

Using Data To Drive Instruction: Teachers' Experiences of Data Routines in Six High-Performing, High-Poverty, Urban Schools

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Abstract

This qualitative analysis of teachers' experiences of school-level data routines is part of a larger, comparative case study, "Developing Human Capital Within Schools," conducted by the Project on the Next Generation of Teachers. Within one city, we interviewed 142 teachers and administrators in six high-poverty schools (traditional, charter, and turnaround), all of which had achieved the highest rating in the state's accountability system. Here, we analyze how teachers and administrators used student learning data to inform and direct instruction. In all six schools, teachers regularly and collaboratively gathered, analyzed and responded to a range of types of data, including common interim assessments, samples of student work, teacher-administered reading assessments, responses to questions on exit slips, teacher-made quizzes, unit tests, performance assessments, homework completion records and disciplinary records such as demerits and detentions. Importantly, the data practices in these schools extended well beyond efforts to simply raise state test scores, despite the significant pressure these schools experienced for improving their results. Teachers used data routines in conjunction with curriculum planning and other professional activities to collaboratively build their knowledge of what they were teaching, how to teach it, how to assess students' progress and what to do when students were not reaching standards.

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The use of student data to improve schools has been a high priority among policy makers for well over a decade. The No Child Left Behind Act [NCLB] of 2002 called for gathering, analyzing and using student achievement data to support school improvement in the hope that greater accountability would lead to higher expectations for all students, especially students of color and those from low-income families. This legislation was intended to promote better learning for all and to reduce racial and class-based achievement gaps (Diamond & Cooper, 2007). This policy's emphasis on data has successfully raised awareness about student achievement (Jennings & Rentner, 2006) and created an unprecedented sense of urgency about students' performance on high-stakes standardized tests (Rentner et al., 2006). In addition, there is ample evidence that states and local districts are using data to inform decisions about the status of schools and teachers. However, it is less clear how educators within schools are using data to inform decisions that are closely tied to everyday student learning.

Most districts nationwide still grapple with how to make relevant student learning data accessible to teachers in efficient and helpful formats (Means, Padilla, & Gallagher, 2010). Evidence suggests that at the school level student achievement data are most often used for school-wide improvement planning and less frequently to inform teachers' work with students (Means et al., 2010). However, the pressures of rewards and sanctions built into federal, state and district accountability policies have encouraged schools to expand their use of data to improve student performance on tests. While some schools and teachers have developed narrow strategies aimed specifically at improving outcomes on standardized test (Booher-Jennings, 2005; Diamond & Cooper, 2007), others have developed a more comprehensive response, intended to improve learning—not simply test scores—for all students (Horn & Little, 2010; Little, Gearhart, & Curry, 2003; Wayman & Stringfield, 2006).

Many for-profit and non-profit organizations partner with schools and districts to support their ongoing use of data. In addition, many schools have developed their own systems and structures to support data use in their organizations, often with assistance from their district or charter management organization [CMO]. Typically, these practices are intended to start with a school-wide analysis of summative data from state standardized tests and lead the teachers and administrators to formulate school-wide goals, professional learning plans and initiatives to support students. Teachers could then engage in ongoing data inquiry cycles (Boudett, City, & Murnane, 2005), with their grade level or content colleagues. They could meet regularly with peers to examine data, identify students' learning struggles, craft ways to address them, implement those approaches, and then return with data to reassess and repeat the cycle. An array of types of data could be used, with some being chosen by the district or CMO while others remain at the school's or the teachers' discretion. As yet, relatively little is known about how teachers experience these and other types of data routines in schools.

In this exploratory study, we examined how teachers experienced data use practices in six high-poverty schools, each of which had demonstrated success, based on state accountability ratings that measure growth in standardized test scores and progress on closing proficiency gaps. The schools included a mix of charter and district schools located in one Massachusetts city. At each school, teachers described meetings in which they regularly gathered and analyzed student data with their colleagues, in order to inform their instruction. Teachers and administrators described their schools as experiencing an acute sense of urgency about improving standardized test scores. Therefore, there was a strong emphasis across all schools on carefully tracking every child's academic progress. However, teachers' and administrators' efforts went beyond a simple, singular focus on raising test scores. Data routines compelled teachers to develop, revise and

reach agreements about what they wanted students to learn, how to assess their progress, and how to respond when students struggled. Data use practices in these schools, which established high expectations for all students and teachers, contributed to professional norms within the school that encouraged colleagues to share and analyze assessments of students' learning.

Teachers were in many respects engaged in “joint work” (Little, 1990).

In what follows, we situate this study in the research literature about data use within schools. After presenting our research methods, we describe the schools in the sample, providing relevant information about similarities and differences in their histories and policy contexts. Next, we present our findings and conclude with a discussion of implications for practice, policy and research.

Literature Review

Researchers have investigated data use by actors at multiple levels of the educational system, ranging from federal regulators to teacher teams within schools. At the federal and state levels it is clear that data plays a significant role in informing and driving policymakers' decisions. In the years after NCLB passed, researchers found that students were taking more tests than ever before (Jennings & Rentner, 2006), yet it remained unclear how the data were actually used by teachers day to day with students.

Across the US, How Are Data Being Used?

In order to understand implementation of the NCLB Act, The Center on Education Policy administered questionnaires to a nationally representative sample of school districts and conducted case studies of individual districts and schools. One focus of their investigation was data use practices, a prominent feature of NCLB legislation. (For reports see *From the Capital to*

the Classroom at <http://www.cep-dc.org/>) Researchers found that schools and school systems were paying much more attention to aligning curriculum and instruction with the standards that drive the assessments and were examining student assessment data much more carefully than in the past (Jennings & Rentner, 2006). Seventy-one percent of the 229 districts surveyed across 50 states had increased time spent on reading and math (both tested subjects) at the expense of other subjects. Students took more tests than ever, and schools were using the tests to identify achievement gaps among sub- groups of students. However, it was unclear how this information was being used. Extant research suggests that that school systems are responding to the policy, but little is known about how these responses influence learning and teaching in classrooms (Rentner et al., 2006).

In another national investigation, *The Study of Education Data Systems and Decision Making*, Means and colleagues (2010) examined data use in districts and schools using both national surveys and site visits to a purposive sample of 36 schools in 12 districts, selected for their active involvement in using data for instructional improvement. Although districts had made progress in developing or acquiring appropriate technology to provide flexible and efficient access to a variety of data sources, they were not routinely supporting schools in using data to inform their daily work.

At the school level, Means and colleagues (2010) found that, more than any other activity, educators were using student data to develop annual school improvement plans. Teachers rarely reported using student data when they reflected on ways to improve their instruction. Instead teachers reported analyzing data to plan curriculum, place students in particular classes (including specialized support situations) and group students within a class for targeted interventions. The researchers concluded that several conditions encouraged data use in

the schools: having timely interim assessment data available to teachers, providing common assessments for teachers to share and review, and engaging school leaders in designing and implementing routines to support data use. However, the study suggested that such conditions were rarely present.

How Do Schools Respond To The Pressures Of Accountability Policies?

Not surprisingly, the policy context in which teachers worked influenced how they interacted with data. Several studies conducted in the years following enactment of NCLB suggest that the policy may have had unintended consequences for how teachers used the data to inform instruction. Legislators and educational officials had hoped that by creating high expectations for all students and providing districts, schools and teachers with detailed disaggregated data about how their students fared on high stakes tests, teachers would respond by improving curriculum and instruction for all students, especially those who were chronically failed to improve.

However, researchers found that in the name of data-driven decision-making, many schools and teachers that hoped to improve the school's profile on state accountability reports, allocated resources and focused attention on some students rather than others. Diamond and Cooper (2007) explored this phenomenon using data from an in-depth longitudinal comparative case-study of school leadership in 13 elementary schools in Chicago Public Schools as part of The Distributed Leadership Project (Spillane, Hallett, & Diamond, 2003). Schools that were not on probation and had a history of achieving higher scores than their counterparts used data for systematic school-wide instructional improvement. For example, teachers worked together to make charts of the skills they were intending to teach and then used data to track all students' progress in acquiring those skills. In contrast, the schools that were on probation for having a

history of lower test scores used the data to make decisions in order to get off of probation. For example, they determined which students were closest to reaching the benchmark scores and provided them with additional instructional support, at the expense of other students they deemed were unlikely to improve or were already succeeding. These schools might have successfully avoided sanctions but were not fundamentally improving instruction for all students. Also, having found that black students and students from low-income families were disproportionately represented in Chicago's lowest performing schools. Diamond and Cooper warned that such responses to the pressures of NCLB could increase gaps in racial and social class achievement over time.

Booher-Jennings (2005), who conducted a qualitative study in an urban elementary school in Texas, found similar responses to state testing requirements. The school's teachers analyzed their data in order to identify students who were most likely to improve and surpass the benchmark score for proficiency, the so-called "bubble kids," who were close to the cutoff. Then, in the name of "data-driven decision-making," they increased instructional support for these students, in part by withdrawing support from the lowest performing students who seemed unlikely to achieve proficiency. Booher-Jennings concluded that educators in this school equated data-driven decision-making, of any sort, with effective school improvement and raising test scores with "good teaching" (p. 231).

