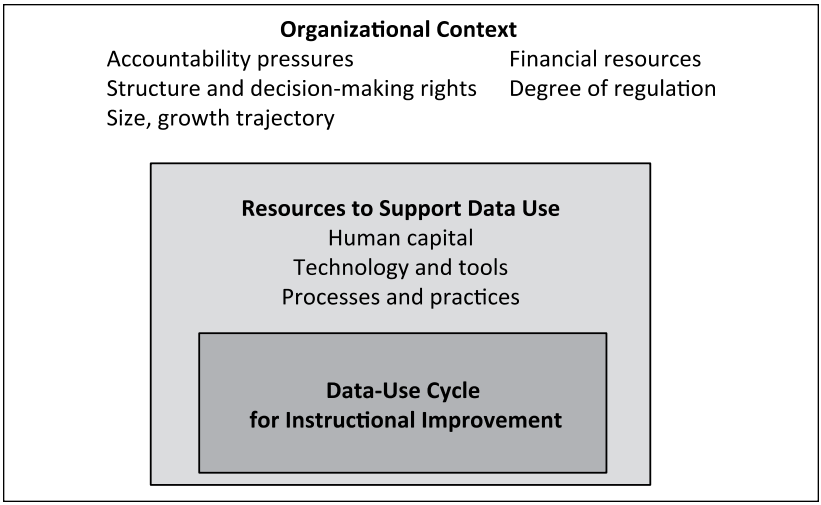


Figure 1. Conceptual framework.

systems from which to begin to examine this relationship, drawing from the general theory of action for data use (Mandinach & Honey, 2008; Mandinach & Jackson, 2012; Marsh, 2012) and knowledge management theory (Bhatt, 2001; Holsapple & Joshi, 2002). Knowledge management theory considers the systematic processes of gathering, organizing, sharing, and analyzing knowledge within and across an organization (Petrides & Guiney, 2002; Petrides & Nodine, 2003).

At the center of this figure is the data-use cycle. Here, data are broadly defined to include metrics from classroom assessments, common grade assessments, teacher observations, interim or benchmark assessments, state tests, and college-ready indicators (e.g., SATs). According to the framework, educators can collect data; interpret them in light of prior knowledge, expertise, and experience; determine how to respond; and evaluate the effectiveness of the response (Ackoff, 1989; Alavi & Leidner, 2001; Bhatt, 2001; Zins, 2007). The model assumes these results, along with new data, can be used to begin a new cycle of feedback. Not all data-use activities will complete the full cycle; for instance, there can be a "knowing-doing" gap where an educator fails to act upon the knowledge derived from data (Pfeffer & Sutton, 2000).

To support this process, the framework suggests that organizations should mobilize their resources to support educators in this process (Marsh, 2012). Core to this goal is the belief that human capital, technology and tools, and organizational practices need to be aligned in order to increase knowledge flow

(Bhatt, 2001; Holsapple & Joshi, 2002; Petrides & Guiney, 2002; Petrides & Nodine, 2003, 2005).

Human capital resources, such as dedicated support positions (e.g., coaches) and professional development, are critical for collaboration, co-construction of new ideas, and joint work. These social interactions help establish social norms around information sharing and provide opportunities for shared sense-making (Lave & Wenger, 1991; Spillane & Miele, 2007; Wenger, 1998). A range of technology and tools are important to help identify, share, and spread knowledge across an organization, such as data management systems or analysis protocols (Silver, 2000; Stenmark, 2001). Finally, formal and informal practices (e.g., scheduled work times) contribute to knowledge development and sharing, as they limit or expand the range of actions that employees consider and bound opportunities for interaction (Blair, 2002; Gersick & Hackman, 1990). Together, these resources are critical to supporting the creation, organization, and analysis of data to actionable knowledge.

Finally, the theory suggests key organizational factors shape knowledge management in organizations. Accountability pressures shape an organization's use of data by emphasizing certain metrics of success over others (Jennings, 2012). Structure is important, as many knowledge management scholars agree that the large, traditional "command-and-control" hierarchy presents major challenges for data use (Nonaka & Takeuchi, 1995; Sallis & Jones, 2002). Although such a structure does support the development of departmental expertise, this type of control and standardization can harm communication, sharing of ideas, and the organization's overall ability to respond quickly to changes based on the data (Nonaka, 1994). Others suggest the importance of sharing decision-making rights through an organization; for instance, Pedler (1991) identified "participative policymaking" as a key characteristic of a learning organization where data are used for improvement. Other scholars point to size as a critical factor. Small firms may have certain advantages, like simpler structures and processes for implementing new programs (Frey, 2001; Lim & Klobas, 2006; McAdam & Reid, 2001). The drawbacks for being small (e.g., a limited pool of financial resources) may hinder efforts, however (Wong & Aspinwall, 2004). Other external factors—government regulations, market competition, and social, political, and community demands—similarly enable or constrain an organization (Holsapple & Joshi, 2000; Keskin, 2005; Walker, 2006).

Consequently, the dynamics of data use and resource allocation cannot be understood without attending to the organizational and environmental setting in which they unfolded. As such, this study answers the following question: How did organizational context shape how school systems use data and mobilize resources for instructional improvement? Next, I present the methods employed and describe findings related to data use within and across school systems.

Research Methods

As exploratory research, this study uses a qualitative comparative case study approach to gain an in-depth perspective on data use in four school systems in the 2011-2012 school year (Ragin & Becker, 1992). Qualitative methods are helpful for studying a limited number of cases in depth, describing complex phenomena situated and embedded in local context (Merriam, 1998; Yin, 2009). Below, I describe the study sample, data collection and analysis, and limitations of this study.

