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Data Use in Urban High Schools



Mary Ann Lachat and Stephen Smith

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Data Use in Urban High Schools

Introduction

The high school reform movement is drawing increasing attention to the need for more systematic uses of data to inform the policy, management, and instructional changes that result in higher student achievement. Data can be a powerful ally as today's educators grapple with the challenge of changing current high school structures into more effective learning environments. In urban, low-performing high schools, increasing demands for accountability are paralleled by equity concerns arising from the enormous diversity of the student population—in culture, language, prior educational experiences, home situations, learning styles, attitudes toward learning, and future aspirations. The twin mandates of equity and accountability have made it imperative that educators base decisions on accurate and meaningful data about student learning and achievement (Johnson, 2002; Lachat, 2002). To create high schools that are responsive to diversity, connected to the realities of today's world, and driven by a focus on success for all students, more systemic reform strategies are needed, and new capacities must be developed. One of these capacities is the strategic use of data to support student success and school improvement (Bernhardt, 2002; Coddling & Rothman, 1999).

The Northeast and Islands Regional Educational Laboratory at Brown University (LAB) is conducting a case study that investigates the process and effects of high school restructuring in five low-performing, urban high schools that are implementing three central elements of systemic reform: (1) establishing smaller and more personalized learning environments, (2) shifting to standards-based curriculum and instruction, and (3) using data to support continuous improvement. The study is being conducted in collaboration with the Center for Resource Management, Inc. (CRM), a partner organization of the LAB. This paper summarizes initial findings of the study component that focuses on the use of data in the high school reform process.

This component of the case study was designed to be aligned with the accountability mandates of No Child Left Behind legislation that emphasize the use of disaggregated data to monitor school progress in raising student achievement and to target areas of improvement. The purpose of the paper is to present initial case study evidence that can contribute to deeper understandings of conditions and practices that either promote or act as barriers to the use of data by school staff, to discuss how disaggregated data are used for improvement in the process of restructuring low-performing high schools, and to examine the policy and practice implications of achieving effective data use.

Data-Driven School Reform

Our examination of data use in five low-performing high schools builds on an emerging body of research and school reform literature that cites the importance of data-driven decision making in creating more effective schools (Armstrong & Anthes, 2001; Bernhardt, 1998, 2002; Killion & Bellamy, 2000; Schwartz, 2002). Effective use of data by district and school personnel is increasingly identified as a central tenet in school improvement processes (Chrispeels, 1992; Earl & Katz, 2002; Protheroe, 2001; Wayman & Stringfield, 2003), not only to raise test scores (Kennedy, 2003), but also to change school cultures and teacher attitudes (Feldman & Tung, 2001), especially toward low-performing, at-risk students (Armstrong & Anthes, 2001). Johnson (1996, 2002) examined many uses of data as a major force in building school and district capacity to equitably educate students and reduce achievement gaps. Her analysis of data use in low-performing schools provides many examples of the power of data as a lever in changing conditions and practices that act as barriers to equitable student achievement. The research and practice literature is showing, however, that several key factors influence data use: the types of data available to school staff; technology and data system capacity; and school conditions and practices that either promote or act as barriers to staff use of data.

Data Available to Schools

Schools and districts generally collect a wide array of data in three primary categories related to demographics, education/program, and performance (Lachat, 2002).

- **Demographic data:** gender; race/ethnicity; economic status; disability; language proficiency; and other data on student characteristics.
- **Education/program data:** current school; grade level; sending school; prior retention; prior education programs; current programs and courses; special programs; learning community/academy or other structures for learning; learning opportunities such as internships; and participation in school activities.
- **Performance data:** attendance; discipline; course grades; diagnostic assessment results; state assessment results; standardized test results; dropout rates; and graduation rates.

While the range of data available to schools is extensive, it is rarely used effectively (Wayman & Stringfield, 2003). Schools that want to use data to drive their decisions often don't know where to begin or what type of data to use (American Association of School Administrators [AASA], 2002). There is often too much data, but not the right type, or not in a format that facilitates use (Schmoker, 2003). Data often aren't available to school staff when they need it, and the often complex and confusing formats of data reports make it more difficult for them to sort through what is most useful for them (NEA

Foundation for the Improvement of Education [NFIE], 2003). When schools attempt to use data, they often employ the wrong type of data, using indirect measures of learning for which they have no explanatory model to interpret the data (Marzano, 2003). Another complexity is the fact that data are collected for different uses. Teachers may attempt to use data meant for compliance or adherence to various mandates and policies when what they actually need is timely diagnostic data on the students they teach (Olson, 2002; Rudner & Boston, 2003).

Descriptive cases on how schools use data for school improvement illustrate that the types of data collected determine the types of decisions that are made. In Mason's study (2002) of the use of data for school improvement, six schools instituted data-driven strategies to improve students' state assessment scores. The data that were most useful to these schools were a combination of assessment, demographic, perception, and education program data. Pardini (2000) notes that when teachers have current information about the skill levels and proficiencies of students sitting in their classrooms, they are better able to modify their instructional strategies. Researchers also suggest the importance of teacher use of varied types of data including video analysis, classroom observations, and student work samples (NFIE, 2003; North Central Regional Educational Laboratory [NCREL], 2003), and that multiple methods of data collection be used (Brimijoin, Marquissee, & Tomlinson, 2003).