These studies raise valid concerns about the perverse incentives that often are part of federal and state accountability policies, but they provide little insight into how schools might effectively use data to improve learning and teaching, particularly for students in the lowest performing schools. Ingram, Louis and Schroeder (2004) sought to understand the effects of accountability policies in nine high schools from across the US that were recognized as leaders

in implementing strategies for continuous improvement. Although these schools were not focused on “gaming” the tests, they also were not using the student achievement data to inform their daily work. Based on a two-year study, Ingram and colleagues found that teachers were willing to use student achievement data for school wide decisions but were much more likely to rely on anecdotal information or their intuition when making decisions related to their classroom. Teachers did not trust the data from standardized external assessments and routinely dissociated their practice from it. Teachers reported having insufficient time to collect what they perceived to be more relevant data. The researchers suggested that educators lacked agreement about which student outcomes they valued, how to measure student learning, and whether data should and could be used to improve instruction.

How Do Teachers Respond to Ongoing Data Routines?

Other researchers have focused less on the accountability policies and more on understanding how teachers respond to data routines in schools. By conducting longitudinal, in-depth case studies of schools that were selected because they were engaging teachers in ongoing data routines designed to improve learning and teaching, these researchers identified the potential of this collaborative work and the implementation challenges it presents.

Wayman and Stringfield (2006) studied three schools in three different states that were using computer-based data systems from outside vendors. Teachers reported benefitting from training during professional development sessions on how to use the systems and having time during weekly team meetings for collaborative data analysis. Teachers particularly valued being able to use multiple sources of data to analyze student learning. For example, they might consider results on multiple assessments of literacy skills along with their professional judgment

in order to determine next steps for student learning. Teachers believed that, as a result of these new practices, they had a better understanding of students' learning needs and a greater sense of collaboration and professionalism. They also believed that they had improved their teaching practice. However, interestingly, many of their examples were actually instances of teachers providing more instruction or instructing students in different groupings, rather than examples of changes in pedagogy.

Other studies found variability in how schools implemented data routines and highlighted factors that enabled productive use of data. In a two-year study of two teacher work groups in two urban high schools, Horn and Little(2010) analyzed teachers' transcribed conversations rather than relying on teachers' self-reports. They found that, despite having enthusiastic, skilled professionals on both teams, one team was far more likely than the other to productively discuss problems of practice presented by colleagues. This team, unlike their less productive counterpart, had shared terminology and concepts about learning and teaching, had a common curriculum, and were supported by a leader who participated in ways that periodically helped to focus the group and deepen the conversation.

In another study of teacher teams across four schools, Little, Gearhart, Curry and Kafka (2003) focused on teams that were regularly presenting, analyzing, and discussing samples of their students' work with colleagues—Looking at Student Work (LASW)—as a data process. The researchers found that the productivity of this process varied depending on the amount of guidance provided by facilitators about what student work to select and how to present it. Across all of the schools, they found that teachers experienced discomfort in talking about their practice and often demonstrated defensiveness by joking in response to others' comments. The

researchers found that, in order for teachers to realize the full potential of the process, they needed more time and more facilitation support.

How Might Data Use Affect Professional Culture In Schools?

As demonstrated by Little and colleagues (2003), collaborative data routines challenge longstanding norms of privacy and autonomy in the teaching profession (Little, 1990; Lortie, 1975) by compelling teachers to examine each other's instructional practices. This raises an important question: Is it a prerequisite that schools have a culture that supports collaboration and continuous improvement in order to productively engage with student data in ways that influence their daily work? Or, can the data routines, themselves, help to shift these professional norms? A large body of literature suggests that collaborative cultures support school improvement, (e.g., Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Hargreaves & Fullan, 2012; Little, 1990; Rosenholtz, 1989) are valued by teachers, (Johnson, Kraft, & Papay, 2012; Kardos, Johnson, Peske, Kauffman, & Liu, 2001; Little, 1982) and correlate with higher rates of teacher retention (Allensworth, Ponisciak, & Mazzeo, 2009; Johnson et al., 2012; Ladd, 2011). For that reason, we sought to understand the relationship between data routines and close collaboration among teachers.

A study by Sherer and Spillane (2011) suggests that data routines can contribute to building a culture of collaboration to support instructional improvement. The researchers found that the school leaders in a K-8 school were able to use an ongoing data cycle to focus teachers' attention on improving learning and teaching in more intensive ways than they previously had accomplished at that school. In this four-year longitudinal study, the researchers also identified subsequent changes in instructional practice. Sherer and Spillane suggest that the intentional design and enactment of organizational routines, such as this data practice, can help to build

norms and culture in a school. Many questions remain about the structures, capacity, and other conditions necessary to support this type of work.

As is evident from this research, practices for data use in schools rarely are integrated with teachers' daily work and, even when they are, teachers experience varying degrees of success. In their effort to improve teaching and learning, administrators and teachers in the six high-poverty schools of this study were using a wide range of school-level data routines as part of their daily work. Here, we explore what they did and how they experienced and assessed these practices, with attention to the role that organizational and political contexts played in their efforts.

Methods

This article is based on a qualitative, comparative case study embedded in a larger study, "Developing Human Capital Within Schools," conducted by the Project on the Next Generation of Teachers. The larger study examines how six high-poverty, urban schools—all of which received the state's highest accountability rating—attract, develop, and retain teachers. Here we focus on teachers' and administrators' experiences and assessments of data use in their schools.

Research Questions

- 1) How, if at all, do teachers and administrators use data to support improvement in six high poverty schools, all of which are succeeding according to state accountability ratings?
- 2) How do teachers describe and assess their experiences with data use in their schools?
- 3) How, if at all, do teachers and administrators' accounts vary across schools?

Sample Of Schools

Our sample selection was guided by four principles. First, we sought a sample that included charter and district schools located in one city in Massachusetts. Second, we looked for

schools that served high-poverty populations (where 70% or more of students were eligible for free or reduced-price lunch) and also enrolled high proportions of students of color. Third, we sought schools that were considered high-performing, having achieved the highest rating in the state's accountability system. Fourth, we sought schools that employed distinctive approaches to human capital development.

To attend to the first three principles, we examined publicly available demographic and student performance data. In seeking out schools that were having “success” with students from low-income families, we used the state's accountability ratings as a proxy for students' academic success. The Massachusetts Department of Elementary and Secondary Education [MA DESE] rates every school on a scale from 1 to 5, with 1 denoting the highest performing schools. The formula calculating a school's rating relies heavily on results from the Massachusetts Comprehensive Assessment System [MCAS], the state's high stakes standardized test. The formula accounts for growth in student performance and the school's success in narrowing proficiency gaps among various subgroups of students, using a weighted average from the four most recent years of MCAS data. Although this definition of success is limited because it relies heavily on standardized test scores, it was the best proxy available for identifying schools that had positive effects on students' learning. In addition, schools were judged by these ratings, both by the state and district in assigning sanctions and rewards, more generally by funders, school boards and the popular media.

To attend to the fourth principle, we consulted our professional networks and considered available information about the approaches to human capital development used by specific schools and, in some cases, charter networks. Based on our initial inquiry, we drew up a sample of six schools—all geographically located within the boundaries of one large urban school

district, Walker City School District [WCSD].¹ The sample included three district schools (one traditional and two former turnaround) and three charter schools authorized by the state (including one restart of a chronically underperforming district school). All schools were elementary and/or middle schools, which facilitates cross-site comparisons. To recruit schools, we contacted school officials explaining our study and requesting their participation. All six schools we approached agreed to participate in the study (For descriptive statistics for sample schools see Table 1 below). The purposive nature of our sample has allowed us to conduct an in-depth, exploratory study of schools in a particular context. However, because the sample is small and deliberately selected, we cannot generalize our findings beyond our sample.

Data Collection

Interviews. Between March and June 2014, we conducted semi-structured interviews with 142 teachers, administrators and other staff in the six schools. Administrator interviews lasted approximately 90 minutes and teacher interviews lasted approximately 45 minutes. At most schools, all members of the research team were present for interviews with the principal and CMO director. In addition all three researchers conducted interviews with teachers at each school, which facilitated cross-site comparisons, improved inter-rater reliability in coding data, and ensured that each research team member knew about each school's structures and culture.

We also purposively constructed our interview sample. At each school, we first interviewed school administrators in order to understand both what processes they used to select, develop, and retain teachers and why they used them. Then, at each school, we recruited a sample of teachers, varying in demographics, teaching experience, preparation, and teaching assignment. We solicited teachers' participation in various ways, including requests by email,

¹ All names of schools, districts and individuals are pseudonyms.

flyers in teachers' mailboxes, and principals' recommendations. We also relied on recommendations from the teachers we interviewed about others in their school who might hold views different from their own. Teachers were promised confidentiality and anonymity as participants in the study. In addition, we interviewed other key staff members (e.g. curriculum coaches, program and family coordinators) when it became apparent that their work and views would inform our understanding of teachers' experiences.

In each school, the number of teachers we interviewed varied depending on the school size, the complexity of the organization and the practices used. We interviewed between 31% and 56% of the teachers at each school. (For descriptive statistics about the interviewees, see Appendix A). We used semi-structured protocols (Appendix B) to guide our interviews and ensure that data would be comparable across sites and across interviewers (Maxwell, 1996). All interviews were recorded and transcribed verbatim.

We did not anticipate prior to the study that data routines would be such a high- priority strategy for improving teaching and learning at all of the schools, so we had not included a direct question about data use in our protocol. However, several of the questions in the protocol led interviewees to discuss data routines and the professional culture that supported these practices. The interview protocols also included questions that encouraged participants to discuss the school's systems and processes related to teachers' professional learning, including work with colleagues. Administrators were asked to explain how their teachers were organized into teams and what work they did together. In addition, questions about their overall view of the school and about hiring created opportunities for interviewees to discuss the professional culture of the school. With administrators and teachers, we used follow-up questions to explore their responses. In order to learn about how teachers assessed their experiences, we also asked them to

reflect on which of the opportunities they discussed worked well for them and which did not. By interviewing teachers and school leaders about a range of strategies to develop human capital in their schools, we sought to understand the connections among their approaches within a school. In our visits to the schools, we observed a wide range of day-to-day practices and looked for evidence about the school's organizational culture.