Study Sample

All four school systems were intentionally selected as "information-rich cases" to maximize understanding the role of organizational context on data use (Patton, 2002; Ragin & Becker, 1992). In accordance with Yin (2009), I included two of each type of school system to strengthen the findings. The four school systems were located in one state and served a similar demographic profile. More than 75% of students were Latino, and more than 60% were eligible for free or reduced lunches. The school systems had approximately the same number of secondary schools, although the two school districts were larger in terms of their overall number of students and schools.[2] Sample selection occurred in three phases.

In Phase 1, two school districts were selected as part of a larger, multisite study.[3] The districts and schools were purposefully chosen based on strong reputational factors and evidence of district commitment to data use.

In Phase 2, two CMOs were selected in order to bring organizational elements into relief. Over the past decade, CMOs have joined school districts as a new form for organizing public schools. In contrast to the stand-alone charter school model, these nonprofit organizations create and operate networks of charter schools that share a common mission or instructional design across schools[4] (Farrell, Wohlstetter, & Smith, 2012; Farrell et al., 2013; Wohlstetter et al., 2011; Wohlstetter, Smith, & Farrell, 2013). From the small body of literature available (DeArmond et al., 2012; Farrell et al., 2012, 2014; Furgeson et al., 2012; Lake et al., 2010, 2012), there are early signs that CMOs are organizationally different from school districts along the dimensions outlined in the conceptual framework—accountability pressures, structure and distribution of decision-making rights, size and growth trajectory, available financial resources, and degree of regulation.

CMOs share the same logic as that behind the original charter idea: increased accountability in exchange for increased autonomy through easing of certain regulations (Wohlstetter et al., 2013; Wohlstetter, Wenning, &

Briggs, 1995). Authorizers—public entities charged with charter selection, oversight, and renewal—are the main mechanism for holding charters accountable for their academic, fiscal, and governance performance over the course of their charter (Bulkley & Wohlstetter, 2004; Vergari, 2000). Theoretically, charters face market accountability; as a school of choice, parents elect to send their children to charter schools, and if they are not satisfied with its performance, they can move them elsewhere (Chubb & Moe, 1990).

In terms of structure and decision-making rights, CMOs were designed, at least in theory, as flatter, more collaborative organizations composed of a network of schools (Farrell et al., 2012; Furgeson et al., 2012; Lake et al., 2010). Around the issue of size, CMOs, like school districts, vary by size (Miron et al., 2012). Perhaps more important, though, is the noticeable pace at which some CMOs are growing (Farrell et al., 2013), creating different demands a school district with a relatively steady student and school count may not face. In terms of financial resources, facing a gap between operating costs of their model (e.g., extended day/year; cost of facilities), some charters and CMOs heavily depend on private sources, such as individual donors, foundations, or corporate sponsors, for fiscal support to open and operate (Quinn, Tompkins-Stange, & Meyerson, 2013). Research suggests there can be tensions when funders have motives and interests different from the values and mission of the CMO (Wohlstetter et al., 2011; Lake & Dusseault, 2011; J. Scott, 2009). Finally, CMOs are freed from some of the rules, regulations, and statutes that apply to other public schools; depending on state law, charters are often not unionized, and teachers often do not collectively bargain for their salary and benefit packages (Wohlstetter et al., 2013). Studying both CMOs and school districts allows for a deeper understanding of how organizational context shapes data use and allowed comparison in the areas theory suggest are important. As such, I identified two CMOs that had similar reputations and matched in their state context, student demographics, and grade configurations.

In the final phase, I selected one or two secondary schools to examine in-depth how data use unfolded across levels of each school system. In all cases, district/CMO administrators recommended schools that were exemplary cases of school-level data use (see Table 1). Preliminary interviews were conducted with each school's leader to confirm their eligibility and interest.

Data Collection

Data collection involved a variety of sources of evidence, including in-depth semistructured interviews and focus groups, observational field notes, and document review. I visited each school system at least five times during the

Table 1. Characteristics of Case Study School Systems and Schools, 2010-2011.

School System	District A		District B	CMO C	CMO D	
Number of students	22,000		21,000	10,000	5,000	
Number of secondary schools[a]	10		9	10	12	
Number of total schools	34		28	34	13	
School	Sherman	Whitney	Green	Mariposa	Norris	Roosevelt
Grade levels	7-8	7-8	6-8	9-11	6-8	6-8
Number of students	500	400	800	350	350	300
Free, reduced lunch (%)[b]	90	90	85	90	85	90
English language learners (%)	20	25	25	20	10	15
Race/ethnicity (%)						
African American	1	1	2	0	3	5
Asian/Pacific Islander	3	4	5	0	1	2
Latino/a	95	94	90	99	94	92
White	1	1	2	1	1	1
Percent at or above proficiency, all grades, in English Language Arts	55	50	40	50	55	60

Source. State Department of Education, district, CMO websites.
Note. Numbers have been rounded slightly to provide anonymity for the school systems. The proportions remain the same.
[a]Secondary schools include a range of different grade configurations, including 6-8, 7-8, 9-12, 6-12, or 8-12. For the CMOs, several of their secondary schools are recently opened and are growing (e.g., 6-7, with plans to serve 6-12). [b]Free and reduced lunch (%) is for all schools, not only secondary schools.

2010-2011 school year. I conducted interviews with the district/home office administrators and leaders on one to two site visits, including superintendents, assistant superintendents, and other staff overseeing data initiatives. I collected school-level data (e.g., teacher, principal interviews) during separate visits. For each school system, a leader at the district or home office was the critical informant to help identify and contact other administrators, whereas for the school sites, the principal was the contact for school-level educators (Bogdan & Bilken, 1998). Teachers were selected if they were regularly involved in data-use initiatives at their schools.

