Strategies to Promote Data Use for Instructional Improvement: Actions, Outcomes, and Lessons from Three Urban Districts

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The current high-stakes accountability environment has created strong incentives for educators to systematically collect and use data to inform instructional decisions. This article examines the strategies employed by three urban school districts to promote data use for instructional improvement and their effect on administrator, principal, and teacher practice. Several factors are found to affect data use, including accessibility and timeliness of data, perceptions of data validity, training, and support for teachers with regard to data analysis and interpretation, and the alignment of data strategies with other instructional initiatives.

Introduction

The current high-stakes accountability environment brought on by the federal No Child Left Behind legislation places great pressure on districts and schools by requiring them to monitor student progress toward standards and holding them accountable for improvement. In the face of growing accountability demands, many school districts have begun to closely analyze data as part of

their efforts to promote high-quality instruction and improve student achievement. However, this new emphasis on data necessitates new systems, knowledge, and skills at both the district and school levels, and many school districts, particularly in urban areas, lack adequate human and financial resources to successfully use data to drive improvement.

Despite the increasing focus on data use in practice, research has just begun to investigate whether and how this strategy leads to improvements in teaching and learning. This article seeks to address that gap by analyzing three urban districts' efforts to improve the instructional quality and performance of their schools by promoting data-based decision making at the district and school levels. In particular, we examine actions taken by three urban districts to promote data use among principals, teachers, and district administrators, outcomes associated with these actions, and factors contributing to or inhibiting effective use of data.

We first present a brief overview of the literature on data-based decision making in educational contexts. We then describe the context and method for the study from which this article draws. The remainder of the article describes findings related to district efforts to promote data use for instructional purposes, themes regarding data use strategies seen across districts, and implications of our research.

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Literature Review

The broad implementation of standards-based accountability under the No Child Left Behind Act of 2001 has facilitated increased use of data in educational settings by providing schools and districts with new sources of data for analysis, as well as increasing the pressure on them to improve student test scores (Massell 2001). While data-based decision making is practiced in different ways at all levels of the educational system, recent studies have more commonly focused on how data are used by the entire school community to guide decisions at the school level (Feldman and Tung 2001).

Recent studies have documented a multitude of purposes toward which schools have successfully applied data-based inquiry. Most commonly, data are used for tasks such as setting annual and intermediate goals as part of the school improvement process. Data may also be used to visually depict goals and visions, motivate students and staff, and celebrate achievement and improvement. Schools use data for instructional decisions such as identifying objectives, grouping and individualizing instruction, aligning instruction with standards, refining course offerings, identifying low-performing students, and monitoring student progress. School structure, policy, and resource use may be informed by data. Schools have also used data for decisions related to personnel, such as evaluating team performance and determining and refining topics for professional development (see, e.g., Bernhardt 2003; Choppin 2002; Feldman and Tung 2001; Mason 2002; Supovitz and Klein 2003).

Though schools today face more pressure to engage in data-driven decision making and may in fact be using data in a more frequent and widespread manner, case studies of schools attempting to enact data-driven inquiry and decision making reveal that implementation is not always successful. Research suggests that effective use of data may depend on several enabling factors, including strong leadership, up-front planning for data collection and use, and strong human capacity for data-driven inquiry.

Leadership

Empirical studies of data-based decision making have consistently found that strong school leadership is a necessary factor for successful implementation. Leaders in schools that were able to effectively use data for inquiry and decision making were knowledgeable about and committed to data use and built a strong vision for data use in their schools (Choppin 2002; Feldman and Tung 2001; Herman and Gribbons 2001; Lachat and Smith 2005; Mason 2002; Mieles and Foley 2005). However, vesting all leadership for data use in one person may be problematic. Several studies have found that the most successful

498   American Journal of Education

principals were able to act as initial catalysts for data inquiry but then worked to create more distributed leadership around data use (Copland 2003; Wayman and Stringfield 2005).

Leadership is often especially important in combating low staff buy-in and cultural barriers, which have been identified as significant challenges to data-based decision making (Feldman and Tung 2001; Herman and Gribbons 2001; Ingram et al. 2004). Ingram et al. (2004) identified a number of widely held teacher attitudes and beliefs that were incompatible with data-driven inquiry. For example, teachers often discounted assessment data because they had developed their own personal metrics for determining success that had little to do with their students' test scores. Teachers who had a weak sense of efficacy and did not believe that they had an influence on their students' achievement data were also unlikely to buy into data-based decision making.

The political context of data use can make a difference as well. Herman and Gribbons (2001) found that teachers in a high-performing school found data use empowering, while teachers in a more diverse, poverty-ridden, and low-performing school felt devalued and disenfranchised by data use. An emphasis from those in leadership positions on data use as a nonthreatening and positive tool for improvement can help to alleviate these problems (Choppin 2002; Lachat 2001). Wayman and Stringfield (2006, in this issue, 569) emphasize the importance of "nonthreatening triangulation" of information in schools where principals were able to help teachers "*use* data rather than *be used* by data."