Although this design, by definition, limits the depth of information we collected on any one topic, such as data use, it situates that practice among other strategies for developing human capital, allowing us to consider connections among them in our analysis.

Document collection. Although interviews were the main source of data for this study, we also gathered many documents that describe school policies and programs related to recruiting, developing and retaining their teachers. The collected documents, which inform analysis of interview data in this study, included teacher handbooks, school policies, assessment calendars, data use protocols, and data analysis forms used by teachers.

Data Analysis

After each interview we wrote detailed thematic summaries describing the participant and summarizing his or her views. First, we identified themes using *etic* codes drawn from the literature on the elements of developing human capital. Then, we used thematic summaries to analyze each site individually and to conduct cross-site comparisons, identifying common themes and differences. We used this preliminary analysis to supplement the *etic* codes with *emic* codes that emerged from the data (Miles & Huberman, 1994). For example, many interviewees reported on multiple strategies for using assessments to monitor student achievement and plan interventions. Although we had not identified “monitoring students” as a theme from our review of the literature, preliminary analysis led us to include this code so that

we could systematically attend to this activity in our analysis. We then used this preliminary list of codes to review a small sub-set of the transcripts, individually and together, in order to calibrate our understanding and use of the codes, as well as to refine the list and definitions. We repeated this process twice in order to finalize the list of codes and to improve inter-rater reliability. We then thematically coded each transcribed interview using the software, Dedoose (For a list of codes see Appendix C).

After coding all interviews, we engaged in an iterative analytic process, using data-analytic matrices (Miles & Huberman, 1994) to address our research questions about data use. We relied on Dedoose's function that allowed us to sort data by codes and by particular characteristics of interviewees to investigate our research questions. We analyzed the data for each school separately completing a data analytic matrix (Miles & Huberman, 1994), which showed the components of data use at each school, identifying who participated in data routines, what data they had access to as well as how they responded to the data. We then reviewed school documents such as assessment calendars, data meeting protocols and data analysis forms to gain additional information about data use processes at each school. After establishing a clear understanding of the different elements of data processes at each school, we created a cross-school matrix, to allow us to consider similarities and differences in teachers' and administrators' perspectives within and across schools. Finally, we wrote an analytic memo comparing data use practices at the six schools in order to discern patterns in the data about how teachers and administrators experienced and assessed these practices.

We used several strategies to address risks to validity. Throughout the process, we returned to the data to review our coding and check our emerging conclusions, seeking rival explanations or disconfirming data (Miles & Huberman, 1994). We also shared analytic memos,

outlines, and drafts among ourselves and with colleagues who are familiar with this line of research but not involved in this project so that they might offer alternative interpretations of the data.

The Schools and Their Context

The schools in this study are similar in several respects and quite different in others. A brief discussion of their histories and policy requirements provides contextual information that informs the subsequent analysis and discussion.

The Charter Schools

Naylor Charter School and *Rodriquez Charter School* were well-established state-authorized charter schools that opened their doors 10 and 20 years earlier, respectively, to serve elementary and middle school students from the area. Both were freestanding entities at their inception, although Naylor Charter eventually became one of three schools in the Naylor Charter Network. As charter schools, they were completely free of all local district policies and received public funding through the state, rather than the school district.

Kincaid Charter School had been selected by the district and authorized by the state to “restart” a failing WCSD middle school in 2011, three years prior to this study. Kincaid administrators visited students’ houses and successfully recruited more than 80% of the students who had been enrolled by the traditional school before the restart, more students than typically returned to the school each year under the prior administration. School officials promised, and Kincaid delivered, significant and rapid gains in student test scores. In accordance with the requirements for restarting a school, Kincaid had invited current teachers from the school to apply for positions in the new charter school; however, very few applied and no one who did was

asked to return. When Kincaid re-opened as a within-district charter school, all teachers and staff were new. Because Kincaid was an in-district charter, the WCSD teachers union represented its teachers. The school had been granted exceptions from the WCSD teachers contract, giving them extensive autonomy to define teachers' working conditions. In addition, Kincaid Network and school leaders had autonomy over their budget, curriculum and assessment, as defined in their charter with the state.

The District Schools

Dickinson Elementary School was a century-old district school that served a largely immigrant student population, most from the school's surrounding community. In recent years, the district and the state recognized Dickinson for growth in students' scores on the state standardized test. Historically, the school had experienced very little teacher turnover and many teachers we interviewed there talked about having waited for years to apply for an opening at Dickinson. In fact, when we conducted our study, over half of their teachers had worked at the school for more than 20 years. The WCSD teachers union represented Dickinson's teachers, and the school was bound by the WCSD collective bargaining agreement, as well as other state and district policies. Dickinson could be characterized as a traditional district school, implementing district policies as required and taking advantage of district resources such as data coaches, district-designed interim assessments, and curricular materials.

Hurston K-8 School and *Fitzgerald Elementary School*, also part of WCSD, had histories that differed substantially from Dickinson's. The state had placed both in turnaround status as chronically underperforming schools four years prior to the study. At the beginning of the "turnaround" process, the state required the schools to replace at least 50% of the existing faculty and the principal. After a process of reviewing the performance of current teachers, Hurston's

new principal replaced about 80% of the school's teachers and Fitzgerald's replaced about 65%. In subsequent years, both schools demonstrated substantial growth on state standardized tests, allowing them to exit turnaround status, each in three years. Although school leaders and teachers at both schools were proud of this accomplishment, they were also forthcoming about the need for continuing improvement.

After exiting turnaround status, both Hurston and Fitzgerald, with support from their teachers, requested and received significant exceptions to district policies in order to continue their reform efforts after exiting turnaround status. For example, both schools were granted autonomy in hiring and budget, as well as flexibility in scheduling teachers' time, additional PD hours, extended learning time for students and decision rights regarding curriculum and assessments. Although both schools were part of WCSD, they continued to have significant school-based control of their organizations.

Table 1. *Selected Characteristics of Six Sample Schools*

School Name	School Type	Grades	Estimated Enrollment	% Low-income students	% African American or Black Students	% Hispanic or Latino Students	% Other Non-white students	% White Students
Dickinson Elementary	Traditional District	PK-5	370	76	4	85	2	9
Fitzgerald Elementary	District - Former Turnaround	PK-5	390	85	70	25	3	2
Hurston K-8	District - Former Turnaround	PK-8	800	75	41	54	4	1
Kincaid Charter Middle	Charter – Restart of District School	6-8	475	88	50	30	10	10
Naylor Charter K-8	Charter	K-8	500	82	70	24	5	1
Rodriguez Charter K1-8	Charter	PK-8	420	72	55	20	7	18

*Percentages are approximated for confidentiality purposes.

Rigorous High Stakes Standardized Tests

All six schools were required to administer the state's standardized test, Massachusetts Comprehensive Assessment System [MCAS]² each spring to their students. It was aligned to the Common Core State Standards [CCSS], which were adopted by Massachusetts in 2010. MCAS included multiple choice, short answer and open response questions and, in certain grades, a written composition. Researchers who compared standards for proficiency on state tests to standards for proficiency on National Assessment of Educational Progress [NAEP] found wide variation across states, but rated Massachusetts' standards for proficiency among the best in the US. (Bandeira de Mello, 2011). In general, the MCAS was regarded as a more challenging assessment than most state tests nationwide. In addition, Massachusetts' students did well in comparison to other countries in international assessment results including the NAEP exam (National Center for Education Statistics (ED), 2012; OECD, 2011).

Findings

In all six schools, teachers and administrators placed a high priority on supporting students' academic performance, but for most, their sense of professional obligation and their hopes for their students extended well beyond raising test scores. Nonetheless, teachers felt significant pressure to ensure their students scored well on the MCAS.

Across the sample, teachers were expected to carefully monitor and support every student's achievement and improvement. They participated in ongoing routines for gathering, analyzing and responding to student learning data. Through these data practices and other professional activities, teachers and administrators in these schools were coming to agreements

² Although some districts and schools in MA were piloting Partnership for Assessment of Readiness for College and Careers [PARCC] as a summative test, all of the schools in this sample were preparing to take MCAS in the year of data collection.

(and grappling with disagreements) about what they wanted students to learn, how they intended to measure that learning and how to respond in the face of learning struggles. Almost all teachers interviewed, endorsed data use in their schools as an effective practice that supported them and their students in their efforts to improve.

State Test Results Played a Prominent Role

In these six schools, teachers and administrators were acutely aware of and driven by their students' performance on MCAS. The Massachusetts DESE, their district or network, their community, their funders and the media routinely judged these schools based on their test scores. In some cases, the schools had been closed or might be closed if their results did not continue to meet expectations. For some, continued funding depended on maintaining and improving performance. As previously noted, all six schools were rated at level 1 in their accountability ratings, which reflects a notable degree of success in terms of growth and closing proficiency gaps among subgroups in students' scores on MCAS. In addition, five had received commendations from the state department of education in recent years for high achievement or for significant growth on student test scores. Two schools had been finalists in competitions sponsored by non-profit organizations that recognized schools for significant improvement. A sense of urgency and persistence regarding students' MCAS results permeated the cultures and practices in these schools.