Semistructured protocols guided all interviews and focus groups, which generally lasted 45-90 minutes and were recorded and transcribed. Table 2 lists the type and number of participants from each school system; in total, 77 people were interviewed, either one-on-one or within a focus group setting. I also attended school and district/CMO-level meetings and professional development trainings and gathered relevant documents (e.g., organizational charts, data protocols). During data collection, I wrote reflective memoranda

Table 2. Participant List.

	District A	District B	CMO C	CMO D
System leadership	5	4	5	8
School leadership	4	2	3	4
Teachers	10	7	4	5
Other	2	1	0	0
Totals	21	15	12	17

to further thinking about possible relationships, and these ideas formed the basis of a case study record for each school system (Yin, 2009).

Data Analysis

Data analysis occurred concurrently with data collection in a continuous and iterative manner (Miles & Huberman, 1994). I used Atlas.TI, a qualitative methods analysis software package, to organize and code all transcripts, field notes, documents, and case study records. I developed an initial *a priori* coding list to encompass the three domains of the conceptual framework. Codes were revised, expanded, and collapsed into more refined categories.

I approached data analysis in three phases as suggested by the conceptual framework and in the tradition of knowledge management theorists and educational scholars (e.g., Kerr et al., 2006; Lee & Kim, 2001; Petrides & Nodine, 2005). First, I explored cross-case patterns in data use. As presented in Appendix I, I classified the reported levels of data use by data type using interview data, cross-referenced with other sources for triangulation (Miles & Huberman, 1994). From the responses related to the kinds of data used to inform literacy instruction in the school system, the classifications of use were assigned as follows: no/low emphasis (no or little reported use of this type of data to guide instruction by majority of respondent group members), moderate emphasis (limited reported use of this type of data to guide instruction by some of the respondent group members, or in instances where there was a mix of no/little, moderate, major responses), or major emphasis (frequent reported use of this type of data to guide instruction, provided by the majority of respondent group members). I also noted when data were used for a particular purpose, e.g., to meet accountability demands or to serve to guide student learning goals.

Second, I created a stage model to understand the investment in different resources across cases at the organizational level[5] guided by other empirical models (Bolam et al., 2005; Kerr et al., 2006; Petrides & Nodine, 2005; see

Appendix II). A system was designated as no/little emphasis in a resource category if there was either no commitment to this resource, or educators were only beginning to acquire information about and/or implement this strategy. Moderate commitment described a system if it had rolled out the strategy with early implementation. If evidence suggested that the school system had achieved a level of mastery, with continuous evaluation of the goals and processes, it was labeled as major commitment. Within each resource category, findings from relevant literature added additional details about what differentiated between designations.

Finally, I explored similarities and dissimilarities in the kinds of contextual factors reported by individual cases and across system type. From these, two broad categories emerged: accountability pressures (federal, state, internal, market/community) and other organizational factors (structure, distribution of decision-making rights, degree of regulation, size and growth trajectory, budget). I then examined these categories in relation to the patterns of data use and resource mobilization. Findings were shared with colleagues, allowing for interpretations to be challenged, refined, and justified, and are presented below.

Limitations

Although the systems' level plays an important role, exploring the district or CMO as the unit of analysis creates two challenges. First, although one or two schools are included in each case, within-district or within-CMO variation may lead in differences across schools. Second, although there were observational field notes for each school system, this study relies more heavily on interviews and focus groups. These self-reported accounts by teachers, school leaders, and administrators spoke to the perceived contextual factors that influence their data use. There may be other factors that were not reported or other ways in which these factors influence data use. Finally, because of length constraints, this article does not explore the data use and resource mobilization patterns in depth. For these reasons, this study is exploratory, serving to lay the groundwork for future investigation.

Findings

Aligned with the conceptual framework, I summarize patterns of data use and explore the range of accountability pressures shaping the kinds of data educators used in their practice. Then, I outline main patterns in resource mobilization, describing the organizational factors that enabled and constrained school systems as they mobilized their resources to support data use.

Patterns of Data Use

Appendix I highlights that, in all four schools, educators used multiple sources of data for instructional improvement. Three notable patterns stand out. First, high-stakes, state assessment data were the only form of data used extensively in all four school systems. This type of data often involved an educator quantifying and measuring student achievement, specifically with the goal of high performance on the standardized state assessments and their impact on federal and state accountability rankings. Other uses for state assessment data across sites included targeting "bubble" students, tracking students into classes by performance level, and focusing instruction on "power standards," those that were heavily weighted on the state exam.

Second, school systems used other forms of assessment data depending on other initiatives in the systems (Hubbard, Datnow, & Pruyn, in press). For instance, in District B, educators attended to classroom data collected as part of their Balanced Literacy initiative: student essays, readers'/writers' notebooks, and documented conversations with students. Teachers here indicated that these types of assessments were helpful to provide immediate feedback concerning their students' understanding of a concept, allowing an instructor to "adjust on a dime" and reteach when necessary. In comparison, District A had a well-funded, long-term strategy of professional learning communities where teachers met with peers to develop common grade assessments and analyze the resulting data.

Finally, CMO educators frequently reported using college-ready indicators such as PSATs, SATs, and ACTs. CMO educators frequently identified using college-ready indicators, given their networks' expressed mission for college preparation for all students. Concerning these college-related metrics, CMO C's Chief Academic Officer explained, "These three are critical to college acceptance. Well, that's our whole reason d'etre, so these are incredibly important." At the classroom level, CMO teachers reported using data from the PSATs and SATs, along with knowledge of students' reading levels, to weave appropriate high-frequency SAT vocabulary into their lessons. Together, these findings raise the critical question: How do differences in organizational context between CMOs and districts explain these patterns?