Planning for Data Use

According to research, up-front planning helped make data collection and use more efficient in many case study schools by clarifying what data were needed, aiding with integration of multiple data sources, and ensuring that data collection processes were on track (Keeney 1998; Lachat 2001). For example, Milwaukee schools that were able to successfully implement data-based decision making used up-front planning to address data management, storage, and confidentiality issues and to ensure that processes for data use would be equitable and fair (Mason 2002). Wayman et al. (2005) advocate that in addition to technical and logistical concerns, up-front planning should include a calibration process, where stakeholders develop consensus about shared standards, definitions, and goals through reciprocal inquiry-based discussion. Using this planning process to involve a broad group of stakeholders and to create clear expectations about the purpose of data use may help to improve teacher buy-in (Choppin 2002; Johnson 1997; NEA Foundation 2003).

Successfully incorporating data into school decision making also requires

planning for the allocation of needed resources, particularly time. Teachers in several case-study schools complained that they were challenged by a lack of time for data analysis and in some cases felt they faced a trade-off between data-driven inquiry work and their teaching (Feldman and Tung 2001; Ingram et al. 2004).

Human Capacity for Data Use

Low human capacity to support data-driven inquiry has frequently been noted as a barrier to effective data use in schools. Supovitz and Klein (2003) were "shocked" by the limited technical capacity of faculty even in schools that had been identified as innovative data users. Just 19 percent of teachers and administrators in those schools felt that they had the skills to manipulate data to answer the questions they were interested in. Similarly, school faculty in six Milwaukee schools implementing the Quality School Portfolio consistently acknowledged their own lack of skills and capacity and still felt that they lacked capacity after a year of training (Mason 2002).

Capacity issues relate not only to the technological capacity of staff and their ability to use computer software to complete analyses but also to skills such as formulating research questions, interpreting results, and effectively developing and using classroom assessments (Herman and Gribbons 2001; Mason 2002). Several recent initiatives (e.g., the National Science Foundation–funded Using Data Project and work by the Center for Research on Evaluation, Standards and Student Testing) have focused on creating better models of professional development for improving skills needed to use data effectively (Chen et al. 2005; Love 2004). Most current models of training educators in data-driven inquiry include a major emphasis on the cyclical nature of inquiry and on learning to formulate research questions. Several training models also focus on structured approaches to dialogue about data and on using the educators' own real-life data issues and school challenges rather than hypothetical cases (Chen et al. 2005; Copland 2003; Love 2004; Murnane et al. 2005).

Outcomes of Data-Based Decision Making

Recent research suggests that data-based decision making can have a positive impact on student achievement and on other aspects of schooling. For example, although they do not systematically track outcomes, a few case studies offer anecdotal evidence of increased test scores and improved student learning in schools that effectively implemented data-driven decision making (Feldman

and Tung 2001; Schmoker and Wilson 1995). In addition, the effective schools literature includes several studies that identify planful and extensive use of data as a common characteristic among schools and districts that are high performing or "beating the odds" (e.g., Council of Great City Schools 2002; Snipes, Doolittle, and Herlihy 2002). Finally, numerous studies link data-driven decision making to changes in school culture and teacher practice that past research has linked to improved student performance. Common findings include teacher reports of greater differentiation of instruction, greater collaboration among school faculties, and improved identification of students' learning needs as a result of data use (Chen et al. 2005; Copland 2003; Feldman and Tung 2001; Wayman and Stringfield 2005).

Background for the Present Study

This article focuses on the actions taken by three urban school districts to promote data-based decision making by district- and school-level staff and the intermediate outcomes associated with these actions. It draws from a larger study of districtwide instructional improvement efforts that examines multiple district reform strategies to promote improved teaching and learning across a system of schools (Marsh et al. 2005). The framework guiding this study posits that district decisions to focus efforts within one or more key areas of reform, such as promoting data-based decision making, led each district to take various actions, such as establishing a policy or program, as a means for effecting change. These actions were expected to lead to a set of intermediate outcomes that were then expected to impact the quality of instruction throughout the district and ultimately lead to improved student learning.

Following are the actions and intermediate outcomes related to district efforts to promote data use examined in this study:

  Actions:
  • School improvement planning
  • District assessments
  • Data systems
  • Technical assistance to schools on data use
  • Professional development on data use
  • Encouragement of review of student work
  • Systematic classroom observation
  Intermediate outcomes:
  • Data are accessible to administration and teachers
  • Data are perceived to be useful for instructional decisions
  • Data are used for instructional decisions

- Individuals at all levels are familiar with and better able to identify areas of need

Our intent was to describe the design and implementation of these actions and assess the extent to which districts achieved the intended intermediate outcomes. For example, districts may choose to create and administer interim assessments, modeled on state standards and assessments, to provide frequent and timely data to school-level staff that can be used to guide classroom instructional practice. Additionally, districts may provide professional development or other training to teachers and principals on how to analyze and interpret test scores and student work samples. As a result of taking actions such as these, districts expect certain intermediate outcomes to occur (e.g., greater accessibility to student assessment data or stronger beliefs on the part of teachers and principals that data are a valuable resource for making instructional decisions). These intermediate outcomes represent the districts' hypothesized means through which improvements in teaching and learning would eventually occur.

In the next sections we describe the data and method employed in this study, including brief descriptions of the study districts. Then we describe findings related to data use within and across districts.