Teachers felt significant pressure regarding high-stakes tests. Across the sample, teachers and administrators repeatedly talked about feeling responsible to help students score well on the MCAS. A Kincaid Charter teacher explained,

The stakes are very high in terms of us producing test scores that show growth. At the end of the day [our school] was founded on the premise that we would improve test scores that were being generated previously, ... which objectively, theoretically, [is]

something I believe in, but in practice has become extremely stress-producing and anxiety-producing.

Across schools, teachers offered different explanations but remarkably similar descriptions of the pressure they felt. A Rodriguez teacher reported,

Our board of directors wants to see that our MCAS results are good. That...trickles down to the teachers that there's an expectation that the scores are going to be in a certain place. Because of that there is a lot of pressure to make sure the test scores are where they should be.

Some teachers agreed with the views of one who explained that the pressure increased as she approached "test season," when there was "a really, really high degree of oversight ...It just feels like a really high-pressure situation." In several schools, administrators spent additional time working with teachers or teacher teams whose students' test results were considered to be below expectations. Notably, although administrators did not use value-added measures in the teacher evaluation processes, teachers were required to demonstrate progress on student learning goals measured with scores on MCAS or interim exams. Teachers' success in achieving these goals influenced their evaluation. In two of the schools, students' test scores also influenced teachers' bonus pay.

Schools Relied on Data In Their Daily Work

Although the annual state standardized test results figured prominently in the ethos of these schools, their data routines went well beyond strategies to raise test scores. We never directly asked interviewees about data routines, yet, time and again, teachers and administrators spoke of the substantial role that data analysis played in their daily work.

Teachers across the sample appreciated regular use of data in their schools and saw it as one of its organizational strengths. A Kincaid Charter teacher who had been teaching for ten years at different schools praised the fact that they were, "incredibly, incredibly focused on data here, incredibly." A teacher at Dickinson with eleven years of experience had a similarly

emphatic report about the role of data at her school. “Data, data, data!” she exclaimed and then went on to explain that the increased focus on analyzing student data had “made a huge difference” and contributed to a “rigorous environment.” A Hurston K-8 teacher with eight years of experience contrasted his school’s regular use of student data with that of his previous school.

The way in which we have systemized using data to drive instruction here just was never a conversation at [my old school.]... The meetings that we have are really driven by looking at student work. ... The fact that the time itself is even carved out and that there is an expectation [is different than my old school].

He characterized the organized use of data as “high-level work.” Across schools, teachers were surprisingly consistent in saying that school-wide and instructional decisions should be informed by objective information about student learning, not just teachers’ impressions of teaching. They provided abundant examples of formal and informal use of data weaving through professional dialogue and activities in all six schools.

Hiring teachers who believe in data-driven instruction. School leaders in this sample realized that not all teachers would want to work in an environment with high levels of pressure related to student achievement and a relentless focus on student data. A Hurston K-8 administrator explained,

There is a lot of data pressure in terms of looking at student growth. Not just MCAS but in all sorts of progress monitoring that we do. Some people honestly just don’t want that. ... [Y]ou can go to many schools and not have that kind of intensity.

For this reason, when administrators and teachers in several of the schools screened applicants for teaching positions, they attended closely to the candidates’ interest and skills in using data to inform their instruction. In describing what he looks for in prospective teachers the principal at Hurston K-8 said, “I wanted people who are comfortable with data...I ask [candidates] to bring data and [explain] how they use it to plan.” The principal at Fitzgerald K-5 explained that they often asked prospective teachers to meet with current teachers who were analyzing student work

and planning lessons in order to see how the candidates responded to the use of student data. A teacher at Naylor Charter explained the role of data use in the school's hiring process.

We just believe in data. ... We use it a lot to assess where kids are weak and where they need to improve more. It just informs our teaching. ... It informs how we plan curriculum. It informs everything. If we are interviewing people who are not experienced at using data or maybe even have some opinions against it—they don't really like the idea of it. That might be a problem.

School-Wide Structures to Promote Data Use

A closer look at the formal structures for data routines in these schools reveals how they were designed to help teachers collaboratively examine what they taught, how they measured student learning, and how they responded when students had not mastered material or skills

Periodic, common assessments to monitor student progress. All schools required teachers to administer interim assessments in academic subjects approximately every quarter. These assessments then became central to the teachers' data routines. At Dickinson and Fitzgerald, teachers used the school district's interim assessments for Math and English Language Arts [ELA]. At Hurston K-8, Rodriguez Charter and Kincaid Charter Schools, administrators purchased quarterly assessments in English Language Arts [ELA] and Math from a nonprofit organization. At these three schools, teachers of other subjects, such as science and social studies, developed or adopted common assessments with their teams. Naylor Charter's CMO leaders had developed their own assessments for core academic subjects at each grade. Across all six schools interim assessments were aligned with both the CCSS and the school's curricular scope and sequence. The tests assisted teachers in assessing students' learning of the content that had been taught most recently. They were formatted to resemble MCAS and both teachers and administrators said they used the results to predict how well students would perform on the annual high-stakes state standardized tests.

Soon after administering the interim assessments (often within a day), teachers received detailed data reports about the performance of each child in each class on each problem, including correlations between the items and particular standards. Teachers and administrators then met to analyze the results and develop action plans. This data routine occurred during the weekly team meeting among grade-level or content area teachers or during professional development sessions devoted to this process.

Teachers explained that, as they interpreted and responded to the results of interim assessments, they could count on guidance from trained teacher leaders, school and network administrators, instructional coaches and data coaches from the district or a non-profit company. In some schools, administrators facilitated data meetings, while in others they participated along with the teachers. In addition, teachers used structured protocols and/or forms provided by their administrators or the non-profit company to guide their work. A teacher in her second year at Rodriquez explained the basics of the framework that guided her analysis of interim assessment data.

[We] go through the data, and I have an action sheet that I need to fill out, which are my first response to looking at the standards we either did well or poorly on, as well as looking at individual children, as well as setting up my own action plan.

Although the approaches and protocols varied from school to school, they always began with teachers analyzing the data in order to identify misconceptions or gaps in students' understanding relative to the learning standards. One teacher said that she and her colleagues aimed to understand "what students know and don't know," while another said that she wanted to understand where students' "strengths and struggles are within the curriculum" as the first step in any discussion of data.

Teaching to the test or using the test to support teaching? Despite having generally positive views about the interim assessments, many teachers also acknowledged a tension

between “teaching to the test” and using the tests as a tool to support their teaching. Teachers associated this particular data routine most closely with the pressure to continuously improve the schools’ test results.

Administrators acknowledged the testing “trap.” Most teachers believed that their school leaders wanted the schools to focus on more than just producing desirable test scores and several shared specific examples to explain why. An experienced teacher at Naylor Charter commented, “I think that [the network director] honestly believes that... ‘No, we don’t want you to feel like the MCAS is the end-all be-all.’” However, she observed that “most of the teachers . . . especially the younger teachers [have that feeling]. They get really scared about their MCAS scores.”

An administrator at Hurston K-8 voiced the concerns of many of her counterparts in other schools. “You can go very wrong with testing. All you do could be testing and test prep.” She spoke of one team where teachers discussed this “trap” regularly: “They really want to ensure that that’s not something that happens here, which I really respect and is really important to this school.” She explained that, as a school, they were not prepared to ignore the tests either. “Then how do you also ensure that there is the accountability piece? That we are measuring and responding to data about what our kids are able to do in that moment?” According to various accounts about this team, the administrators and teacher leaders tried to capitalize on this disagreement in order to promote discussion of the standards and increase accountability for teaching them, rather than allowing the disagreement to derail their collaborative work. An experienced teacher from Rodriguez Charter recalled the principal’s response when some teachers expressed concern about items on an interim test.

“Well, don’t just teach something because you think you have to teach it because of [interim test.] If that’s the case, then we need to decide: Do we just not do [an interim test] in second grade? Do . . . we cut out those questions? . . . Don’t ever just do

something.” She wasn’t saying it in a confrontational way, just...”If you don’t think it’s the best way to do it...then let’s figure it out.”

Despite administrators’ efforts to convince teachers that their work was not only about raising test scores, this tension was not easily dismissed.

Most, but not all, teachers accepted the focus on test data. Most of the teachers willingly accepted the substantial role that test results played in their schools, believing that focusing on students learning the standards served them well. A fifth grade teacher reflected on the role that testing played: “Do I teach to the test? I would say, ‘No, I don’t.’ I use the information that I get from [interim tests] and their MCAS scores and I’m going to say, ‘Okay, what’s happening with what kids?’ ... I think yes, I do teach some specific things that I know are going to be on the test.”

Another teacher explained,

I’m going to work hard to get these kids to be successful and they might not get the scores and I’m okay with that. But I’m also not going to say, ‘We don’t care about the test because that’s not the school’s mission.’ So I think it’s a balance. You know ...there’s no perfect school.

A middle school teacher explained why it was problematic for teachers to ignore the test.

Regardless of what your philosophical disposition is, there’s a test and [the kids] are judged based on that test. Given that they’re kids who are from poor neighborhoods and brown, your philosophical disposition is actually hurting them. You are not giving them access to power, which is being able to do well on a test, to open doors for you.

Many teachers spoke in ways suggesting they had come to accept the focus on tests results as part of the context in which they worked, that the benefits to students outweighed their concerns.

However, a small number of teachers worried that their school’s focus on test results had a negative influence on decisions about what and how to teach. Several from various schools expressed concerns that in preparing students for the interim assessments they narrowed the curriculum in ways that undermined student learning. A second grade teacher at Rodriguez Charter said,

It doesn't leave much room for creativity in the classroom. Even at seven and eight years old, our curriculum is now geared towards our quarterly [interim] tests that we're taking. ... Essentially we are teaching to a test. ... I find that frustrating but I don't think I would find it any different elsewhere.