Technology and Data System Capacity

Researchers and leaders of school reform efforts cite the capacity for data disaggregation as essential to effective data use (Bernhardt, 2002; Holcomb, 1999; Johnson, 2002; Love, 2000). High-level data disaggregation requires the capability to integrate or link multiple types of student performance data, demographic data, and data on students' educational experiences. However, even in districts where extensive data are maintained, the technology to integrate and manipulate different types of data is lacking (Wayman, Stringfield, & Yakimowski, 2004). Visher and Hudis (1999) report that very few high schools participating in the New American High Schools initiative had the information system capacity to link student results to specific programs, classroom practices, and learning environments. Data generally exist in multiple electronic files that include the district data system as well as data files from state assessments and other testing programs. This means that teachers and administrators may not have easy access to the data they need to examine how students enrolled in particular programs are performing on various measures, nor are they able to determine the effects of programs and practices on student performance over time (Lachat & Williams, 2003).

In their analysis of currently available technology, Wayman, Stringfield, and Yakimowski (2004) note that recent technological advances in data warehousing applications have produced software tools that integrate multiple student data files. They recommend that schools move toward data warehousing capability to support

the analysis and use of data. Other researchers also cite the increasing importance of more advanced data system technology and the need to present data in formats that are meaningful to school leaders and teachers (Rudner & Boston, 2003; Schwartz, 2002; Streifer, 2002; Thorn, 2001). While technology may be available, however, school districts often lack the funds or do not allocate the resources necessary to establish coherent and high-level data system capability (Olson, 2002).

Technology alone is not the answer. Mason (2002) notes that information system capacity needs to be coupled with teacher will and capacity to use data. In her study of six schools, “teacher teams came to understand that data do not magically appear ready-made to provide evidence of success and to solve all of the school’s problems” (p. 5). Teachers need to learn how to obtain and manage data, ask good questions, accurately analyze data, and apply data results appropriately and ethically. The study outlines six areas to address as schools build capacity: (1) cultivate a desire to transform data into knowledge, (2) focus on a process for planned data use, (3) commit to the acquisition of data, (4) organize data management, (5) develop analytical capacity, and (6) apply information and results strategically.

Supporting Data Use

A study by Armstrong and Anthes (2001) highlights several elements associated with effective data use: strong leadership; a district-wide culture that supports the use of data for continuous improvement; a structure for supporting and training teachers to use data; a close accounting of every student’s performance on academic standards; and a well-defined, data-driven school improvement process. Leadership at the district level, and from the principal and a coach at the school level, have been identified as key elements to successfully using data in school reform efforts (Center for Collaborative Education, 2001, 2002, 2003). A process that involves teachers in data analysis also is essential, and Wade (2001) emphasizes that as many teachers as possible are needed to support effective data use in schools. It is most effective when teacher decisions about instructional effectiveness are based on assessments of students’ actual proficiencies in various skill areas (Pardini, 2000).

A data-driven inquiry process can be used as a tool for change in schools often considered furthest from current standards of excellence (Holcomb, 1999, 2001). Data-use strategies that involve school staff in collaborative problem solving can foster the open dialogue needed for equity issues to be addressed (Love, 2000). Inquiry-based schools promote a culture of standards and the use of appropriate assessments for improving student learning (Rallis & MacMullen, 2000). Some writers highlight the use of questions to structure teacher analysis of data as a key element to their using data effectively (NCREL, 2003; Protheroe, 2001).

Ideally, teachers should be provided with opportunities to work collaboratively in building their capacity to use data (NFIE, 2003). A study conducted by the North Central

Regional Educational Laboratory (NCREL) notes that schools committed to using assessment information to inform and guide improvement also allocated time for teachers to meet and review data in making instructional decisions (Cromey, 2000). A study of 18 Annenberg Challenge schools in six states also notes successes in the use of data-driven strategies in which teachers worked collaboratively in framing questions to monitor school progress in implementing new practices (Keeney, 1998).

Barriers to Data Use

Many reasons for the lack of data use in schools center on the lack of training, cultural resistance, and fear of reprisal. Most school staff lack the skills and the orientations to analyze and use data wisely (Bernhardt, 2000). Few administrators and teachers have had formal training or experience in analyzing and interpreting data or how to use assessment results for program and instructional improvement (Cizek, 2000). There is minimal preservice emphasis on the use of data in school reform (Cromey, 2000), and most schools do not provide teachers with the ongoing, sustained training they need to ask the right questions in analyzing and interpreting data (Protheroe, 2001). In her extensive examination of data use in schools, Love (2000) highlights that schools are ill-equipped to use data to address problems, target improvements, or monitor progress. They lack the skill, time, and organizational structures to use data effectively.

Cultural resistance is a significant barrier to effective data use in high schools. High school cultures simply do not focus on data collection, analysis, or use, and the use of data for ongoing decision making and program improvement represents a major cultural shift (Lachat, 2002; Visher & Hudis, 1999). Bernhardt (2000) notes that most schools conduct their education programs with little analysis of how well programs work for students and rely instead on “gut feelings” about what is and isn’t working. Changing a school’s culture and building teacher capacity to use data often requires a change in staff attitudes toward the diverse student populations in a school as well as the skills to apply appropriate interventions for students based on data.

In a study examining teacher attitudes toward the potential success of previously low-performing students, Armstrong and Anthes (2001) note that teachers find it difficult to link data to an appropriate intervention. Teachers find it challenging to provide differential instruction to reach a variety of learning styles, and their attitudes about students influence their effectiveness. In this study, the researchers determined that teacher use of data helped clear up false assumptions. However, even when teachers are given training and time to think about using data to inform their practices, they may be reluctant to do so in a culture where they feel threatened or fear they will be attacked for something they are doing or not doing in the classroom (Bernhardt, 2000). Effective data use requires a culture that is driven by inquiry, not fear.