Data and Method

This study employs a comparative case study design and mixed methods to examine district efforts to promote instructional improvement. While the larger study examines several additional research questions, this article primarily answers the following questions:

- What strategies did districts employ to promote instructional improvement through data-based decision making? How did these strategies work?
- What constrained or enabled district efforts to promote data use for instructional decision making?

The following section provides further details on the sampling methodology and data collected to answer these questions.

Sample

The study was conducted in a purposive sample of three school districts: Monroe, Roosevelt, and Jefferson.[1] Table 1 displays demographic information

TABLE 1

Demographic Characteristics of Study Districts, 2003–4

	Monroe	Roosevelt	Jefferson
Number of students	80,000	30,000	30,000
Number of teachers	5,000	2,000	2,000
Number of schools	100	50	50
Percent low-income students*	55	80	75
Percent minority	70	85	80

NOTE.—Numbers have been slightly altered to maintain district anonymity, but basic proportions and scale remain true.

* The definition of "low income" varied slightly among the available data in each state, including students eligible for free- or reduced-price lunch or other public assistance.

about each district. Each district is located in an urban area and has a significant percentage of low-income and minority students. While Roosevelt and Jefferson each have approximately 30,000 students, Monroe has nearly 80,000 students. We chose these districts because they had made districtwide instructional improvement a high priority and varied in size, union environment, and state context. Additionally, each had worked with the Institute for Learning (IFL), an intermediary organization central to the broader study from which this article is drawn, for at least three years.[2]

Data Sources

To analyze the instructional improvement efforts in these three districts, we collected both qualitative and quantitative data from multiple sources over a two-year period.

District site visits with fieldwork.—Researchers visited each district multiple times during the 2002–3 and 2003–4 school years. We interviewed central office leaders and staff as well as community leaders, such as school board members and union officials. District-level interviews included the superintendent, associate superintendents, and administrators in the areas of curriculum, instruction, and professional development. Across the districts, a total of 85 interviews were conducted with district and community leaders.

Additionally, in spring 2003 and winter–spring 2004, we visited a representative sample of schools in each district and observed district meetings and other related activities. During school visits, researchers interviewed the principal and conducted one to three focus group discussions with teachers. Assistant principals and/or instructional specialists were also interviewed where

relevant. In total, we made 72 school visits, accounting for 118 teacher focus groups and 73 principal, 30 assistant principal, and 50 instructional specialist interviews.

Principal and teacher surveys.—In spring 2004, we surveyed all principals in the three districts, all teachers in Roosevelt and Jefferson, and a sample of teachers in Monroe. Principal response rates across the districts ranged from 68 to 78 percent, while teacher response rates across the districts ranged from 31 to 48 percent.[3]

Cross-Cutting Themes and Findings

Each of the study districts made significant investments in promoting data-based decision making at the district and school levels, yet they emphasized different actions to varying degrees and with varying levels of success. This section describes cross-case findings related to district actions to promote data use and the outcomes associated with those actions. We then describe in more detail the specific strategies implemented in two of the study districts that made data-based decision making a focal district reform initiative, as well as common barriers and enablers to district efforts to promote data use.

District Actions to Promote Data Use for Instructional Decision Making

The study districts invested to varying degrees in strategies promoting the use of data to guide instruction and instructional decisions. Strategies included the development of interim assessments and technology/systems for housing, analyzing, and reporting data; the provision of professional development and/or technical assistance on how to interpret and use student test results; the revamping of school improvement planning processes; the encouragement of structured review of student work; and the use of an IFL-developed classroom observation protocol, the Learning Walk, to assess the quality of classroom instruction. Table 2 presents the relative emphasis each district placed on these specific actions to promote data use.

Overall, our data revealed that promoting data-based decision making was much more of a focus in Jefferson and Monroe than in Roosevelt. In particular, Jefferson invested in implementing a new, data-driven school improvement planning process, and Monroe focused on implementing a system of interim assessment tests linked to a data processing and analysis system. We provide more detail about the use of these specific strategies in Jefferson and Monroe later in this article. While Roosevelt leaders did invest in some strategies to promote data use and acknowledged that future efforts would include a more

TABLE 2

Relative Emphasis of District Actions to Promote Data Use

Actions	Monroe	Roosevelt	Jefferson
School improvement planning	Minor	Minor	Major: FOCAL strategy
District assessments	Major: FOCAL strategy	Minor: emerging	Moderate
Technology/data systems	Major: FOCAL strategy	Minor: emerging	Minor
Professional development on data use	Major	Moderate	Major
Technical assistance to schools on data use	Major in low-performing schools, moderate in others	Major in high schools, minor in others	Major in low-performing schools, moderate in others
Encouragement of review of student work	No emphasis	Moderate	Moderate
Learning walks	Moderate	Moderate	Major in low-performing schools, minor in others

prominent focus in this area, we found that data use was a less prominent reform initiative in this district during the time of this study.[4]

In addition to strategies related to school improvement planning, interim assessments, and technology/data systems, each district also provided professional development and technical assistance to teachers and principals to support their knowledge about and use of data to guide instructional decisions. Compared with Roosevelt, Jefferson and Monroe placed a greater emphasis on data analysis in staff professional development, focusing particularly on analysis of test score data. As table 3 illustrates, larger percentages of teacher and principal survey respondents in Jefferson and Monroe reported an emphasis on the interpretation and use of student test results in the training and support they received from their school and/or district.