A Hurston K-8 teacher with ten years of experience said that interim assessments “should be used as a dipstick; instead they are used as a compass.” Another teacher reported that the emphasis on testing made her feel that the work in the school ultimately focused on “how do you compare?” and created competition among teachers about student test scores. A teacher at Naylor Charter worried that both teachers and the school were losing sight of the “whole child.” Notably, these teachers were a very small minority among those interviewed, and sometimes they, themselves, observed that they were outliers. Interestingly, most of these teachers attributed this problem not to their administrators, but to the power of federal and state accountability systems.

Teachers' accounts suggested that they often were grappling with pressure and concerns about the prominence of high stakes testing that they perceived in their schools; however they did not believe their experience would be different at another school. In general, most teachers suggested that their schools' organization was striking a balance between being driven by the tests and using the assessments as a tool to support student learning.

Other types of data complement the interim tests. Teachers may have accepted the intense focus on interim assessments closely associated with MCAS because it was not the only way used to monitor student learning. Each school also gathered other types of data that teachers examined with peers and administrators during weekly team meetings or whole-school PD sessions. These included samples of student work, teacher-administered reading assessments, responses to questions on exit slips, teacher-made quizzes, unit tests, performance assessments, homework completion records and disciplinary records such as demerits and detentions. At

Naylor Charter, Kincaid Charter and Hurston K-8, teacher teams incorporated data analysis into the ongoing curriculum work of their content and/or grade level teams.

Progress monitoring. Dickinson and Fitzgerald dedicated one grade-level team meeting per week to student “progress monitoring.” At Fitzgerald, teachers took turns presenting formative data about one or more students who were struggling, while at Dickinson, teacher teams used formative data to identify a learning need for their whole class. Teachers then helped one another plan academic interventions. Then after six to eight weeks, they reported back to their team with updated student data. Teachers at both schools valued the opportunity to consult with colleagues about how to respond to individual students’ learning needs. A Dickinson teacher described how progress monitoring helped her plan to provide students with focused, small-group instruction on phoneme segmentation. She enthusiastically reported that the data, which she gathered during one-on-one assessments with students, showed that they had grown significantly in that skill, beyond her expectations. Fitzgerald’s principal recalled teachers’ responses when she surveyed them about which structures they found most helpful in supporting their success as a turnaround school. “One of them was progress monitoring. That was the number one strategy that teachers felt contributed to our students’ success. They wanted that to continue.” Many teachers appreciated having the regular, structured opportunity to monitor student progress and seek advice from peers.

Monthly data packets. At Fitzgerald, teachers were also required to submit a monthly set of student learning data to their supervisor, who then provided individualized feedback. This set of data included math assessment scores, reading scores, writing scores, writing samples, homework logs and reading logs. The math scores were based on the most recent unit assessment. The writing scores were a class set based on using a rubric to score a monthly

written response to a prompt. The writing samples were from three students selected to represent the range of low, middle and high-level writers. Writing for the same three students was submitted each month all year. The homework and reading logs were records of the students' homework and independent reading. The contents of the data packet varied across grade levels but were specifically prescribed in the school handbook.

Although a few teachers said they found it hard to meet the demands of administering the assessments and gathering data every month, others said that the process and the feedback they received were helpful. A kindergarten teacher recalled a specific, valuable suggestion that her principal made in response to a student's writing sample. In her data packet, the teacher had indicated that she was working with a student on using the full width of the paper when writing. The principal responded that another teacher had assisted one of her students with a similar challenge by highlighting the margin in bright yellow.

Teachers recognized that the potential of this process was not only in the feedback they might receive from their supervisor, but more importantly in the ways that the process kept them attending closely to their students' academic progress. The instructional coach at Fitzgerald explained,

Because we carefully monitor all of our kids' progress, for our teachers it's really amazing when they think "wow, this kid...moved from an AA to a G [reading level] in first grade"...and the first grade teacher knows it's because of the hard work she is doing.... I think it's very rewarding, but it's challenging too.

She believed that their ongoing attention to data helped teachers to recognize student growth and to feel effective in their work.

Variation in data used across schools reflected differences in educational philosophies. Notably, in some cases the data that were available to teachers and the data that they most frequently discussed in our interviews reflected the school's educational approach. For

example, at Rodriguez Charter many educators told us about their philosophy, which one administrator summarized as an approach to students characterized by the phrase, “We love you and we have the highest expectations for you.” In keeping with this approach, Rodriguez Charter teachers had access to data about students’ social-emotional well-being. The school’s professional development for the year focused on social emotional learning, which called for administering a student survey to all students covering one teacher described as four domains—“assertiveness, reflection, belonging, and active engagement.” Teachers were expected to use these data along with data about students’ academic progress in deciding whether students should participate in intervention groups; while one student might be getting extra help with mathematics another might be in a small group working on issues related to bullying.

In contrast, at Kincaid Charter, where administrators and teachers spoke at great length about their strict behavioral expectations and disciplinary system, educators made frequent references to monitoring data about behavioral infractions, homework completion, tardiness and attendance in addition to academic data. Their data leader had developed a customized data “dashboard” that provided teachers easy access to students’ academic and disciplinary records. Teachers and administrators talked about using team meetings and professional development time to identify patterns and exceptions in the behavioral data. For example, one teacher talked about identifying students who were repeatedly attending “homework club,” a penalty for having incomplete or unsatisfactory homework. The level of attention to data about students’ behavior was consistent with the school’s “no excuses” approach to schooling.

At Hurston K-8, the types of data used by teachers were different still. Although data routines were pervasive there as well, teams within the school varied in the types of data they used. Hurston teachers often spoke of the extensive professional autonomy their administrators

afforded them, but also observed that there was an intense focus on coordination within teams and high expectations for student achievement. Therefore, teams of teachers decided what assessments to adopt, adapt or develop to guide their work. While some teams focused heavily on samples of student work, others relied on benchmarking tools from published reading materials and yet others depended on teacher-made assessments. Teachers deeply appreciated the professional autonomy that their teams had to define how they would use data.

Comprehensive Responses to Data

Given the many types of data and multiple routines in use at each school, it was not surprising to hear teachers say things such as, “We are very aware of where [students] are at. We use data really well.” But the work did not stop there. Across schools, teachers then focused on planning next steps to address students’ learning needs. Teachers responded to the student data in three ways. In some cases, they planned opportunities for additional, targeted instruction. In other cases, they revised their lesson and unit plans for upcoming classes or for the following year. Finally, many teachers across all six schools reported that data routines helped them reflect on and improve their teaching practice. These responses to data were not mutually exclusive; in fact most teachers described responding in several ways to collaborative data analysis. These processes also compelled teachers to discuss their understanding of and agreements about what they taught and how they taught.

Providing additional targeted instructional supports. At all six schools, teachers and administrators described times when they responded to data analysis by planning additional, targeted instruction for which they had a large repertoire of options. Sometimes they offered instructional support during class while at other times it was outside of class but within the school day. In other cases, teachers provided additional instruction after school. For example, a

Hurston K-8 administrator recalled a time when a middle school math team identified gaps in students' procedural knowledge. They designed, proposed, and then offered small group instruction for a specific group of students in lieu of their usual extended day activities. An early elementary teacher described how data analysis might lead to having a reading interventionist "pull-out" a small group of students for support during the school day. Rodriguez Charter and Kincaid Charter had a designated time each day when all students were intentionally grouped for additional, targeted instruction based on frequent analysis of student data. At both schools, as one teacher explained, "data analysis . . . drives the intervention groups," and they regularly reorganized the groups based on students' developing skills and evolving needs. At Dickinson, teachers talked about referring particular students for afterschool tutoring or homework club, where they received support from classroom teachers who took turns running the sessions, Homework club and afterschool tutoring had been proposed, designed, and implemented by teachers, with support from Principal Davila. In some cases, teachers provided targeted instruction during regular class time by grouping students based on data analysis and then differentiating instruction for the groups. For example, a Fitzgerald teacher explained that at the end of each math unit, she and her colleagues used current data to group students. To do this, they selected students from across the four classes of the grade-level for a day of targeted instructional support. During this "intervention day," they addressed students' misconceptions or gaps in understanding that were evident in data.

Other teachers spoke of using benchmark assessments of students' reading to determine guided reading groups. At other times, teachers realized that content had to be re-taught to all students. A veteran teacher at Dickinson suggested what collaborative analysis might reveal:

[For example,] a skill in reading that they missed in these [district] interims... we're analyzing. We know that the percentage [that] made it is very low. We need to increase

the teaching in these areas ...and then we try to see in the next test if they improved or not.

Many teachers across the sample offered examples of how they used data to identify students for additional, targeted instruction within and beyond the classroom setting.

Data analysis informed lesson and unit planning. Planning based on specific data was considered standard practice across the schools. When teachers described their process of writing and revising lesson plans or unit plans, they frequently spoke about how data analysis informed that work. Most teachers in these schools were not relying on published curriculum materials but were expected to develop or adopt a common curriculum across classes. Therefore their meetings involved examining and negotiating what they were planning to teach. At Fitzgerald, Naylor Charter, Kincaid Charter and Rodriquez Charter, teachers developed all of their own curriculum materials or were revising what their predecessors had created. Dickinson used curriculum materials provided by the district, but teachers also spoke of routinely adapting and supplementing the published materials in response to identified student needs. At Hurston K-8, teachers initially used curriculum materials provided by the district, although over time they developed their own units of study aligned to CCSS, or adopted other programs that better suited their goals. A Kincaid Charter teacher described her most recent weekly content team meeting.