Methodology for the Study

The data collected and analyzed for this paper are part of a broader four-year case study of the processes and effects of high school restructuring in five low-performing urban high schools that are implementing three central elements of systemic reform: (1) establishing smaller and more personalized learning communities, (2) implementing standards-based curriculum and instruction, and (3) using data to support continuous improvement. The case study component focusing on data use was designed to be aligned with the accountability mandates of No Child Left Behind legislation that emphasize the use of disaggregated data to monitor school progress in raising student achievement and to target areas of improvement.

The purpose of this case study component is to investigate (1) how disaggregated data can be used to examine progress and guide improvement in the process of restructuring urban low-performing high schools, (2) factors and conditions that either promote or act as barriers to data use, and (3) the policy and practice implications of achieving effective data use in a high school reform process. Research in this area is limited, and few studies have produced case study evidence of the multiple factors associated with the use of disaggregated data to improve student learning and achievement in urban low-performing high schools. The study is thus intended to build on the current literature and provide evidence of data use in high school reform that can serve as a foundation for future research.

The Study Sites

The case study is being conducted in five low-performing high schools located in three high-poverty urban districts. Site selection criteria were aligned with criteria for participation defined by the LAB. Two major criteria related to

- 1 The LAB's mission to furthering research knowledge of effective reform strategies in high-poverty, low-performing high schools.
- 2 Conducting research in high-poverty high school settings where reform plans reflected a clear commitment to the concurrent implementation of three core reform components: (1) establishing smaller and more personalized learning communities, (2) implementing standards-based curriculum and instruction, and (3) using data to support continuous improvement. These elements of reform are aligned with the No Child Left Behind Act and federal grant initiatives that are targeted at high school reform.

Site selection criteria are described below.

- Sites were representative of high-poverty, urban, low-performing schools that serve a diverse student population.
- Sites were engaged in reform activities supported by district and school reform plans and commitments for high school restructuring that concurrently focused on three core elements of high school reform.
- School and district commitments had been made to dedicate significant resource support to high school reform, such as allocating the resources necessary to allow school staff to be engaged in the school reform activities.
- There was district and school commitment to ensuring broad and inclusive participation in the high school reform initiative.
- There was district and school commitment to cooperate with the LAB on the research study.

The schools chosen for the study were intentionally selected to meet the above criteria. They were not randomly selected. The districts and schools had a positive interest in participating in a research study that would provide them with evidence of their progress toward reform and the factors that either enhanced or inhibited their success. This commitment to participation also was an important factor in their selection. The study sites drew upon an array of resources to support their reform processes, with funding from such sources as the U.S. Department of Education Smaller Learning Communities Grant Program, the Carnegie Foundation of New York, and the Bill & Melinda Gates Foundation.

Characteristics of the Study Sites.

All of the study sites were characterized by a diverse student population. There were no significant demographic shifts in the student population of any of the study sites over the course of the study. Table 1 depicts students' demographic characteristics for the 2003–2004 school year. For purposes of confidentiality, pseudonyms are used to identify the study sites. As shown in Table 1, during the 2003–2004 school year, the size of the student population across the five schools ranged from about 1,400 students to 1,800 students. In four of the high schools, Hispanic students represented slightly more than half of the student population. All of the high schools showed a decline in the number of students enrolled in the school between the 9th and 12th grades.

Contextual descriptions showing similarities and differences in smaller learning community (SLC) structures and school leadership across the study sites are provided on the following page.

Table 1. Demographic Characteristics of the Student Population in Five High School Sites, 2003-04. Northeast and Islands Regional Educational Laboratory at Brown University (LAB)

	Total	High Schools									
		Monroe		Jefferson		Washington		Adams		McKinley	
		#	%	#	%	#	%	#	%	#	%
Total Population	8125	1863		1642		1640		1419		1561	
Grade Level											
Grade 9	2886	639	34%	716	44%	550	33%	480	34%	501	32%
Grade 10	2056	436	23%	438	27%	438	27%	390	27%	354	23%
Grade 11	1757	405	22%	247	15%	389	24%	305	22%	411	26%
Grade 12	1426	383	21%	241	14%	263	16%	244	17%	295	19%
Gender											
Female	3914	926	50%	760	46%	728	44%	691	49%	809	52%
Male	4211	937	50%	882	54%	912	56%	728	51%	752	48%
Ethnicity											
African-American	2151	376	20%	586	36%	379	23%	421	30%	389	25%
Asian	843	383	21%	70	4%	205	13%	70	5%	115	7%
Hispanic	3478	168	9%	831	51%	908	55%	745	52%	826	53%
Native American	39	—	—	1	<1%	15	1%	11	1%	12	1%
White	1614	936	50%	154	9%	133	8%	172	12%	219	14%
Special Education	1037	257	14%	257	16%	229	14%	137	10%	157	10%
ESL/Bilingual	1124	250	13%	361	22%	205	13%	164	12%	144	9%

Washington High School, Adams High School, and McKinley High School.

These three high schools were located in a single district and were part of a district-driven high school reform process. During the first year of the study, the district had mandated the establishment of ninth-grade SLCs in all of the high schools that would be staffed by interdisciplinary teacher teams. The ninth-grade SLC structure included daily common planning time for the teams. These schools offered the opportunity to examine variations in data use in high schools operating under the same strong district mandates for high school reform. The culture of each school was very different, and they varied considerably in expanding school restructuring beyond the ninth grade.

Washington High School. In this high school, each of the ninth-grade teams had an instructional coach assigned to work with it, and a large portion of common planning time was used for professional development activities. The principal was a particularly strong leader who set clear expectations for the use of common planning time meetings and the professional development that was provided by the instructional coach. This is one of the two study sites at which the principal did not change over the course of the study.

The school also used a transition coach who helped the principal and the teacher teams address school reform issues. The school piloted different

approaches to extending the SLC structure to the 10th grade, but nothing as formal as the 9th grade structure was established.