Accountability Pressures and Data Use

As seen in Table 3, the four school systems faced "multiple accountabilities disorder" (Koppell, 2005). The fact that school systems face different forms of accountability is not new (e.g., Knapp & Feldman, 2012), nor is the finding that accountability pressures shape data use in schools (e.g., Jennings,

Table 3. How Accountability Pressures Shaped Data Use.

		Accountability Pressures			
	School Systems	Federal, State	Internal	Authorizer	Market, Community
Major emphasis on high-stakes state assessments	District A	X			
	District B	X			
	CMO C	X		X	X
	CMO D	X		X	X
Major emphasis of other forms of data on a case-by-case basis related to other organizational initiatives	District A		X		
	District B		X		
	CMO C		X		
	CMO D		X		
CMOs had major emphasis on college-ready indicators	CMO C			X	X
	CMO D			X	X

2012). However, the differing organizational context brings into relief how these different forces pushed educators' data-use practices to different ends. Data use in all four systems was related to federal and state accountability systems, as well as adherence to internal program monitoring. Additionally, the CMOs' data use was shaped by accountability to their authorizers, the educational market, and their school communities.

Federal and state accountability. Both federal and state accountability policies had strong influences on data use across all four cases, particularly in relation to the dominance of high-stakes, standardized state assessment results (e.g., Jennings, 2012). Described by one teacher as "the ghost that is chasing us," numerous educators pointed to state assessment scores and other assessments designed to model these tests as key sources of data because of the link to program improvement status and the resulting penalties. In response, teachers and administrators in all four systems focused on the "bubble" or "cusp" students, those whose scores came within points of designated performance categories. These data were also used for student placement; for instance, administrators in District A used state assessment results for classroom assignment and student scheduling, placing students who scored far below basic or below basic in double periods of resource classes, whereas students who scored proficient or advanced were placed in Honors classes.

Internal accountability. Other patterns in data use relate back to internal literacy initiatives within a school system that were prioritized, supported, and monitored. For District A, school and system leaders focused on the common

grade assessments that teachers co-developed in their professional learning communities, a district-wide policy that was supported and monitored at the district and school levels. Similarly, CMO D had performance management systems in place that incorporated internal benchmark assessment results with consequences in teachers' evaluations and compensation systems. As such, one teacher felt that she prioritized these scores in her instruction because it was a measure of her effectiveness, with consequences attached: "No one here has tenure. So it is your data. You have got to show the data—are you being an effective educator? The data will prove it or not." The performance systems in these schools meant that teachers focused on the benchmark data for their own job performance and security, which drove their focus on it.

Authorizer accountability. With respect to the charter systems, educators in both CMOs voiced the belief that their schools faced a legitimate threat of closure if state assessment scores were poor. One central office administrator at CMO C argued, "the [state assessment results] are our 'bread and butter,' the reason we can stay open." During times of charter monitoring or reauthorization, charter educators felt a pressing need to prioritize state assessment data. One of CMO D's principals explained:

> [State assessment] scores, federal and state assessment rankings are all demands, especially when we are up for renewal. The way charters have been set up, we've exchanged our autonomy for increased accountability. So for AYP, especially when you talk about English language learners (ELs) on the [state assessment], it's absolutely, absolutely a huge thing. We've barely made it with ELs in the last couple of years, barely making the threshold, and with it always going higher and higher, you absolutely have to focus with the staff what we are going to do with that group.

CMO leaders also noted that state assessment scores were critical to the network's potential for expansion under the current authorizer. One leader felt the current charter landscape was "crowded," and their authorizer, the local school district, may be less likely to grant charters to new schools in the future. High scores on the state assessment would provide evidence to "prove the success" of the model and support the case for future replication.

Market and community accountability. Market and community accountability pressures meant CMOs paid greater attention to college-ready indicators than their peers in the school districts. CMO educators internally used these data to evaluate if they were meeting their schools' missions for college preparation but externally as well. As schools of choice, the CMOs publicized their college-ready metrics outwards into the educational market to attract

parents and families to their organization. Data displays of college-ready metrics established the CMOs' "reputations" and were included in recruitment materials, the organizational websites, and as part of the parent/student handbooks. As one of CMO D's central office administrators explained, "to put kids in the seats, we use our graduation rates, SAT scores, college acceptance rates to attract families to our schools. We want to communicate that going to college is part of the '[CMO D] brand.'" The college focus helped position these schools in the educational marketplace, and the metrics signaled to parents and families the success of their model.

Finally, one CMO was engaged in a local political debate around the value of charter schools specifically and school choice more generally. The CEO felt that the dialogue around charter schools had recently turned negative, and "the attacks that we're experiencing have made us even more vigilant about our [state assessment scores] being very, very strong. … They will be used as a weapon to speak badly about us, otherwise." Here, high stakes assessment scores not only established legitimacy in regards to district schools, but they also distinguished the CMO-related schools as "high quality" when compared to the rest of the field of charter schools.

Patterns of Resource Mobilization

Knowledge management theory and the data-use theory of action assume that human capital, technology and tools, and organizational process and policies are critical organizational "preconditions" for data use. As summarized in Appendix II, all four school systems made investments in these resources to varying degrees. For instance, District A expected teachers to meet regularly in professional learning communities to plan and design instruction, compare assessment data, and share best practices. District B, in contrast, concentrated on providing instructional coaches to every school.

Looking across cases in Appendix II, the CMOs appear to have made more major investments in resources that support data use than the school districts. First, six of the eight investments by the CMOs were classified as a major initiative, compared to only three of the eight human capital investments in the districts. In terms of human capital, CMOs stood out in hiring and training new employees and developing educators' capacity to use data early on in their careers. The districts, in contrast, allocated human capital resources to support teachers once they were working in their classrooms. Second, the CMOs had more significant commitment to tools and technology. CMO C, for instance, had developed the most sophisticated of data management systems, one that integrated multiple types of data in a comprehensive location with many analysis tools. Finally, the CMOs had four of their six organizational

policies ranked as major, compared to one of six of the districts' investments. For example, the CMOs regularly reserved time for in-school data analysis and cross-network collaboration to collectively analyze data and share instructional strategies. Again, these findings beg the question: How do organizational conditions influence resource mobilization to support data use?