We talked about what we want [the culminating essay for the unit] to look like. We looked at exit tickets from this past week to look at the data of what it was showing us about their progress. We talked about what book we want to teach in the next unit and then we looked at each other's lessons for next week.

In a few cases teachers provided specific examples of how data from assessments had informed future planning. A kindergarten teacher recalled when her team realized that their students were often unable to solve math problems on paper, even though they could solve them using hands-on activities during class. In response, they maintained their focus on hands-on

learning during class but added a short math session at the end of the day where they helped students to apply their knowledge to questions on paper.

Much like the interventions that provided students with additional, targeted instruction, many teachers said that, in response to their analysis of the data, they planned lessons or gave students more exposure to particular topics or standards. However, some examples focused on using data to review the efficacy of the curriculum as teachers prepared for the following year. As a Kincaid Charter teacher explained, “We’re always talking about where it worked, whether it didn’t work, how are we gauging students’ achievement levels. . . . How can we fix it next year?”

Coming to agreements about what they teach. The process of developing and continuously revising lesson and unit plans in response to current data required teachers and administrators to coordinate what they intended to teach. Principal Hinds looked back on the collaborative, ongoing process at Hurston K-8.

And so last year, we finally tackled systematically what are we doing for writing. And I think that’s part of what’s been so hard [about being] a teacher here, is as we’ve built it, there have been years where . . . [we’re] constantly analyzing the data and making decisions; whereas now, we have a curriculum. We’ve developed a roadmap of units for writing and now reading. And here’s how they play out and here’s . . . the standards that have to be mastered. Here’s how we’re going to assess it in a performance assessment. Here’s how we’re going to assess it in a standardized assessment.

An experienced science teacher leader reported that her teacher team had similar, ongoing negotiations about curriculum and assessment, which she believed created a sense of shared responsibility. “We built accountability with each other that we were all going to bring our data and report our data out and then make decisions about re-teaching or reassessing based on that data.” She reported that through this two-year process they eventually agreed on “what we were going to teach, when we were going to teach, when we were going to assess.” Across schools, these types of conversations were routinely grounded in the CCSS and other standards the schools had adopted in an effort to align curriculum, assessment, standards and pedagogy.

In some content areas, and in some schools for all content areas, administrators decided both what teachers should teach as well as when and how to assess students' learning. Nonetheless, in these cases, teachers' accounts of data routines suggest that they were not simply complying with the administrators' decisions, but instead were closely examining the learning standards that guided their instruction while also monitoring students' progress in reaching those expectations. The data routines provided them the chance to better understand the underlying ideas of what they were trying to teach. As one teacher explained, "Instead of numbers, I'm looking at what they're missing. I'm looking at trying to figure out whether they're missing the concept, how they're answering questions." Another teacher explained that they are regularly "dissecting the data [to know] where the kids are at, where they need to go." A middle school teacher explained how, when they first started using interim assessments, he believed they were "running from issue to issue" reacting to the results of each assessment. Eventually, though, they settled into routines where they used an interim test to review the success of recent teaching—"rather than telling us where to go, letting it tell us how what we just did went." Many teachers across schools believed that administering, analyzing, and responding to common assessments helped them to coordinate their teaching with one another and ensure that they were tracking and supporting all students as learners.

Data analysis in support of instructional improvement. Research shows that educators in schools often respond to data with interventions that provide students with more of the same type of instruction, but rarely consider how changes in instructional practice might improve student learning (Means et al., 2010). In this sample, many teachers reported otherwise, saying they believed that collaborative data routines provided an opportunity to reflect on and improve their pedagogy. As a teacher at Dickinson explained, "We're looking at [data] constantly. We're

trying to improve our teaching, our delivery based on that data.” A Naylor teacher who also said that data analysis guides the work of her team elaborated, “What else can we adjust to make [our teaching] better?” An experienced teacher at Fitzgerald described a typical scenario.

We’ll look at a math assessment and say, “My kids really struggled with this. Did your guys?” If they all did, “What can we do?” Or if it is just me, it must have been something about how I taught the information. “How did you present this? Because maybe the way I did it was confusing.”

Although we did not observe instructional practice in our study, this type of account was prevalent in our interviews, suggesting that teachers in these schools operated with an assumption that student data not only informed them about their students’ struggles, but also provided insight into their professional problems of practice.

Multi-faceted responses to student data. In most cases, teachers described responses to student data that had many dimensions, potentially involving additional supports to students, adjustments to curriculum, and improvements in their instructional practice. A math teacher with 10 years of experience at Naylor Charter explained that when analyzing assessment data, her team had identified a type of probability problem that repeatedly “destroyed our kids” in quizzes and tests. He explained that his team decided that their response needed to be two-fold. “There was content [we missed] and there was also the way we delivered it that needed to be changed.”

In the case of a teaching team at Kincaid Charter, a teacher explained,

If we have a recent assessment we go into a quick data dive to figure out what students know and don’t know and create what we call a spiraling document, which is like when are they going to see this again. Do we need to fully re-teach it, or was there a piece of something that either they didn’t get or we just didn’t instruct very well? [It was] usually the latter

As our interview data clearly showed, teachers and administrators in these schools used many collaborative structures—progress monitoring sessions, interim data analysis meetings, and

weekly planning meetings that were infused with data analysis—to regularly assess students’ learning needs and develop a comprehensive set of responses.

Data Practices Contribute to Professional Culture

Given that these data practices played a substantial role in teachers’ daily work, it is not surprising that they also contributed to the professional culture of the schools. The schools we studied stood in stark contrast to the classic “egg-crate” school (Lortie, 1975; Tyack, 1974). They incorporated a range of professional activities, including data practices, which continuously reinforced norms of collaboration, collective responsibility for student learning, and high degrees of accountability for each and every child’s progress.

Making teaching a public, collaborative practice. Teachers frequently reviewed their own data along with that of their colleagues. As a teacher at Naylor Charter explained, “We get a bar graph of every single classroom in [our grade level] in all [network] schools. You want yours to be high, and you also want the other people to be high, too.” Similarly, a teacher at Hurston K-8 explained how, when teachers on her team analyzed and created action plans based on their interim test results, they posted the analysis and plans on a Google doc to which the entire team and the school’s administrators had access. She explained that then, “we’re able to view each other’s action plans and pull each other’s resources if needed or if wanted.” Teachers in all of the schools described routinely sharing student learning data, in some cases across the school. Data use practices were connected to and accompanied by other structures such as peer observations, shared classrooms, and shared lesson plans, which compelled teachers to make their professional practice known to each other. In these schools, teachers’ professional lives were decidedly public and open to scrutiny by peers and supervisors

The data routines were one of the ways that these schools compelled teachers to rely on each other in the context of their daily work. An experienced teacher at Hurston K-8 explained that she could look to her team for help: “Wow, like 30% of my kids were proficient on the standard about contour maps. Here’s their work. What do I do? Here’s what I tried.” A teacher at Kincaid Charter praised the fact that, “I’m not allowed to [be] an island here. I have to work and collaborate.” A Naylor Charter teacher who was looking for a new job in another state shared her perspective on the school’s collaborative culture.

I’m looking at all the other schools, all their teachers teach in silos. It’s like, “This is my classroom. I am my teacher. These are my students,” which is not true here at all. I sit surrounded by colleagues more than I sit surrounded by students. There is just that sense and that spirit of collaboration is just incredibly strong.

Teachers generally appreciated being involved in what Little (1990) calls “joint work”—“encounters among teachers that rest on shared responsibility for the work of teaching” (p. 519).

Shared responsibility for growth of “each and every student.” As the instructional coach at Fitzgerald explained, “teachers feel like they’re responsible for every kid.” She continued, “People might say, ‘Well of course you should,’ but...I mean in a very detailed way, they’re held accountable for kids’ behavior and academics and attendance and progress in school.” Dickinson’s Principal Davila said that in the conference room where each teacher team met weekly they maintained an interactive “data wall” where they posted current academic data for “each and every student” in the school, which served as a constant reminder and source of support. Rodriguez’s Principal Rega said, “Things don’t slip through cracks, things or children!” At Hurston K-8 teachers explained that they sent progress memos home with every student once a month focusing on “subject area, behavior and attendance.” These practices, combined with the weekly discussion of student data as part of progress monitoring sessions or curriculum

meetings, created an environment in which teachers were acutely aware of how every child was progressing relative to the standards.

This level of accountability for each child, combined with the sense of pressure that teachers felt because of MCAS could have been overwhelming. However, most teachers seemed to manage that tension, possibly because they were not alone in doing so. A kindergarten teacher at Rodriguez Charter explained, “People here really do genuinely care about every single kid in the school whether they’re four years old in K-1 or in eighth grade.” A Naylor Charter teacher shared a very similar view: “Everybody is really committed to being a good teacher and invested in not just their own students but every student in the school.” Prescribed structures and systems, along with shared professional activities, including data routines, helped to build a sense of interdependence, collaboration and collective responsibility among the educators in these schools, which the teachers prized.

Discussion and Implications

All of these schools, each serving large proportions of students from low-income families and students of color, had taken on a major challenge—developing and sustaining high-performing schools for historically underserved populations. For three schools that the MA DESE had once sanctioned as chronically underperforming, that challenge was heightened. At the time of this study, all six schools had achieved the highest level in the state’s accountability rating system, having demonstrated significant growth or high levels of achievement on the rigorous MCAS. Given their histories, it is not surprising that results on these tests figured prominently in the professional culture of the schools. Most teachers felt that the heavy emphasis on test scores and ongoing monitoring of student achievement were ultimately in the best interest

of their students, although some worried that this had the detrimental effects by narrowing the curriculum and creating excessive pressure for teachers and students.