Adams High School. For more than 20 years, Adams High School had a “school within a school” tradition, with an arts academy existing within the larger high school. This academy had been established through the school’s long connection with the Coalition of Essential Schools. At the beginning of the study, the school had already established a school-wide SLC structure by adding three other academies, all under the overall direction of the school principal. Each academy had grade-level interdisciplinary teacher teams with common planning time, and instructional coaches provided support to the 9th and 10th grade teams. Leadership was unstable in this school over the course of the study, and additional instability was caused by scheduling and resource allocation issues resulting from the school-wide SLC structure. The four academies were consolidated into three academies during the third year of the study, each under the leadership of a director. A transition coach provided support to the directors, instructional coaches, and teacher teams.

McKinley High School. This high school had a tradition of career academies that enrolled a relatively small proportion of the student body. Central to these academies were academy-specific courses and internships for 11th and 12th graders. Under the district mandate, an SLC structure was established with interdisciplinary teams at the ninth-grade level. Teams were not academy-specific, and an instructional coach worked with all grade nine teams. Administrator turnover was high in this school, with three principals assigned to the school over a four-year period. The lack of stable leadership left the ninth-grade SLCs operating without clear expectations or consistent administrative support. The school did not have a transition coach until the fourth year of the study.

Jefferson High School.

This high school site was one of five high schools in a district where there was an overall district plan for education reform, but reform decisions were largely site-based. The SLC structure at Jefferson High School began with the establishment of ninth grade interdisciplinary teams during the second year of the study. Special teams (Academic Improvement Magnet [AIM]) for students who repeated the ninth grade also were formed. The ninth grade teacher teams had common planning time. The principal was a strong leader with a clear vision of teaming who frequently attended team meetings and provided significant support to teachers’ efforts to improve student achievement. This is one of the two study sites where the school principal did not change during the course of the study. Efforts were made in this high school to expand the SLC team structure to grades 10–12. The transition to 10th grade SLC teams was accomplished, but plans to create team structures in grades 11 and 12 were abandoned because of staffing and scheduling issues.

Monroe High School.

This high school site was the only public high school in its district. By the first year of the study, the school had been reorganized into four houses, each led by a house principal under the overall direction of the school principal. Each house had a ninth-grade academy staffed by an interdisciplinary team of teachers. The ninth-grade teacher teams had daily common planning time. Leadership in this high school was provided by the same principal until the fourth year of the study. In addition to the SLC structures, this principal had piloted a variety of personalization strategies. The principal appointed during the fourth year of the study took a more conservative approach to change in response to staff perceptions of being pulled in too many directions. He was supportive of the SLC structures that had been established in the school but did not start or expand upon other initiatives.

Study Procedures

Procedures for the case study of school reform in the five low-performing urban high schools involve both qualitative and quantitative methodology. For each of the case study focus areas (standards, smaller learning environments, and use of data), qualitative data were collected to systematically examine the implementation and effects of reform processes within and across the study sites. These data provide contextual evidence of factors that either supported or inhibited the process of restructuring the low-performing high schools into learning communities characterized by rigorous and personalized instruction, and the systematic use of data to improve student results. Quantitative analyses will focus on longitudinal changes in multiple student performance indicators: school attendance patterns, performance on state assessments and standardized tests, participation in higher level courses, student grades, and dropout rates.

Case Study Procedures for the Data Use Component.

Qualitative procedures included the use of a data coach as an external facilitator across the study sites who also functioned as a participant-observer member of the research team. In addition to providing technical assistance, the data coach was able to maintain an ongoing presence in the schools over the four-year period and collected detailed field note documentation of data use in the schools. The rationale for the use of a data coach as part of the study design was based on emerging research showing the importance of external facilitators or coaches in school change processes (Center for Collaborative Education, 2001, 2002, 2003; RAND, 2002). There is growing support for the role of coaches in multiple aspects of school reform (Greene, 2004). However, while the literature cites the use of coaches to support school-wide change, instructional improvement, and literacy, there is limited case evidence of the role of a coach in supporting data use. Our case study thus contributes to this new area of knowledge. It is also important to note that because of each high school's emphasis on data use as an integral aspect of its reform process, all of the schools had established a school team with assigned responsibility for data analysis and data dissemination. They tended to be called *data teams*, which is the term used to describe them in this paper.

Over a four-year period, an extensive array of qualitative data were collected to examine the process of data use in the five study sites and to provide contextual evidence of factors that either supported or inhibited the use of data. Qualitative data sources include (1) school reform documents, (2) field note documentation, (3) an archival catalogue of the various types of data used by school staff, and (4) individual and group interviews with school staff. These data sources are described below.

- 1** Document review of pertinent publicly available district and school documents that provide information on the evolution of high school reform processes. Examples of these documents include: district education reform plans and school education improvement plans that describe reform priorities and show uses of data for planning and improvement, curriculum documents associated with standards implementation, and school design team planning documents.
- 2** Field note documentation compiled by the data coach as a participant observer in the study sites over a four-year period. The data coach maintained detailed field notes of the numerous data analysis meetings that occurred in the schools, including a running record of decisions and actions that resulted from data use, and conditions and factors that either promoted or acted as barriers to data use.
- 3** Archival catalogue of data for each school of the types of data used by various school staff, including additional requests for data made by different staff as they used data.
- 4** Individual interviews with school principals, assistant principals, and other school leaders with assigned responsibility for the high school redesign process. Participation in the interview process was voluntary. The one-hour interview included questions that specifically focused on the types of data used and how they were used, any actions taken in the school resulting from staff use of data, conditions that either supported or acted as barriers to data use in the school, and their perceptions of any changes in staff use of data over the past three years.
- 5** Semi-structured group interviews with (1) members of the high school design team and data team at each of the schools, and (2) teacher groups from the newly formed SLCs. Participation in the interview process was voluntary. Interviews with the design teams and teachers primarily focused on the progress of the schools in establishing smaller and more personalized learning communities and implementing standards-based curriculum and instruction. These interviews are not primary data sources for the data use component of the study.