Organizational Conditions and Resource Mobilization

Certain organizational conditions—namely, structure and distribution of decision-making rights, size and growth trajectory, financial resources, degree of regulation—were contextual conditions that enabled and constrained resource allocation (see Table 4 for summary).

Structure and decision-making rights. The structure of the two types of organizations shaped the systems' abilities to mobilize resources for data use. The two school districts were hierarchical, with compartmentalized departments. In contrast, CMOs were best described by respondents as a home office that provided back office support to their decentralized networks of schools. Although the CMOs did have some of the same departments as the districts (e.g., human resources), the CMOs were flatter, with fewer levels on their organizational charts. In all four school systems, the central offices supported schools and provided resources, whereas individual school sites were expected to be responsible for student achievement. However, by design, a greater level of autonomy and decision-making rights were distributed to the school sites in the CMOs, particularly in the areas of budgeting, staffing, and curriculum development.[6]

Consequently, the governance structure largely shaped the flexibility with which system resources could be mobilized for data use. For the districts, these data-use initiatives were sometimes fractured along the departmental lines. For example, in District A, departments were distinct, overseen by separate supervisors with individual budgets. The assistant superintendent of secondary schools shared that the departmental silos got in the way of sharing resources for data-use initiatives: "I have very, very few resources to begin with. … But do you think that [the assistant superintendent of elementary schools] is willing to share her resources that are more abundant than mine with any of my schools?" When one such initiative was unveiled, the compartmentalized nature of the districts also shaped the success of its implementation. For instance, one department in District A purchased video cameras, so that teachers could record their instruction and share it as data of instructional practice with their fellow teachers. However, this initiative was seen as the "baby" of the one department, and as such, it did not receive widespread

Table 4. How Organizational Context Shaped Resource Mobilization.

	Districts A and B	CMO C and D
Structure, decision-making rights	• Compartmentalized central office sometimes led to siloing of efforts and fractured implementation of data-use initiatives	• Decentralized network approach, where home office provided options of supports to schools, encouraged school commitment to data-use initiatives
	• Hierarchical, centralized structure limited collaborative structures between sites around data and instruction	• Network form allowed for information around data and instruction to be easily exchanged across schools; several routines in place to support collaboration between school sites
Size, growth trajectory	• Large size and complexity compelled use of a top-down strategy for data-use initiatives, sometimes limited school level buy-in	• Smaller size enabled CMO responsiveness when mobilizing or reallocating resources in response to data at the systems level
	• New data-use initiatives required integration into current systems and policies	• Recent establishment of the system meant data-use initiatives designed from the ground up
		• Organizational "growing pains" sometimes limited support to schools
Financial resources	• Overall constraint for resource mobilization	• Overall constraint for resource mobilization
		• Philanthropic funding enabled data-use initiatives (e.g., data management systems), but with certain conditions and constraints
Degree of regulation and the collective bargaining agreement	• CBA created boundaries around use of teachers' time and available relevant human resource positions	• Absence of collective bargaining agreement allowed for flexibility with human resource investments (e.g., performance management system, data coaches)
	• Formal negotiations to CBA take time, making it difficult to change some organizational processes	• Less protection for teachers, creating conditions for teacher burnout

support within the district central office, nor was there uptake of the initiative from teachers or principals. In contrast, District A's professional learning community initiative to support collaboration around common assessments results that was led by the superintendent and involved *all* departments in the district met with a greater level of commitment. In sum, the compartmentalization of the districts sometimes constrained their mobilization of resources when there was not a concerted effort from the top leadership to connect and unite departments.

Based on their organizational charts and self-reports, the two CMOs had thinner home office structure, with fewer levels of authority between school sites and the top management. On one hand, the network approach (along with decision-making rights distributed out to school leaders) offered the flexibility to adjust resources at the systems level when necessary and potential for adaptation to changing conditions. The two central offices of the CMOs saw their role as developing a "menu of supports" from which the school sites could choose, which were then constructed and revised to meet the needs of individual school communities. As explained the CMO administrator:

> Bureaucracy gets in the way. We've noticed over and over that mandates don't get you any farther. Even if you do mandate it, it's not like it happens, so you might as well do it the hard way which is: "We think this might work. Here's the best thinking we've got to date on this. Let me put this in front you, teacher, principal, coach. What do you think?" And those stakeholders, buying in to that and talking what they think works, and then using all those incredible feedback loops … so that our materials are constantly growing and changing.

Additionally, when it came to making classroom or school-level decisions based on data, the individual charter school sites had greater flexibility to make adjustments. One teacher noted that at the school sites, "our principal has the autonomy and responsibility for the budget, so we can use our resources however we need for our classrooms based on the data."

On the other hand, the commitment to a thin back office also impacted the level of support and resources to schools. As a principal at one CMO C school reported, "It can be frustrating, because [home office] thinks it is providing all this support, but they're really not. Some people are stretched so thin, they can't do anything to really help you." Additionally, several educators in both CMOs expressed concern that the push to centralize and establish "standards operating procedures" for analyzing and responding to data and "nonnegotiable" practices around instruction, curriculum, and assessments would move the systems toward a more top-down structure.

Size and growth trajectory. Closely related to system structure was the size of the school system and where it stood in its growth trajectory (i.e., age of school system and individual schools). The two school districts were larger in terms of the number of students served, although the overall number of schools in each system was comparable. Additionally, the districts with only slight variation had maintained their size over the past few years, whereas the two CMOs had seen remarkable growth within a short period of time. CMO C, for instance, had grown from one to over 30 schools over the course of 10 years. As such, the two CMOs were newer school systems compared to the two districts that had been established years before.