Districts also provided technical assistance to school-level staff to assist with data analysis and interpretation, though each district focused additional technical assistance on certain groups of schools. In Monroe and Jefferson, while assistance was available to all schools, efforts concentrated on low-performing schools where data use was made an even greater priority. In Jefferson, for example, district staff members assisted low-performing schools with data analysis, which occurred primarily as part of the school improvement planning process. Assistance was provided to help principals choose and implement appropriate instructional strategies to meet needs identified through analysis of student achievement data. Alternatively, technical assistance in Roosevelt focused on high schools, where the district made available an external organization to assist school data teams with articulating appropriate questions and performing the needed analysis.

The study districts also implemented strategies to promote data use that included evidence other than student test score data, such as information gained from systematic review of student work and systematic observations of classroom instructional practice. In Roosevelt and Jefferson, the districts placed a moderate emphasis on reviewing student work (e.g., student writing samples and project-based work) as a means of assessing curricular goals and/or iden-

TABLE 3

Percentage of Teachers and Principals Reporting a Moderate to Major Emphasis on Interpreting and Using Student Test Results to Guide Instruction in Professional Development Activities

	Monroe	Roosevelt	Jefferson
Teachers	68	39	68
Principals	90	73	94

506　　American Journal of Education

tifying areas of weakness in student performance. As part of a larger middle school reform initiative, teachers in Roosevelt reviewed student work samples to develop grade-level expectations. Using a different strategy, Jefferson promoted review of student work as a means of measuring and assessing student performance and desired changes in instructional practice. The district trained school-level instructional specialists in a specific protocol to lead groups of teachers through a process of reviewing student work and tying results to instructional practice.

Finally, all three study districts also implemented Learning Walks to varying degrees. Learning Walks are an IFL-developed protocol for observing classroom instruction across a school and benchmarking and assessing teachers' instructional practice. They typically involve five- to 10-minute visits to a set of classrooms and are focused on gathering information about teaching and learning and about how the school is organized to enable student learning. Information is often gathered in classrooms by questioning students and examining their work. They are not meant to be stand-alone events or to be used as a high-stakes evaluation of the work of any individual teacher but rather are intended as an ongoing practice of observing and benchmarking instruction that informs school and district staff about current practice and areas that should be targeted in future professional development. As table 2 indicates, Learning Walks were more of a districtwide focus in Monroe and Roosevelt and a more targeted strategy in low-performing schools in Jefferson.

Focal Initiatives to Promote Data Use: Stories from Two Districts

While Jefferson and Monroe shared a common focus on data, the nature of district strategies and the types of data emphasized differed greatly. Although each utilized multiple strategies, we have chosen to examine two initiatives given the most attention and investment during the period of study: school improvement planning in Jefferson and interim assessments linked to data systems in Monroe.

Jefferson: School improvement planning.—While school improvement planning (SIP) as a formal process occurred in all three districts, it was a more central, supported, and valued endeavor in Jefferson. Having revised the SIP process in 2002–3, Jefferson administrators encouraged school faculties to examine assessment results by grade level to identify areas of needed improvement in math and English language arts and to identify a realistic, narrow set of strategies to address those needs. District administrators provided schools with a new, detailed SIP template to guide this process and limited training on how to use it. School coaches were also expected to assist with data analysis and implementation of the plans. The SIP process was supported more intensively

in the 20 lowest-performing schools, where district leaders conducted periodic "SIP implementation visits" as well as informal visits to support and monitor SIP implementation.

As a result of the district's targeted investment in this area, school-level staff in Jefferson were more likely than their counterparts in the other two districts to identify SIP as a districtwide reform priority and focus of professional development. Moreover, teachers in Jefferson seemed to convey a stronger awareness of the contents of their school's plan. For example, 45 percent of teacher survey respondents in Jefferson reported that they had read their school's SIP and had a thorough understanding of it, compared with only 23 percent of Roosevelt teachers and 30 percent of Monroe teachers.

Most important, school staff in Jefferson consistently described school improvement planning as useful, although labor intensive. In interviews, principals and teachers described the process as one that helped them identify school and classroom needs. They also valued the process because it allowed for the collective identification of school goals and drew on in-house expertise of school staff. They described the plans as more meaningful than plans developed in the past and described the new SIPs as documents that truly guided their work. This contrasted with interviews in Monroe and Roosevelt, in which SIP plans were more often characterized as "compliance documents."

Teachers in Jefferson were particularly positive about the impact of their SIP on instruction. On surveys, 62 percent of Jefferson teachers reported that the SIP had influenced their teaching practice, compared with only 35 percent and 36 percent in Roosevelt and Monroe, respectively. In interviews, teachers often noted that the SIP process helped them identify with their colleagues ways to address student weaknesses, such as by mapping areas of weakness to curriculum to review pacing, coverage, and instructional strategies associated with each curricular unit. Nevertheless, Jefferson teachers and principals also widely noted that the process itself was very time consuming and challenging. For example, 78 percent of principals reported that the SIP process was more labor intensive than it needed to be.