The interview with the data teams specifically focused on how data were used in the school, types of data that were most useful, what they learned from the data, actions that were taken, changes that occurred in school use of data, conditions or factors that supported the use of data, and barriers to data use (See Attachment 1 for data team interview protocol). Across the five schools, 25 data team members were interviewed: three SLC directors; six assistant principals; nine teachers; two guidance directors; two instructional coaches; two transition coaches, and an assistant superintendent. With two exceptions, all of the individuals interviewed had been a member of the high school's data team for at least two years. Although principals in all of the schools had a role on the data team, as noted above, they were interviewed on an individual basis.

The findings reported in this paper are based only on initial analyses of the extensive field note data collected over the four years of the study, the archival catalogue of data used by school staff, and the semi-structured group interviews with the data teams.

Qualitative data were entered into NVivo, a qualitative data management program selected because of its flexibility and power to support coding and manipulation. For the first-level coding of the qualitative data, the research team adapted a coding dictionary that had been developed and used at The Education Alliance at Brown University for previous school reform studies. Nine major code categories that were pertinent to the study were extracted, and the research team identified additional subcodes under these major categories. Two coders were assigned to the coding process. The codes were tested through a content analysis process that coupled intensive coder training with structured feedback on the codebook categories (Neuendorf, 2002). Coder feedback on the codebook categories and related definitions was documented. This process resulted in refinements to several of the code definitions to improve specificity in describing the intended use of a given code and to distinguish more effectively one code from another.

A formal pilot test of intercoder reliability was conducted subsequent to coder training. Following procedures defined by Lombard, Snyder-Duch, & Bracken (2003), two intercoder reliability indices were chosen in order to “bracket” all determinations of coder agreement. Percentage agreement and Krippendorff's alpha (Krippendorff, 2004) were chosen as liberal and conservative indices for this purpose respectively. Bracketed coder agreement for most codes fell within a range that was considered sufficient to proceed to coding the full document database. Documents sampled for the pilot reliability study were recoded, and final determination of reliability was completed after final coding. None of the subcodes or major categories analyzed for this paper failed to meet a 0.80 standard of agreement established at the outset. Percent agreement indices ran roughly ten points higher than alpha statistics: the former within the range 0.87 and 1.00, the latter within the range 0.81 and 0.92.

The full study also will report on changes that occurred on multiple indicators of student performance in the study sites. A longitudinal (four-year) research database has been created to support this analysis. The application used to create the longitudinal student database is CRM's Socrates Data System, a data warehousing application that integrates data from school administrative systems, state assessment data files, standardized test files, and other data sources. The system creates a fully integrated database that links all relevant information about the student and allows extensive data disaggregation. It was specifically designed to support data integration, data management, and research/program evaluation functions. Socrates was used in the study because it not only supported research functions but also provided a technology tool for establishing data system capacity at each site that was essential to a study of data use by school personnel.

As noted in the research findings described earlier in this paper, in spite of federal mandates that call for fuller use of disaggregated data, many districts and schools lack the technology to disaggregate student performance data (Lachat & Williams, 2003; Rudner & Boston, 2003; Schwartz, 2002; Streifer, 2002; Thorn, 2001; Wayman, Stringfield, and Yakimowski, 2004). This observation was true for the study sites as well. Therefore, technical assistance was provided in order to create equal capacity across the five high school sites in establishing school access to disaggregated data essential to the focus of this study. The case study could then focus on how each of the schools actually used data for decision making and the factors that affected data use. Socrates was used to create a fully integrated relational database for each of the study sites that brought together data from the district information system and data from state assessments and other testing programs. The database linked multiple types of student performance data to demographic data, student program data, and membership in an SLC. These linkages allowed data to be disaggregated by these variables.

Limitations in Methodology.

The study was designed as a case study of the process and effects of high school reform in urban high school settings that were committed to the concurrent implementation of the three core areas of reform described previously in this paper. The schools chosen for the case study met this criteria; as such, they were not randomly selected. Although this is a limitation of the study, all of the high school study sites share the trait of being large comprehensive high schools in urban, high-poverty areas. Each contains a diverse student population with many students not performing at grade level on state-mandated assessments. Although the schools are not a statistically representative sample, they can be considered typical of many low-performing medium to large urban high schools. The limited sample of only five high schools in the Northeast makes generalizability to other high schools more difficult but certainly not invalid, because the literature suggests that many high schools across the nation struggle with the same issues as these five schools.

Study Findings

The case study findings described in this paper present the results of initial analyses conducted to examine the following areas of inquiry:

- How were data used in the five low-performing high schools?
- What factors and conditions either supported or acted as barriers to data use?

Case study evidence is presented in this paper for these areas of inquiry. The paper concludes with a discussion of the policy and practice implications of using data in the context of improving low-performing high schools.

Case Examples of Data Use

Case examples of data use provide evidence of how school staff in the five high schools used data to address student performance and school improvement. As part of the reform initiative, each high school had a team with assigned responsibility for facilitating data use. The purpose of these data teams was to analyze and disseminate data that would be used to inform decisions by different groups in the school. Their primary focus was to examine the extent to which improvements were occurring on multiple indicators of student performance. Beyond this primary charge, the teams worked with school administrators and other staff to foster a data use culture in each school by encouraging and modeling the ongoing use of data. The role of the team at each site varied somewhat, but in general the teams focused on these core functions.