Size largely impacted how the school systems allocated their resources to support data use in schools. For the districts, their size and complexity compelled them to use a top-down strategy for data-use initiatives when they wanted to reach all schools. One central office administrator shared, "Unless you roll something out with a structure, you can't replicate it across the system as big as ours." In contrast, the CMOs believed that their smaller size enabled their flexibility and responsiveness when mobilizing or reallocating resources. Explained a vice principal in one of the CMOs, "We're like a little tug boat, and we can kind of navigate through the waters. Whereas you have [a larger system], it's this big hulking Titanic [that] can't stop as easily."

The second factor related to size was where the organizations stood in terms of their developmental trajectory. The two districts were at relatively fixed sizes, whereas the two CMOs had spent the past 10 years growing their networks of schools. This contextual factor supported enabled data-use efforts, as the CMOs designed their school systems and structures from the ground up. Reflecting on the initiatives in place to support data use, CMO C's chief academic officer noted: "They'd be incredibly difficult to do in places that don't do them now because we all know how difficult change is. But we weren't overcoming that. We started from nothing, and if you get to build a system from the ground up, you can build it really well." This "ground-up" design may also have contributed to the close alignment of data-use initiatives. For example, as CMO C rolled out its data management system, they also built in the complementary human capital resources–professional development and a dedicated "Data Leader" at each school site. As younger organizations, CMOs may have been better positioned to invest in technology than the established school districts, particularly when establishing the infrastructure to fit the changing data accounting.

The push for growth in the future, a feature of both CMOs, was also part of the push behind the investment in the sophisticated, automated data management systems and tools for school and system leaders. As the Director of Data and Assessment at CMO D articulated:

> Because of the economic crisis, we are being hit hard just like everybody else, and we are also continuing to grow schools. So, it's becoming more and more challenging to be able to do all the [data] analysis that we want with just two people, and we don't have the budget to grow as our schools grow. So as a result, there are certain school-level analyses that we do that we've always done manually, and we're going to have to figure out how to automate it.

However, the rapid scale-up in CMOs led to what one CMO D staff member called organizational "growing pains." Despite efforts to plan, decisions to develop new data-use initiatives sometimes occurred retroactively—that is, in response to the multiple new stresses on the system that followed the expansion of the system. CMO D's Director for Technology explained that the impetus for their integrated data management system was a recent investment. He explained:

> When you have a small, 100 student school, you don't need a comprehensive system. You can remember everybody's name and scores longitudinally. But then the amounts of data, they compound quickly. As things get moving, it all becomes a second thought until one day, you hit a wall, and you're forced to revisit.

Finally, bringing new schools online meant additional demands on the home office staff (e.g., identifying new streams of funding, finding a new facility, hiring new teachers), as well as the need to build capacity at that site around data use (e.g., creating norms of data use with the new school leader/staff, professional development and training). In the meantime, the home offices of both CMOs had not grown in proportion with the new schools, making data-use support to schools even more challenging. As one staff member responsible for supporting schools' access to the data system at CMO C shared, "there's a lot of anxiety around the growth plan. We just added four more schools, but I couldn't add another headcount to my team. I'm not sure how this is going to work." Although findings indicated that the two CMOs had made "significant" investments in resources to support data use, the continued pressure for growth, coupled with financial constraints, raised questions around the long-term sustainability of the data-use resources.

Financial resources. In all four systems, the statewide budget cuts were identified as a critical constraint for investing in data-use initiatives. This set of financial constraints caused educators to consider where they would find "the biggest bang for the buck" when it came to investing in organizational resources to support data use. For instance, in District A, the superintendent saw the investment in training for professional learning communities to be a front-end cost;

once fully implemented, the PLC model would be self-sustaining, providing professional development from within the system at little cost.

For both CMOs, the limited financial resources were further complicated by the self-reported per-pupil funding differential between charters and district schools. Together, these circumstances led to heavy involvement by philanthropic partners to support data-use initiatives. Two large national foundations funded CMO C's advanced data management system as well as the 10-person support staff. One CMO leader shared, "working with foundations has helped us launch several projects related to using data to inform organizational decisions—programs we definitely couldn't do without their help." However, working closely with the foundations had its own restrictions and limitations. For one, CMO leaders reported feeling that some foundations used funding as a "carrot" to encourage the CMOs to engage in a new project in one of the foundation's areas of interest. Having projects driven by grants also created internal pressure based on the life of the grant. As one member of CMO C's central office explained, "CMO C is very go, go, go, when the money is there. … The timeline is always tight, the funding is always tight, the resources for people's time is always tight." It also meant that programs or projects risked termination once a grant ends. At the time of the study, CMO C's technology team was exploring how it could monetize data tools and technologies to other schools and districts to become self-funded once its grant ended.

New demands for data collection also occurred based on foundation interest and strings attached to funding. Fulfilling data requests from foundations was "time consuming because each funder wanted to see it in different ways," reported the head of CMO C's technology team. This demand for data as part of grant writing and reporting was another reason behind CMO C's move to collect multiple forms of data in a central, unified data management system.

Degree of regulation and collective bargaining agreement (CBA). Educators pointed to the presence or absence of a CBA as an important factor that shaped their ability to mobilize their human capital resources to support data use. Neither of the two CMOs had a CBA with a local teachers association, whereas the two districts did. For CMOs, this deregulation gave the charter schools more flexibility to allocate their human capital resources. "When you have the ability to hire and fire at will, as scary as it sounds," one vice principal at CMO C shared, "it's the starting point to be able to break the rules a bit, and be more flexible and agile with your staff." It also gave them the ability to develop a range of positions (e.g., lead teacher, mentor teacher, and induction coach) where students' performance was an important part of hiring and promotion.