Monroe: Interim assessments linked to data systems.—While all three districts regularly administered formative assessments, only Monroe administered a comprehensive set of standards-aligned assessments in all grades and core subjects linked to a sophisticated data management system. Leaders designed the system to provide an "early warning system on progress being made" at meeting state standards. In addition to other district-developed, formative assessments designed to measure what had been taught over a limited period of time (e.g., six-week tests), these interim assessments were administered at the beginning, middle, and—if there was not a state test in that subject—end of the year to assess students' knowledge relative to the state standards and assessments. As such, some administrators described them as something between formative

and accountability data. Monroe leaders purchased a data management system to provide quick access to results, to facilitate detailed analysis of data, and to allow for the development of additional assessments customized to a particular class, group, or student.

The results of this new initiative were positive at the administrative level in Monroe. The majority of principals and district staff interviewed found interim assessment data valid and useful and reported using the system regularly. They described utilizing its information for a variety of decisions, such as identifying students, teachers, and schools needing additional support (e.g., training, visits from curriculum specialists) and deciding how to design this support. More than two-thirds of principal survey respondents reported that these assessments were a good measure of student progress, and 81 percent found data moderately to very useful for making instructionally related decisions.

Teachers, however, were more mixed in their responses. Of those teachers who reported having these interim assessment data available, 59 percent found them moderately or very useful for guiding instruction in their classroom. Many teachers interviewed described looking at item analyses to break down student needs by objective, to identify topics that required reteaching and new ways of teaching, and to identify and talk with colleagues who succeeded in teaching a particular objective. Yet, 60 percent of teacher survey respondents also reported that other classroom assessments provided more useful information for planning. Many noted that classroom-based assessments were more thorough and provided more timely information or that district assessments simply duplicated what they already knew from classroom assessments and reviews of student work. Many teachers were also concerned about too much testing and time taken away from instruction and about a lack of time to fully utilize the data system.

Outcomes Associated with Efforts to Promote Data Use

Overall, district efforts were generally recognized and valued by staff in all three districts. The majority of teachers and principals we surveyed or interviewed reported they had received help with data analysis from district staff and had participated in valuable training that emphasized some form of data use. Despite these overall similarities, outcomes associated with district actions to promote the use of data for instructional matters were generally stronger and more positive in Monroe and Jefferson. This finding is not surprising, given that these two districts invested more time and attention into data use strategies. As a result, they were more consistent and successful in making data available for instructional decision making, and teachers and principals in these two districts were more likely to perceive the data as useful for making these decisions.

AUGUST 2006   509

First, teachers and principals in the study districts reported having multiple sources and forms of data available to be used for instructional planning and decisions. Nearly all principals and the majority of teacher survey respondents reported having access to state assessment results for their school as a whole and for students disaggregated by student groups (e.g., by class or student demographic characteristics) and by subtopic or skill. Yet, differences existed across districts in the degree to which data could be accessed and used in regular and meaningful ways. Although Roosevelt's data were available to teachers and principals, respondents in this district reported that they were in a less sophisticated and usable format, limiting the types of analyses that could be done and the degree to which school staff could use data to guide their work.

Second, teachers in Jefferson and Monroe were more likely to find data, when available, useful for guiding instruction in their classrooms. As table 4 displays, compared with teachers in the other two districts, smaller percentages of Roosevelt teachers reported finding each source of information, when available to them, useful for guiding instruction in their classrooms. Interestingly, we found less variability across districts in principals' views about the value of various types of data. While around half to two-thirds of teachers found data sources

TABLE 4

Percentage of Teachers Reporting Various Types of Data Were Moderately or Very Useful for Guiding Instruction

	Monroe	Roosevelt	Jefferson
Schoolwide student performance results on state test(s)	50	45	60
Your students' performance results on state test(s) disaggregated by student groups (e.g., grade level, classrooms, student characteristics)	60	44	63
Your students' performance results on state test(s) disaggregated by subtopic or skill	65	48	68
Your students' performance on district assessments	59*	48	66
Results of systematic review(s) of student work	79	62	70

NOTE.—This table reports the percentage of teachers reporting that they had each type of data available and found it to be moderately to very useful for guiding instruction in their classrooms (i.e., calculation of these percentages excluded teachers who reported not having these data available). It is worth noting that, on average, 20 percent of teachers in Monroe, 24 percent in Jefferson, and 31 percent in Roosevelt reported not having these data available.

* In Monroe this figure represents an average of two separate survey items: student performance on district interim assessments (an item only included on the Monroe survey) and student performance on other district assessments.

to be useful in guiding instructional decisions, nearly all principals surveyed in all three districts found all of these sources of information moderately or very useful for making decisions about instructional matters at their schools.

Third, staff at all levels in Jefferson and Monroe reported more extensive and frequent use of data to identify areas of weakness and to guide instructional decisions. Principals responding to surveys in Jefferson and Monroe were much more likely to report spending at least five hours a week reviewing student achievement data or reviewing student work with teachers. Principals interviewed spoke about reviewing test scores to identify student, classroom, and school deficiencies and regularly using this information to change curriculum sequencing and target resources to students and teachers.