The case study examples reveal uses of data that focused on similar concerns across the schools as well as concerns that were specific to a school. The examples illustrate how various uses of data connect to accountability and improvement issues in low-performing high schools in areas of inquiry that relate to

- student attendance
- grading criteria
- standards
- implementing and evaluating instructional interventions
- more effectively meeting the needs of ninth-grade students as they entered new SLC structures
- fostering deeper and more focused use of assessment data by teachers

Attendance and Academic Performance.

Student attendance was an issue for all of the high schools throughout the study. The data teams and ninth-grade SLC teams in Adams and Washington High Schools particularly focused on the use of quarterly data to monitor attendance patterns. Students with poor attendance were more quickly identified, and SLC staff started working more effectively with guidance personnel in holding meetings with students and parents to address attendance problems.

Washington High School illustrates how the use of data to hold SLCs more accountable for student attendance changed staff attitudes about their role in improving student attendance. The principal held the ninth-grade SLCs accountable for reducing absence rates. Quarterly attendance data were disaggregated for each ninth-grade SLC to examine progress in improving student attendance, and results were compared across the SLCs. This motivated a new sense of shared accountability for absence among the interdisciplinary SLC teacher teams; in the past, English language arts and mathematics teachers had not considered themselves responsible for motivating higher student attendance. As part of the SLC team, they now had to own this responsibility along with other SLC staff. One of the strategies used by the ninth-grade teams in this school was to involve students more directly in a discussion of school attendance. Discussion sessions on the importance of school attendance were scheduled during a summer transition program for incoming freshmen, and follow-up discussions were held with the ninth graders within their SLCs throughout the first semester of the school year.

The examination of attendance data at McKinley High School led a school design team composed of both teachers and administrators to examine their assumption that low achievement scores on state and standardized assessments resulted from high student absence. Their focus on this issue was partly a reaction to the district-wide mandate that high schools improve student achievement and the quality of instruction provided to students. It also reflected a tendency on the part of some teachers to “blame the student”—that is, to believe that if students came to school, they would be more successful, and the school would be showing better results. Most of the teachers on the design team assumed that the students with high attendance were experiencing success on multiple measures that included state assessments and course grades, and that the students with low attendance were not.

Performance rates on the multiple measures were disaggregated by frequency of student absence. The data showed that while students with low attendance rates were certainly performing at failing levels, the same was true for the majority of students with high attendance. The data thus confirmed that the school had two problems—student attendance *and* the quality of instruction. Reviewing the data and eliminating teacher assumptions that the problem was only an attendance issue allowed more productive discussions about the content and quality of instruction provided to students, teacher expectations, and ways in which SLCs might engage students more effectively in instruction as well as school attendance.

Standards and Grading Criteria.

Consistency in grading across subject areas within teams and within subject areas across teams became an issue for all of the schools as SLC teacher teams, department chairs, data teams, and the principal reviewed ongoing data on grading patterns. In all of the high schools, this led to conversations initiated at the team and department levels to address grading criteria issues. Through these data-driven conversations, the question of the relationship between the students' course grades and their performance on state assessments and other standardized tests was raised. At different times during the study this became a key question in all of the high schools. When it did become a concern, the schools examined the relationship between course grades and performance on external assessments for the content areas of English language arts and mathematics. What school staff discovered was that many students who had been given high grades were performing at the lower levels of the state assessments and other standardized tests.

Recognition of this problem through a data analysis process led administrators, teachers, and department chairs at each of the high schools to address this issue in different ways. Many concerns were raised when teachers reviewed the data. A basic question was what a grade of A or B really means. This often stimulated a discussion about the criteria teachers were using for the grades given in the core content area courses taken by all students and whether teacher grades were based on progress or proficiency. The questions were not easily answered due to the independence of departmental structures and the orientation toward teacher autonomy. In this regard, the interdisciplinary structure of the SLCs had made grading patterns more visible and open to discussion.

A key role that the data coach played in the discussions was to facilitate a positive and collaborative dialogue among teachers, department chairs, and administrators so that the questions raised did not become threatening to specific teachers. The school teams started to recognize that these questions were connected to the more complex issues they faced in their school reform efforts—whether course offerings and grading criteria were aligned with standards and whether instruction was sufficiently focused on the higher level proficiencies that were being measured in the state assessments.

In the three high schools that were located in the same district, a highly prescriptive standards-based scope and sequence curriculum framework had been mandated for core high school content-area course offerings. What emerged in the discussions around grading criteria was that teachers felt that the framework, while being highly prescriptive, lacked instructional guidelines, expected far too many student work products to be completed within a semester, and did not provide clear criteria for grading the work products. Data analysis discussions thus became connected to the larger issue of the very difficult transition to standards-based instruction that these low-performing urban high schools were experiencing. Through a teacher survey process, all three of these schools were subsequently able to provide feedback to the district on improvements needed in the scope and sequence framework. The schools also

identified the need for professional development in developing rubric-based grading criteria and student work products as a school priority.

In Monroe High School, the data team identified the grading criteria issue as a priority area to address. A professional development day was scheduled to explore the issue with all of the ninth-grade SLC teams before the opening of school. Follow-up meetings were scheduled with the teams to review quarter one and quarter two course grade data and to discuss the grading criteria they had used. Subsequent meetings were held with 9th- and 10th- grade teachers to review grading practices within subject areas, across teams, and across grade levels. A decision to develop standards-based classroom assessments and grading criteria with the assistance of outside consultants resulted from these meetings. The school also made a decision to start the development of common examinations across subject-area course sections to ensure more consistency in teacher expectations for student performance.