Importantly, the data practices in these school extended well beyond responding to results on standardized tests. Ongoing data routines were a significant part of their strategy for improving student outcomes by improving teaching quality. In all six schools, teachers had developed, adopted or adapted common formative assessments, by grade level and content area, which were aligned to CCSS and their curriculum materials. They also regularly used a range of other types of data to monitor student learning. Teachers responded to data analysis in comprehensive, multi-faceted ways by providing supplementary targeted instruction for students, and revising and developing unit and lesson plans. In addition, unlike the trends reported by other researchers (Means et al., 2010), many teachers in this sample said that their school's data routines provided an opportunity to improve their instructional practice. Further, data analysis was used in conjunction with curriculum planning and other professional activities to build their understanding of what they were teaching, how to teach it, how to assess students' progress and what to do when they were not succeeding. This exploratory study, which highlights the potential benefits of implementing school level data routines, suggests conditions that support productive use of data by teachers. It also raises many questions for future research.

Educational Infrastructure

Cohen and colleagues (2014) suggest that a major problem hindering reform efforts in the United States is a lack of "educational infrastructure."

Public education never developed the educational infrastructure that is common in school systems in many developed nations: common curricula, or curriculum frameworks, common examinations that are tied to the curricula, common educational practices that are grounded in the curriculum, teacher education that focused on helping teachers learn how to teach the curriculum that students will study and a teaching force whose members had succeeded with those curricula and exams as students, among other things. (p.5)

The schools in our study were obliged, at a minimum, to adopt the CCSS at a minimum and to use the state's high stakes summative assessments, MCAS. However, as is clear in these accounts, the schools were left to determine, sometimes in collaboration with their district or network, the details of how to align curriculum, formative assessments and instructional practices in their daily work.

These schools' data routines were only one component of their integrated approach to developing and then continuously revising their instructional infrastructure. As they adopted and implemented common assessments, reviewed results, and responded with changes in curriculum and pedagogy, teachers approached their professional work together. They came to agreements, or at the very least, confronted disagreements, about the elements of their educational infrastructure.

It is unrealistic to think that the educational infrastructure in the US can be developed one school, one network, or even one district at a time. Nonetheless, there is something to be learned from the process these schools had undertaken and the effect it was having on their teachers and school organizations. Teachers' testimonies suggest that there is potential for building substantial instructional capacity within a school by focusing systematically on student outcomes and their implications for curriculum review and instructional practice. Through this integration, teachers were collaboratively working through issues that related to all three elements of the "instructional core," teachers and students interacting in the presence of particular content (Cohen, Raudenbush, & Ball, 2003).

So often in practice, policy and research, we address the components of the instructional core as discrete elements and ignore the interactions among them. For example, data routines in isolation might focus on student achievement without attending closely to the content the

students are learning or the instructional practices of the teachers. This was not the case in these schools. Cohen, Raudenbush and Ball (2003) suggest that, as we study and advance our conceptions of learning and teaching, we need to have a more sophisticated model to guide the work: “Teaching is what teachers do, say, and think with learners, concerning content, in particular organizations and other environments, in time. Teaching is a collection of practices, including pedagogy, learning, instructional design, and managing organization” (p.124).

Implications for Practice and Policy

Data routines in these schools, although squarely focused on student learning, were a key component of teachers’ professional learning. We know from research that effective professional development is job-embedded, content-focused, connected to other initiatives, employing active learning techniques, requiring collaborative participation and sustained over time (Cohen & Hill, 2001; Darling-Hammond et al., 2009; Desimone, 2011; Penuel, Fishman, Yamaguchi, & Gallagher, 2007). However, research has provided little guidance about what this looks like day to day in schools. This study suggests that intensive, collaborative data cycles within schools may be a key component of productive professional learning. These cycles can help teachers to more deeply understand the learning standards, tune their instructional practice and become more reflective practitioners while aligning their work with their colleagues’ work. The examples in this study also suggest that learning occurred at the individual, team and school levels because of the systems and structures that promoted ongoing collaboration.

It is clear that data inquiry practices require significant investment by schools and school systems. In this sample, the schools relied on their district, network or an outside provider, to provide common assessments, expert coaching, guidance in managing and engaging with the data, and sufficient time for teachers to collaborate. These were crucial components of their data

practices, which varied across the sample. Hurston and Fitzgerald used funding provided through the state during turnaround to train and pay teacher leaders to guide this work. Hurston also purchased interim assessments and ongoing support from data coaches. Hurston and Kincaid Charter had the resources and flexibility to assign an administrator to oversee all school-level data practices. In contrast, Dickinson managed its data routines with far fewer resources—interim assessments and bi-weekly data coaching provided by the district. The differences in the resources available to schools affected the extent to which data routines could be used.

The time available for teachers' collaboration also varied across schools in this sample. Many schools arranged for frequent, extensive blocks of time for teachers to work with colleagues on a regular basis. At Dickinson, however, Principal Davila abided by the teachers contract, which allowed her to designate only how one 50-minute preparation period per week could be used, significantly less than the other schools in the sample. Although teachers had additional daily planning time that they often used for informal collaboration, the principal had no formal say in its use. With less time available, Dickinson's teachers did significantly less formal collaborative work on curriculum than their counterparts in other schools. In contrast, Hurston K-8 administrators used the autonomy granted them by the state along with their extended learning time to create 110-minute blocks for each teacher grade level or content team each week. The other four schools in the sample, much like Hurston, had generous allotments of time for data and curriculum meetings. The longer blocks of time for teacher collaboration allowed them to engage in the intensive data routines and integrate them with other professional deliberations about curriculum and instruction. Schools, districts, or CMOs intending to use data analysis as they schools did would first need to ensure that sufficient time is available for

teachers' to do this work together. Further, they would need to carefully integrate data practices with other efforts to develop curriculum, lessons, and pedagogy.

Future Research

Many questions remain for further research. In schools that effectively use data analysis to improve instruction, how do teachers and schools find a balance between the external demands for accountability and teachers' best professional judgment that serves students well? Federal accountability policies have created urgency in schools that can be productive, unproductive, or destructive. As schools become increasingly sophisticated in their use of data, it is important to understand the effects of these policies on students. In this sample, it is unclear how the pressure to succeed on standardized tests and these data practices were ultimately affecting student learning. Further research is warranted.

In addition, there is more to learn about how, if at all, school-based data routines lead to changes in instructional practice. Although teachers widely reported that they were revising the curriculum and improving their pedagogy, we did not observe instruction or examine evidence of student learning to verify the effect of these routines. In addition, we did not observe the data routines in action. Many questions remain about the protocols and frameworks that best support teachers in productively engaging with data. In future studies, researchers could supplement teachers' self-reports with more ethnographic studies of data teams in action.

There is also much to be learned about how data practices interact with and contribute to the professional culture of schools. We know from prior research that collegial interactions among teachers often remain shallow because they discourage close examination of each other's instructional practice (Little, 2007; Little et al., 2003; Supovitz & Christman, 2005). By contrast, teachers' accounts in this study suggest that this was not the case. However, collaborative

practices certainly varied within and among schools, both in how they were conducted and what they achieved. This variation warrants future examination. In addition, longitudinal studies could reveal how professional cultures change over time in schools that engage in ongoing, intensive data practices among teachers.

Federal and state accountability policies have clearly created the impetus for schools and school systems to attend closely to high-stakes, summative student achievement data; in some places that pressure led educators astray, to simply intensify ineffective practices or focus exclusively on students whose higher scores would raise the school's standing. (Booher-Jennings, 2005; Diamond & Cooper, 2007). However, this study suggests that external policy pressure can motivate schools to regularly examine formative student data in ways that create higher expectations and improve teaching and learning for all students, especially students from low-income families and students of color. Investing in data practices that involve teachers in continuously gathering, analyzing and responding to data can build the capacity of individuals and their school to support student learning.

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Appendix A

Table 2. *Number of Interviewees at Each School*

School Name	Administrators*	Non-Teaching Staff **	Teachers in Training	Teachers	% of Total Teachers in the School Interviewed
Dickinson Elementary	1	2	n/a	15	56
Fitzgerald Elementary	2	2	n/a	14	47
Hurston K-8	4	5	n/a	21	31
Kincaid Charter Middle	5	4	2	16	38
Naylor Charter K-8	2	3	2	17	46
Rodriguez Charter K1-8	3	3	3	16	36

* Administrators include directors of CMOs and school based administrators who directly supervise teachers.

** Non-teaching Staff includes instructional coaches, parent coordinators, data leaders, recruitment officers, deans of discipline and other administrators who do not teach students and do not supervise teachers

Table 3. *Total Teachers Interviewed at Each School & Years of Experience*

School	Novice* (1- 3 years)	2nd Stage (4 - 10 years)	Veteran (11+ years)
Dickinson Elementary	3	5	7
Fitzgerald Elementary	1	11	2
Hurston K-8	6	11	4
Kincaid Charter Middle	4	11	1
Naylor Charter K-8	8	7	2
Rodriguez Charter K1-8	1	9	6
Totals	23	54	22

*Does not include Teachers in Training

Appendix B: Interview Protocols
Teacher Interview Protocol

Intro: Study Explanation emphasizing that we really want to learn about your experience at this school.