The absence of a CBA also allowed the CMOs to quickly make changes to organizational routines in response to data. One notable example arose between District A and CMO D. In one CMO D school, the ELA department analyzed winter benchmark results and decided that, as their instructional response, teachers would change their prep periods so that they would have more available time to spend in each other's classes, supporting students one on one. Between administering the exams and adjusting the schedule, the decision process took 2 weeks. In contrast, the president of the District A's teachers association reported that the union and district had spent over 2 years negotiating the language in the contract around dedicated teacher meeting time to be used for collaboration around common assessment results.

Educators in the school districts stressed the importance of the CBA as a mechanism for protecting the rights of teachers. In both districts, the expectations around new data-use initiatives were high, and many teachers interviewed expressed feeling "overwhelmed." One District A union representative argued that in some schools, completing data analysis protocols and other paperwork had put a strain on teachers' time: "It's not about the classroom and teaching. It's all the rest to prove that we're teaching. That's where it's gotten bad, all the documentation and the paperwork and the data tracking to prove we're doing our job correctly." District A's union president also noted that although demands on teachers to use data to inform their instruction had increased, professional development and training from the district to effectively do this work had not kept pace. The contract then provided a starting point for the conversation between the teachers union, site leaders, and district office administrators about how to best manage and prioritize the demands on teachers' time. CMO teachers expressed similar feelings of being overwhelmed, but without a CBA in place, it could be difficult to balance these pressures. Explained one teacher at CMO D, "Work-life balance without a union is a little bit tough, because really no one is telling you that you have the right to go home, even if your data analysis isn't done."

Discussion and Implications

This study suggests that the school system as a whole plays a critical role in supporting schools and educators in using data, regardless of whether that system is district or charter. First, the accountability demands on the two types of systems influenced the data types prioritized and how they were used by educators. Federal and state accountability systems led both CMOs and districts to place a high value on high-stakes, state assessment data. Authorizer

and market/community accountability further encouraged CMOs to emphasize state assessment results and indicators of college readiness. Second, the systems' abilities to mobilize their resources to support data use were influenced by a range of organizational factors. Some conditions, like the state's difficult financial environment, had a similar limiting influence across all systems. For CMOs, their decentralized network structure, smaller size, and fewer regulations seemed to enable their resource allocation for this work. As with other initiatives, however, it is critical to note that the process of data use is dynamic and complex in nature, with multiple facilitating and constraining factors influencing the systems and educators within them.

What do these findings offer for policy, theory, practice, and future research? Although other scholars had noted the importance of the federal and state accountability policies in the press for data use (Ingram et al., 2004; Means et al., 2010; J. L. Peterson, 2007), this study provides insight to the tensions that arise when educators are faced with multiple forms of accountability, whether from federal or state actors, the educational market and local community, or other third-parties (i.e., authorizers). These competing accountability demands privileged the use of certain forms of data over others, creating complex demands for educators. Given data's function as a metric by which to hold organizations publically accountable, assessment results also took on the additional role of demonstrating legitimacy within the larger educational field. CMO leaders in particular reported needing to keep federal and state accountability indicators high as a way of proving their quality when compared to other charters and public schools. Thus, it behooves policymakers to closely consider the design of accountability systems and the metrics chosen to demonstrate success.

Additionally, this study raises questions about the policy attention, political support, and financial investment in CMOs. On one hand, the two CMOs were more apt to collect and attend to a wider range of data for instructional improvement, including college-ready indicators. They also demonstrated the benefits of a decentralized network structure, particularly related to their ability to allocate resources in response to needs identified in the data. However, the pressures from federal and state accountability systems, authorizers, and expectations from foundation partners may have restricted the instructional innovation promised by charter advocates. Because of these demands, in some critical ways, the CMOs looked very similar in their data-use practices to their district counterparts. How might charter schools be held accountable for high levels of performance while being encouraged to use their autonomy and flexibility to develop their own metrics for success? How could authorizers take into account a wider range of metrics beyond state assessment results for decisions related to charter selection, oversight,

monitoring, and renewal? Finally, many of the significant commitments for data use were funded through major philanthropic investments that may not be sustained. Further understanding of how this external funding can both support and hinder CMOs can help policymakers assess whether they are a viable mechanism for the replication and long-term success of educational programs.

Second, the conceptual framework, developed from knowledge management theory, suggests the three resources for data use: human capital, technology and tools, and organizational policies and processes. Some have argued that this theory is more "prescriptive" without ample empirical evidence to test its assumptions. For instance, Becerra-Fernandez and Sabherwal (2001) suggest that knowledge management theorists overly assume that resources are "universally appropriate" (p. 23). The research here pushes against this assumption. Across all four school systems, there was no one single recipe to support the use of data. In District A, for instance, the investment in professional learning communities seemed to support teachers' data use in similar ways as District B's instructional coach model. In CMO C, data use was supported by a data management system in which educators at all levels could access each other's assessment results, whereas the other three systems found alternative solutions for making data public. Each system and school approached resource allocations decisions differently in ways that made sense to them based on the goals they wanted to achieve. As such, the given end result—using data to support instructional improvement—could be equifinal, that is, reached by different organizational pathways or trajectories rather than a single, cause-and-effect course of actions (Drazin & Van de Ven, 1985; W. R. Scott, 2002).