Implementing and Evaluating Instructional Interventions.

After reviewing student results on the state Regents Examination in mathematics, the combined efforts of mathematics teachers and the data team in Jefferson High School led to the establishment of an after-school math program to provide additional assistance to students who would be taking the test. The goal of the program was to increase the percentage of students who passed the Regents Examination the first time they took it. After the first year of implementation, the mathematics teachers and the data team reviewed the success of the program by collecting and reviewing Regents results, course grade data, and attendance data for students who participated in the program. They used the data to make recommendations for program enhancements. The data team in this school considered this initiative a model of how data could be used to identify a need and a target population, design an initiative in collaboration with school staff, monitor the progress of the initiative, provide feedback for refinement of the initiative, and continue to evaluate success.

The efforts of the mathematics department and the data team were shared with other school staff. This led to increased data use by another department in the school when teachers asked the team to gather and analyze data on the Regents performance of groups of students who had participated in two different instructional approaches to the Regents Global Studies program. Data were collected and analyzed to gain insight into the effectiveness of a new student-centered Global Studies instructional strategy. One teacher in the Global Studies program had been using a set of student-centered instructional strategies with her underperforming students. The performance of these students was compared to the performance of similar students who did not receive this type of instruction. Although not conclusive, the data suggested that students benefited from the student-centered approach, and it was decided to collect additional data the following year.

Improving the Capacity of Smaller Learning Communities to Meet Student Needs.

The establishment of a ninth-grade interdisciplinary team structure was a major strategy used by all of the high schools to create more personalized and rigorous learning environments for students. Many of the teacher teams struggled with the new experience of shared responsibility for a community of students. By the end of the second year of the study, the ninth-grade teacher teams wanted information on the characteristics and past performance of the incoming ninth-grade students assigned to their learning community as close to the opening of school as possible. With the exception of Monroe High School, the ninth-grade population came from several district middle schools, and data were not readily available at the opening of school on the characteristics of the students, absence levels for the previous year, previous test performance in reading and mathematics, and eighth-grade state assessments results.

The process of creating SLC teacher access to these data illustrates the fundamental connection between data system capacity and data use. It also illustrates how SLC use of data can be immediately applied to addressing potential student attendance issues and designing effective literacy interventions.

- The first issue that had to be addressed was a data system issue that required working through procedures and a schedule with district data system personnel. The key people involved were representatives of the data team, the district data administrator, and the data coach. Key steps in the process were as follows: (1) it was agreed that by the fourth quarter of the school year, the district data system would be updated in terms of the assignment of eighth-grade students from various middle schools to the high schools, as well as their assignment to a specific learning community; (2) assignment to a specific learning community became a standard data element in the district data system so that data could be maintained on SLC participation; (3) end-of-year absence data for the eighth-grade students would not be purged from the district data system until the data had been imported into each school's integrated database along with the demographic data and SLC assignment; and (4) as soon as the eighth-grade state assessment file was available to the district, it was imported into the database, which usually occurred during September.
- Having all pertinent data in the database as soon as possible meant that disaggregated data could be provided to the ninth-grade teacher teams in the early part of the first quarter of the school year—data that yielded important information about their students' demographic characteristics, eighth-grade attendance, and performance levels on the eighth-grade state assessments in English language arts and mathematics.

Access to the data allowed administrators and SLC teams within a school to examine the question of whether the SLCs were similar in the demographic characteristics of

their students, which was a goal in establishing the SLC structures. In McKinley High School, the data showed that a large proportion of ESL (Hispanic) students had been placed in one SLC, thus creating a segregated learning community for these students. The examination of the data also showed that special education students had minimal or no access to the SLC structures. This led to questions of how to effectively integrate diverse student populations into the SLC learning environments and how to identify the types of support personnel that needed to be a part of the SLC teacher team structure. These concerns were not easily resolved in this high school and continued to be an issue throughout the study.

In Adams High School, an analysis of the demographic characteristics of students in SLCs with career-oriented themes showed clear gender differences. Students had been allowed to choose their SLC, with the result that very few female students had chosen either of the two technology-oriented SLCs. This raised both gender and equity issues, and led school administrators to question the merits of career-oriented SLC structures, which might have the effect of limiting student exposure to a broader array of learning opportunities. This was still an issue during the fourth year of the study.

SLC teams used absence data on the incoming freshmen to determine whether school attendance was a major issue they had to address for their students. This became a concern for Washington High School where eighth-grade attendance records did not bode well for what could be expected of these students in their first year of high school. The data team in this school examined the data to determine if any of the ninth-grade SLCs had a higher proportion of students with a record of poor school attendance. The teams obtained lists for students whose attendance records showed they might be at risk, and attention was paid to immediately connecting with these students and monitoring their attendance.

Ninth-grade teacher teams used grade eight state assessment results to identify students who (1) had achieved or were close to achieving standards for literacy in reading, writing, and mathematics skill areas, and (2) clearly needed intensive interventions. Except for Monroe High School, throughout the study the data showed very low levels of literacy for nearly half of the freshmen entering the other four high schools. In all of these high schools, the SLC focus on smaller and more personalized learning environments evolved into an added focus and urgency around student literacy. This led to instructional/literacy coaches being assigned to work with the ninth-grade teacher teams.

Deeper and More Focused Use of Assessment Results by Teachers.