Similarly, teachers in those two districts were more likely to report that their principals regularly helped them with data analysis. For example, approximately three-fourths of teachers responding to surveys in Jefferson (79 percent) and Monroe (72 percent) reported that their principals helped them adapt their teaching practices according to analysis of state or district assessments, compared with 56 percent in Roosevelt. Moreover, Jefferson and Monroe teachers repeatedly reported spending time in school- or grade-level meetings or professional development sessions reviewing student assessment results and other data to group students, develop targeted interventions, and identify student weaknesses and areas that required reteaching or reinforcement. As one teacher in Jefferson remarked about how he and his colleagues use data, "We look at why students were particularly weak in a particular area, and we've brainstormed and discussed what we could do in the classroom, what we specifically do as far as teaching to address that and to improve that. So it drives instruction."

Finally, district administrators in Jefferson and Monroe also were more likely to cite examples of data-driven decisions around instruction. For example, Monroe administrators decided to stop using a particular reading program at the third grade in their lowest-performing schools when local assessment results revealed misalignment with the state test. In addition, both districts often deployed district staff to support schools when assessment results exposed significant problems.

Factors Affecting Data Use

In summary, the degree of staff buy-in, perceived usefulness, and use of data were stronger in the two districts that invested more energy and resources in supporting schools' use of data. While district leaders in Monroe and Jefferson utilized different strategies, both districts created data-driven cultures. Several factors influenced districts' efforts to use data for instructional improvement purposes, including the history of state accountability incentives, access and

timeliness of data, perceived validity of data and flexibility to alter instruction, and staff capacity and support.

A history of state accountability provided incentives for some to use data.—The No Child Left Behind Act has created strong incentives for districts around the country to examine student achievement data and gauge student and school progress at meeting standards. Yet, unlike Roosevelt, Monroe and Jefferson experienced added pressures from long-standing state accountability systems aimed at developing individual school and student measures of achievement. As such, these two districts operated for years in an environment with strong incentives to carefully analyze student learning and test scores at individual student and classroom levels, which may have contributed to a stronger motivation and capacity to analyze data in this way.

Accessibility and timeliness of data limited use across and within districts.—In all three districts, access to and timeliness of receiving data greatly influenced individual use. Compared with the other two districts, Monroe achieved stronger access through its online data system. Even though technological problems limited access on some campuses, most schools had the ability to see a variety of student data, disaggregate it, run item analyses, and display results in multiple formats. In contrast, school staff in Roosevelt had to issue data requests to a district administrator or an outside organization that would run the analysis for them. Roosevelt leaders recognized that this arrangement limited opportunities for data to inform decisions in a timely way and were in the process of developing an online data system. Despite these overall differences, individuals in all three districts commonly complained that data were not timely. In Jefferson, for example, principals and teachers in more than half of the schools visited criticized the district's emphasis on using state test results in the SIP process because they felt these data were out of date and less relevant than other, interim assessment data.

Perceived validity of data greatly affected data buy-in and use.—School staff in each site often questioned the accuracy and validity of measures. These doubts greatly affected individual buy-in for the various data sources, which past research has identified as an important factor affecting meaningful data use (Feldman and Tung 2001; Herman and Gribbons 2001; Ingram et al. 2004). In Monroe, some principals and many teachers questioned the validity and reliability of the interim assessments, believing that some tests had changed in quality from the first administration to the second or that students were not motivated to perform well on them. Some principals and teachers in Jefferson and Roosevelt voiced similar concerns about state test data, believing the results did not provide student- or classroom-level item analysis (in Roosevelt) or were not good measures of student skills (in Jefferson). Similar to their Monroe counterparts, many expressed a preference for classroom assessments and reviews of student work, which were seen as more meaningful

512   American Journal of Education

and valid. As a result, to varying degrees, teachers in all three districts often reported relying on other data to inform their practice.

Perceived lack of flexibility to alter instruction limited data use.—When assessment data revealed problem areas that required reteaching, teachers in Monroe and Roosevelt often felt they lacked discretion to veer from district-mandated curriculum guides. Given the perceived pressure to stay on pace, many teachers opted to follow the curriculum instead of the data.

Staff capacity and support enabled data use.—As described earlier, numerous studies have found that school personnel often lack adequate capacity to formulate questions, select indicators, interpret results, and develop solutions (Choppin 2002; Feldman and Tung 2001; Mason 2002). Our study districts were no exception. While we observed a range of data-use skills and expertise in all three districts, capacity gaps were most visible in Roosevelt. Compared with those in the other two districts, Roosevelt teachers reported feeling less prepared to use data. For example, only 23 percent of survey respondents reported feeling moderately or very prepared to interpret and use reports of student test results, compared with 43 percent in Monroe and 36 percent in Jefferson. Compounding the reported lack of capacity were reports that principals were less likely to help teachers with these tasks and that professional development was less focused on data use, as reported above. According to interviews of district leaders in Roosevelt, data use had been less of a priority for professional development because appropriate data and data systems were not yet available.