1. Background:
 - a. How did you come to be in your current position at this school?
 - b. Starting with college, can you tell us what you've done?
 - i. Probe for: training and employment
2. Current Teaching Assignment:
 - a. What do you teach here?
 - b. How did you wind up in this position?
3. Overall view of school:
 - a. If another teacher would ask you, "What's it like to teach at _____?" How might you respond?
 - b. What are the advantages and disadvantages of being a teacher here?
4. Hiring:
 - a. How were you hired at this school? Step-by-step.
 - b. Do teachers play a role in hiring other teachers? If so, how?
 - c. Has the hiring process changed at this school? If so, how and why?
5. Induction:
 - a. Did you have some kind of induction as a new teacher at this school? What worked and what didn't?
 - b. How are new teachers inducted now? How have things changed since you got here?
6. Support:
 - a. What kinds of supports are available here for teachers to improve their instruction?
 - b. What works well for you? What doesn't? (Probe: PD, Coaching, Collaboration, Evaluation)
7. Evaluation:
 - a. How is your teaching evaluated? Describe the process.
 - b. Was it helpful? How?
8. Administration:
 - a. Who do you go to for support? For what?
9. Social & Psychological Supports:
 - a. What sorts of social and psychological supports does your school offer for students?
 - b. What support do you get for interacting with parents and families?
10. Career goals:
 - a. How long do you expect to stay at this school? In what roles?
 - i. If yes: What keeps you at this school?
 - ii. If no: Why do you think you might leave?
11. Union:
 - a. What role does the union or the contract play in this school?
12. More: Do you have any additional comments?

Principal Interview Protocol

Overview of Study: 6 Schools, All high-poverty, high-minority. All Level 1.

1. Background:
 - a. How long have you been at this school? Prior experience in education? Anything else we should know about how you got here?
2. School Overview:
 - a. Could you first provide an overview of its structure and programs?
 - b. (Where applicable) What does it mean for your school to be a pilot/turnaround/charter school?
 - c. (Where applicable) How did you go about selecting teachers when ---- was placed in turnaround?
 - d. How would you describe it to a teacher or parent who might be interested in it—both its strengths and weaknesses?
3. Teachers: We'd like to get a sense of who your teachers are.
 - a. Where do they come from?
 - b. What formal or informal preparation do they have?
 - c. What attracts them to the school?
 - d. Approximately, what proportion has fewer than 10 years of experience? 5 years of experience? 0-5 years of experience? (Has that changed or remained steady?)
4. Recruitment and Hiring:
 - a. Could you describe the process you use to recruit and hire teachers? (Applicants per position? Teaching demonstration? Who decides?)
 - b. What challenges do you face in recruiting teachers?
 - c. Are there specific demographics or subject areas that you have trouble finding/attracting? If so, how have you addressed those challenges?
5. Assignment:
 - a. How do you assign teachers to a particular grade or subject?
 - b. Could you describe the teachers' responsibilities, both during school hours and outside of school hours? Scheduled and unscheduled time?
6. Compensation:
 - a. Please tell us about the pay scale for teachers. Are there additional stipends? If so, can you describe these opportunities?
7. Collaboration:
 - a. Are the teachers organized by teams, grade-levels, subjects? If so, what does that mean for how they do their work? What is the work of those teams?
8. Supports:
 - a. What supports can a new teacher count on in getting started? And for more experienced teachers?
9. Role:
 - a. Are there specialized roles for some teachers? (Teach Plus, team leaders, etc.) If so, please describe these roles.
10. Curriculum:
 - a. Does the school provide a curriculum for the teachers? If so, please tell us about it.
11. Professional Learning:

- a. Do you have formal professional development? Instructional coaches? If so, please tell us about them.
- 12. Supervision and Evaluation:
 - a. How do you supervise teachers? How do you evaluate teachers? Are these separate processes? Do students' test scores play a role in evaluating teachers?
- 13. Dismissal:
 - a. How frequently do you dismiss or decide not to rehire a teacher? Reasons?
- 14. Retention:
 - a. How long do teachers stay? Why do they stay? Why do they leave? Is there a type of teacher who stays or leaves? Is turnover a challenge?
- 15. Policy Context:
 - a. Does state or local policy play a role in how you approach building your teaching capacity?
- 16. Union:
 - a. What role if any does a teachers' union play at your school?
- 17. Have we missed anything?

Appendix C: List of Codes and Descriptors

Codes	Description
Assignment	Teacher Assignment: What do you teach/ your job at the school, views of your assignment
Background	Background: Past work history, education
WhyTeach	Why teach? Personal sense of purpose can include changes in views over time.
SchoolOverview	Facts about the school (the facts but not mission or culture), might include specific school goals
HistorySchool	History of School
FacultyComposition	Descriptions of the composition of the faculty
Equity	Interactions, policies or dynamics described in relation to race, ethnicity, social class
Hiring	Related to teacher recruitment, hiring, including teacher's experience of being recruited / hired. –timing, demo lessons, debriefs, meetings with current teachers, written applications, Who the school seeks and how they find candidates
WhySchool	Why chose school - why teach at this particular school? May reflect changes over time
Mission	Descriptions of what the school aspires to accomplish (if explicitly talking about mission do not double code with culture)
AdminAdmin	Interactions / relationships among administrators (including non-teaching positions such as coaches and guidance, deans and other non-teaching roles)
AdminLeadership	Descriptions of administrators' style, vision, agenda, priorities, purposes, etc. (includes self-descriptions)
AdminRole	Specific responsibilities and job descriptions of non-teaching faculty
AdminStudent	Relationship between administrators and students (include coaches, guidance, deans and other non-teaching roles)
AdminTeach	Interactions between administrators and teachers (include coaches, guidance, deans and other non-teaching roles in this code)
Demands	Teachers professional responsibilities and expectations, work hours, teachers views on demands
Resources	Material and human resources (money, buildings, positions, --if it is about admin roles will be double coded in Adminroles) - Facilities
Accountability	Related to external accountability (state accountability status and state testing, turnaround status) - what the state does and then what is done as a result
DistrictNetworkState	Formal relationships / governance from State, District or CMO, includes school boards and trustees
Testing	References to standardized tests, state tests, network tests and interim assessments and how used in the school
MonitoringStudents	Teachers' use of assessments and instructional strategies to monitor achievement
Student	Student Characteristics: Descriptions of students and their community
Neighborhood	Descriptions of the local surroundings of the school
Family	Ways of connecting families and community to school, Perceptions of parents/ families + Teacher and admin connections to parents / families
CurriculumPedagogy	What and how you teach - including instructional planning
SpEdELL	Descriptions of programs or approaches for educating students with special needs and /or ELLs
SpecialSubj	Referring to non-core academic classes (art, music, library, dance, etc) and extra-curricular or co-curricular programs or activities

Using Data to Drive Instruction

SchoolCulture	Expressions of school-wide norms & values including kids, teachers and parents (not explicit statements of mission), big picture that everyone from school would understand
Colleagues	Commentary on colleagues and their characteristics (what I think about the people I work with) - big picture impressions of colleagues
ProfCulture	Professional Culture- the norms of being a teacher or admin in this school. Big picture expectations for how we work together as professionals
Eval	Related to teacher supervision and evaluation: observations, feedback, meetings between supervisors and teachers, how work with teachers on instruction
Coaching	Formal instructional coaches, but NOT induction mentoring
Induction	Programs and supports (formal and informal) for new teachers: prior to day 1 and after day 1
FormalCollab	Deliberate, structured groups working together-organized by the school- including whole school sessions – including approach to lesson planning and who is included and who is not - JUST TEACHERS
InformalCollab	Specific work with colleagues that is not organized by the school, informal collegial interactions -JUST TEACHERS
RolesTeach	Formal roles and opportunities for career advancement (Teach Plus etc.) may have double coding when example of influence through a formal role including leadership teams, Teachers in Training, etc.
InfluenceTeach	Teacher opportunities as brokers of influence (teachers generally in their work having influence), including committees where you can voice concerns - Admin change view because of a teacher
CareerGrowth	Individual professional growth for career progression
OrderDiscipline	Safety, systems, expectations and rules for students, and enforcement
StudentSupports	Social and emotional and academic supports for students and behavioral - outside of classroom structure
StudentTeach	Interactions among teachers and students inside and outside the classroom.
Turnover	Why other people stay or leave; both causes and frequencies, personal plans to stay or leave, also about satisfaction and dissatisfaction, might be stuck in job
Pay	Payscale, stipends and other things related to compensation
Partners	Partners including City Year, Teach Plus, Ed Schools, etc.
Union	Related to the union and the contract
Gem Quote	This is a great quote.

Descriptor Categories for Characterizing Interviewees

Descriptor	Definition	Response options
School	School Name	
Grade Level	Grade Level Presently Taught	Non-teacher, pre-k, k,1, 2, 2 or more grades, all grades, 3, 4, 5, 6, 7, 8
Gender	Gender	Male, female
Position	Position in the school or system	Recruitment officer, CMO administrator, principal, non-teaching faculty or administrator, teacher, assistant teacher / resident teacher, split role: teacher and other non teaching job
# years at this school	# of years working at this school counting this year	
# years at charter	# of years working at charter schools in total	
# years at district schools	# of years working at district schools in total	
# years at private schools	# of years working at private schools in total	
# years teaching	total of charter, district, private years	
Race / Ethnicity	Self-identified race / ethnicity	Black, White, Caribbean, Cape Verdean, Latino/a, multi-racial, other, Asian
Classroom type	Type of classroom in which interviewee teaches	Self-contained elementary multi subjects, departmentalized core subject, specific subject non-core, ELL/ Special Ed only
Age	Age of interviewee	