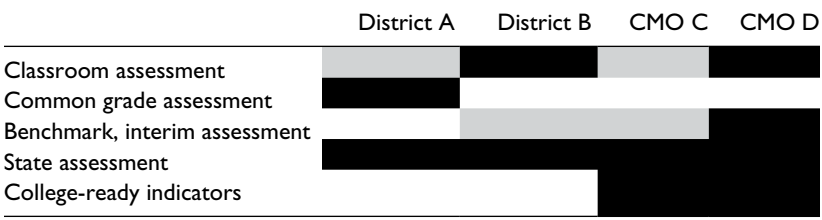
Third, for school and system leaders, this study lays the groundwork for the diffusion of promising practices across school districts and CMOs, as well as across schools with varying levels of autonomy, such as the pilot schools in Boston and Los Angeles, and school districts experimenting with portfolio management models, as in Chicago, New Orleans, New York, and Philadelphia (Bulkley, Henig, & Levin, 2010). For instance, districts could work with the CMOs to understand how to weave in or adapt assessments to support higher-order thinking skills, as CMO educators have tried to do in their own assessments to support college-readiness goals. In terms of resource investments, the districts had found ways of engaging resources (e.g., professional learning communities) to support teachers to help ameliorate the stresses associated with data use, an area where the CMOs, with their younger, less experienced teachers, still struggled. CMOs' investments in advanced data management systems could provide a model for districts regarding how to merge multiple databases to enable more sophisticated data analysis.

Finally, for researchers, this study is one of the first to consider how organizational context shapes data use in school systems. As an exploratory study, this improved conceptualization can provide the foundation for future work in this area. Given the range of contextual conditions at play, are there leading organizational factors? For instance, would these findings hold across CMOs and districts of the same age, or is there an "imprinting" effect that happens for new systems, where they are able to develop new systems rather than change existing ones (Stinchcombe, 1965)? If the study were replicated in a state that had greater financial resources for both districts and charters, how would system resources for data use vary? Additionally, because of sampling criteria, there are other organizational factors that may shape data use that were not included that could be explored in the future. For instance, how are the processes for using data to drive instruction in elementary schools different from secondary schools? Are there additional challenges in implementing data-use initiatives in schools or districts that are low performing or engaged in "turnaround" work (Calkins, Guenther, Belfiore, & Lash, 2007; Huberman et al., 2011)?

Future research could test the findings developed in this case study to better understand the relationships between the range of responses to data, resources mobilized for data use, and different contextual conditions. Given the fact that there was no single recipe for data use across the four school systems that had expressly engaged in this work, using qualitative comparative analysis would be one helpful and novel method to dig deeper into what combinations of "ingredients" may lead to certain models of data-based decision making (Ragin, 2008).

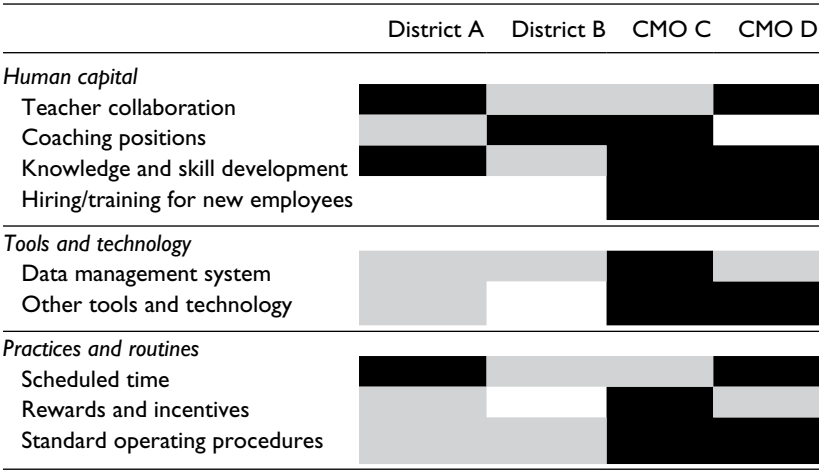
Although these and other questions remain, these findings have affirmed that we cannot fully understand data-use initiatives in school systems without a clear picture of the organizational setting in which this process unfolds. It was the aim of this exploratory study to initiate this critical line of inquiry and generate new directions for future research.

Appendix I. Relative Emphasis of Different Forms of Data.



Note. No/little emphasis = white; moderate emphasis = gray; major emphasis = black.

Appendix II. Relative Emphasis of Resources.



Note. No/little emphasis = white; moderate emphasis = gray; major emphasis = black.

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Notes

1. For recent exceptions, see special issues of the *Peabody Journal of Education* (2010), *American Journal of Education* (2012), and *Teachers College Record* (2012); reviews of literature by Coburn and Turner (2011) and Young and Kim (2010); edited volumes (e.g., Mandinach & Honey, 2008; Moss, 2007); and the What Works Clearinghouse review sponsored by the Institute for Education Sciences (Hamilton et al., 2009).

2. Charters can vary widely in their organization, governance, and structure. For instance, there is a growing number of virtual charters. The charter schools in this study were brick-and-mortar schools and quite similar to the traditional schools in their general goals, daily schedule, and daily activities. The two CMOs did have an expressed commitment to college preparation as an organizational mission. Other key organizational differences are highlighted in the article.
3. Funded by the Spencer Foundation, this study focused on interventions that support teachers' use of data to inform their literacy instruction: data coaches, literacy coaches, and professional learning communities/data teams. For more on this project, see Huguet, Marsh, and Farrell (2014); Marsh and Farrell (in press); Marsh, Farrell, and Bertrand (in press); and other forthcoming papers.
4. Excluded from this definition of CMOs are loosely tied networks of charter schools without a central office, organizations that run virtual or online charter schools, and school districts in which all public schools are charters.
5. Budgetary data were unavailable from all four systems to contribute to this analysis.
6. The one exception was a number of schools in District A whose teachers, through a school turnaround initiative, had developed a memorandum of understanding with the teachers union and district to allow for greater school-level autonomy.

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