In contrast, Monroe and Jefferson made stronger district-level investments in supporting school staff with data analysis. They employed several individuals in the district office with strong data-analysis skills and assigned individuals to "filter" data and make them more usable for school staff, for example, by completing initial analysis and summarizing results in easy-to-understand tables and graphs (a strategy found to be successful in several studies, such as Berhardt 2003; Choppin 2002; Herman and Gribbons 2001). In Jefferson, school-based coaches often took the first step of analyzing test results and presenting them in usable forms to school faculties. Both districts also targeted extra support for data use in the lowest-performing schools, frequently presenting state and district assessment data in easy-to-read reports (Monroe) and visiting schools to assist in planning and benchmarking progress (Jefferson).

IFL Role in District Use of Data to Inform Instruction

In recent years, an increasing number of organizations have emerged, both nationally and locally, to provide districts with assistance in meeting their improvement goals. These external organizations, sometimes called nonsystem actors (Cohen 1995), intermediaries (Bodilly 2001; Honig 2004), or reform

support organizations (Kronley and Handley 2003), generally seek to support system reform by building the capacity of school and central office staff to support improvements in teaching and learning. Support for data use is one of many areas in which these organizations can provide technical assistance to districts and schools.

This study investigated the role of one intermediary organization, the IFL, in influencing district work around data use. Results show the IFL made two key contributions to district efforts in the area of data-based decision making. First, some district leaders, particularly in Jefferson, reported gaining important concepts from the IFL around notions of accountability and the importance of benchmarking progress. In Jefferson, these concepts were applied to the design of SIP efforts, particularly in leaders' attempts to evaluate the implementation of SIPs in the lowest-performing schools. Further, administrators in several districts reported that exposure to IFL ideas led to more widespread feelings that instructional practice should be "open," that is, observed and discussed, as opposed to something that happens behind closed doors.

Second, the IFL promoted the implementation of one prevalent data strategy in all three districts: the use of Learning Walks to assess the quality of instruction in classrooms and schools. In all three districts, the IFL provided protocols, tools (e.g., rubrics), and professional development for staff on how to conduct these walks, record observations, analyze the evidence gathered, and make judgments about the quality of instruction as it related to best teaching practices. As one district administrator explained, the IFL "has given us that structure" for how a group of people walk through a school, collect information, and talk about teaching.[5]

Conclusion and Implications

In summary, although all three districts invested to varying degrees in multiple strategies promoting the use of data to guide instructional decisions, two districts focused much more on use of data. Jefferson's school improvement planning process was highly regarded and used to guide school decisions but was perceived to be overly labor intensive. Monroe's investment in interim assessments linked to data systems was seen as particularly useful for administrators but less so for teachers who preferred more timely, regular classroom assessment data. Overall, in both of these districts, principals and teachers reported more frequent and extensive use of data than did their counterparts in Roosevelt.

Several factors were identified as affecting the use of data by school and district staff. District efforts to focus on data were enabled by long-standing state accountability systems, accessibility and timeliness of data, teachers' views of the assessment results as valid measures of students' knowledge and ability,

and the degree to which school staff received training and support for analyzing and interpreting data. While we do not have data to suggest that the lessons learned in these three districts can be generalized to other districts attempting similar efforts to create a data-driven culture, the experiences nonetheless may provide important insights for policy makers and practitioners seeking to promote districtwide improvement through increased use of data. As such, the factors affecting data use in these three districts may have broader implications for practice.

First, a major challenge facing the three districts in our study was the need to provide data that were timely, valuable, and presented in a user-friendly format that could readily benefit teachers in their daily instruction. This finding supports that of current research showing that teachers face challenges both with having the time to analyze and interpret data (Feldman and Tung 2001; Ingram et al. 2004) and with having the skills needed to engage in the inquiry and analysis process (Herman and Gribbons 2001; Mason 2002). To address this challenge, administrators might consider offering more support in analyzing and interpreting data, as well as identifying strategies to address diagnosed problems. Such support could include focused training, as well as assigning individuals to work with teachers to filter data, that is, to better interpret the data. Districts might also consider investing in assessments that yield more regular data that teachers perceive to be valid, useful, and not time consuming.

Similar to that reported in Supovitz and Klein (2003), many teachers and principals in these three districts felt that state assessment data were not ideal for analyzing student performance and driving instructional decisions. School staff reported that state assessment data are not timely or adequately aligned with daily instruction to be particularly useful, are limited in subject and content coverage and often in the grade levels tested, and have a significant time lag before results are released. Across all three districts, school staff used multiple other types of test-based and non-test-based data in the data inquiry process, including district- or school-administered interim assessments, student writing samples and/or other examples of student work, and data gathered from formal and informal classroom visits. In this study, many teachers articulated the value of multiple types and sources of data to their inquiry process, supporting research showing that multiple measures of student performance from a variety of sources may enhance data use by allowing for triangulation of findings, providing greater balance, and reducing the stakes of any single assessment (Copland 2003; Herman 2002; Keeney 1998; NEA Foundation 2003). Therefore, districts might consider implementing assessment and data-analysis strategies that include multiple types of data collected at regular intervals to allow for a timely, balanced, and meaningful review of data.

Second, each district, to some degree, faced challenges due to a perceived misalignment between using data to guide instructional practice and imple-

menting other district reform initiatives. This misalignment was most pronounced in Monroe and Roosevelt, where each district had placed great emphasis on curricular reforms that standardized the content and timing of instruction across and within schools. Both districts expected teachers to implement the new curricular reforms and employed mechanisms to hold teachers accountable for following new district curricular guides (e.g., classroom visits). At the same time, the districts encouraged teachers to use student achievement data to identify particular skills or standards that students did not perform well on, expecting teachers to then alter their instructional methods or reteach particular topics to help students reach proficiency. However, some teachers felt that the district curriculum guides did not allow them the flexibility to address the needs identified by data analysis. For example, by reteaching certain topics they risked falling behind on district-directed curriculum pacing. In short, from the perspectives of some teachers, using data to guide instruction conflicted with other district instructional efforts. Districts seeking to promote greater data use by teachers might consider the nature of other instructional reforms, particularly those involving curriculum coverage and pacing, to ensure flexibility to alter instruction based on data analysis.

Finally, district capacity to assist school-level staff with data analysis, and with identifying appropriate interventions and/or changes to instructional practice as a result of data analysis, was a key factor in the three study districts. As noted above, research shows that many school-level staff lack the capacity to successfully engage in data use, both in terms of the skills needed to appropriately ask and answer questions using data and the associated technical skills needed for this work. Our research instead speaks to a lack of district capacity, particularly to support and bolster school-level efforts when the capacity of school staff is lacking. It is not surprising that some district officials may also lack the expertise or skill to analyze data and use results to drive decision making; yet knowledge that school staff may also lack needed capacity underscores the critical role districts may need to play in supporting school staff in this work. Each district in this study targeted technical assistance resources around data use to a subset of schools, which may have constrained effective data use in other sites. Availability of district staff and resources to assist school staff with data analysis is likely to be an important consideration for districts attempting districtwide strategies to promote data-based decision making. Districts might also consider providing professional development opportunities for central office staff to develop stronger data-analysis skills.

Linked to the notion of district capacity to support widespread data use is the technological capacity at the district level to house, analyze, and interpret data and consistently provide user-friendly reports in a timely manner to school staff. Only one of the three districts examined here, Monroe, implemented comprehensive, new technology to support the focus on data use. In general,

516   American Journal of Education

the system implemented in Monroe contributed in part to the relative success of their districtwide focus on data-driven decision making. In each of the other two districts, by contrast, implementing new technology or systems was only a relatively minor part of their overall strategy around districtwide data use. And in each, educators reported challenges related to access and ability to easily manipulate data. These findings suggest that districts consider and plan for appropriate technology and/or systems needed to support data use at the school level, in particular looking for guidance from existing research on the particular features of technology and/or data systems needed for successful data-driven inquiry in educational contexts (Bernhardt 2003; Herman and Gribbons 2001; Mandinach et al. 2005; Wayman et al. 2004).

In sum, the experiences of these three districts illustrate that efforts to promote a data-driven culture may be gaining prevalence in urban school districts, which may be particularly important considering the current policy context and accountability demands of No Child Left Behind. The findings discussed in this article demonstrate that districts can take actions that encourage and support the use of data for instructional decisions at both the district and school levels. However, several factors discussed here concerning the design and implementation of district policies may significantly influence the degree to which staff analyze and use data for instructional purposes and the types of decisions made in light of data analysis.

Given these findings, additional research in a larger and more representative group of districts and schools is warranted to further examine district strategies to promote data use and the outcomes associated with these efforts. In particular, findings from this article point to several additional questions, such as: Are certain types of data more useful at certain levels of the system? And if so, what are the implications for district policy making and resource allocation? Data from this study revealed that principals and teachers differed to some degree on the types and sources of data they found to be most effective for guiding their work. Additional research is needed to further investigate these differences. Additionally, our research raised questions about how and to what degree data-analysis activities translate into changed practice at the classroom level. How are teachers altering their daily classroom practice as a result of data use and to what effect? Researchers, policy makers, and practitioners would benefit from a more fine-grained study of data-based decision making that links data analysis to teacher practice and student achievement.

Notes

dation, RAND, or New Leaders for New Schools. An earlier version of this article was presented at the annual meeting of the American Educational Research Association, Montreal, April 2005.

1. To ensure anonymity, pseudonyms are used for the names of the districts in this article.

2. See Marsh et al. (2005) for a description of the Institute for Learning and its role in the broader study of districtwide reform efforts.

3. Though teacher response rates on surveys were relatively low in some sites, the survey data were used to support and triangulate findings seen in other data sources. Used in this way, we believe this represents a valuable source of data. Additionally, analysis and weighting strategies were used to test and bolster the validity of the teacher survey data. Analysis indicated that teacher and principal respondents in each district were reasonably representative of their respective population of teachers. Yet since systematic differences could still exist between responders and nonresponders, teacher survey data were weighted in an attempt to account for potential differences resulting from nonresponse and, in the case of Monroe, differential sampling probabilities. Please see Marsh et al. (2005) for a detailed description of analysis and weighting methodologies used to address issues related to teacher response rates and representativeness.

4. During the time of this study, curricular reforms and school-based coaching strategies were identified as focal district reform initiatives. See Marsh et al. (2005) for a detailed description of Roosevelt's reform efforts.

5. Additionally, the IFL contributed more significantly to other district reform efforts, particularly around building the instructional leadership capacity of principals. See Marsh et al. (2005) for a discussion of the IFL's broader role in other district reform strategies.

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