As school accountability for improving student achievement became a more critical issue in the high schools, teachers increasingly wanted more specific information about the skill areas in which students needed the most assistance. Reading literacy was a major issue for the three high schools in the same district, with the majority of their students below grade level in their reading skills. The high school

reform initiative in this district had a very strong literacy focus that emphasized literacy instruction within core content areas across the curriculum. The ninth-grade standardized assessment used in this district provided school level results on very specific reading sub-skills (content cluster reports). The district imported the content cluster data into the integrated database for each school and disaggregated the data by students' current 10th-grade English language arts teacher across all course sections taught by the teacher. The provision of the disaggregated reading content cluster data allowed deeper and more focused use of assessment results by teachers in the following ways:

- Tenth-grade teachers had targeted information on the proficiency levels of their students for specific reading sub-skills that related to reading vocabulary and reading comprehension skills. The teachers learned that the majority of students were below grade level not in all of the sub-skill areas but in particular sub-skill areas. This allowed teachers to target their instruction far more effectively. For example, for reading vocabulary skills, the majority of the students scored below average in demonstrating the ability to recognize synonyms for words and determine the meaning of a known word with multiple meanings. However, most students were at grade level or above in their ability to use context clues to assign meaning to a word.
- Disaggregating data for different course sections meant that the 10th-grade teachers had a course level reading proficiency profile of their students. They could determine whether there was a higher proportion of students below grade level in specific reading skills in any of the course sections they taught compared to other course sections. One teacher immediately determined that the reading proficiency profile differed across her course sections for specific reading comprehension skills. This again suggested the need for more intensive reading intervention strategies in certain course sections compared to others.
- Within a course section, teachers also had specific reading skill profiles for each student. For the first time, the 10th-grade teachers had a clear and very specific picture of the extent to which instruction needed to be differentiated for different groups of students in a class for specific skill areas.

The availability of classroom-level assessment data on students' reading skills also enabled the literacy coaches in these schools to work more effectively in supporting teachers. The disaggregated content cluster reports became part of the core set of reports the district provides to these high schools.

Another example of deeper and more focused use of assessment results related to the fact that school teams started to recognize that they needed different types of longitudinal data to determine the school's progress in improving student performance and reducing achievement gaps. All of the schools were increasingly examining longitudinal state assessment performance trends and were discouraged about the

results. In examining the longitudinal data, teachers often raised the issue that looking at 10th-grade state assessment trends over time did not provide a true picture of the school's progress in improving student performance because the annual data represented achievement trends for different groups of students. Through the LAB, technical assistance was provided to district data personnel in producing data reports that showed changes in grade 8 and grade 10 state assessment performance for the same cohort of students who had scores on both tests. Jefferson High School was the only school that did not receive this type of report because the state assessment files did not allow for these types of comparisons.

Having these data allowed the school teams to ask the following types of questions.

- Did students who scored proficient or above in grade 8 maintain this performance level in grade 10? If not, was the decrease greater in mathematics or English language arts?
- Did students who performed below the basic level on the grade 8 assessments improve their performance on the grade 10 assessments? What changes occurred for the two content areas?
- What do the data indicate about the progress of students as they proceed through the high school program?

The analyses of these data by the school teams during the fourth year of the study provided some meaningful insights about performance trends. What was most striking and encouraging for all of the schools as they examined the data was that they were making positive progress in improving the performance of grade 8 students who had scored at the lowest levels of the state assessments in the two content areas. What was discouraging was that across the schools, about 25% of the grade 8 students who had achieved the standard or above on the grade 8 assessments were below standard on the grade 10 assessments. This led to discussions about differences between the grade 8 and grade 10 assessments. More important, school teams raised the issue of whether the schools' intensive focus on literacy intervention for the many students who were below grade-level in their skills was resulting in insufficient attention to building the skills of the higher performing students.

In summary, the case examples of data use in the five low-performing high schools build on current research and practice literature that cites the importance of data-driven decision making in creating more effective schools. The examples provide vivid illustrations of applied uses of disaggregated data that led to a more focused examination of school and program effectiveness in addressing specific areas of student performance. Uses of the data revealed issues that would not have been identified without a data-driven approach to school reform, and the process of data use became a mechanism for making more informed decisions.

Factors and Conditions that Support or Act as Barriers to Data Use

The other area of inquiry addressed in the initial analyses of case study data focused on factors and conditions in the five high schools that either supported or inhibited data use. Again, this area of inquiry was framed by current research and practice literature that has identified several key supports and barriers to data use in schools, but not to high schools in particular. The case study evidence revealed six interrelated factors and conditions that influenced the use of data in the study sites. These related to

- 1 The central role of a data team in facilitating data use.
- 2 Timely access to high quality data.
- 3 The transition to a data-driven school culture.
- 4 The use of questions to focus collaborative data analysis and use.
- 5 Time for the analysis and interpretation of data.
- 6 School leadership that supported data use.

The Role of a Data Team in Facilitating Data Use.

The efforts of a school team with assigned responsibility for data analysis and data dissemination functions was an important factor in establishing and sustaining a focus on data use in the five urban high schools. The data coach worked directly with the teams in each of the schools to build their skills in data analysis and to facilitate the development and implementation of school-wide data dissemination strategies.

- In the three high schools located in the same district, district mandates had required the establishment of a data team in each of the schools. These data teams were generally composed of the principal, an assistant principal, teacher representatives, and a guidance department representative. In the Adams and Washington High Schools, the transition coach and instructional coaches/literacy coaches were members of or participated frequently in data team meetings.
- In Jefferson High School, a subcommittee of the school design team was assigned responsibility for facilitating data use. In Monroe High School, the school's broadly representative leadership team was charged with the responsibility of establishing a data-driven decision-making process to support high school restructuring.

In Jefferson, Monroe, and Washington High Schools, the data teams were particularly successful in increasing the analysis and use of data by SLC teacher teams, department chairs, and transition and instructional coaches. At Adams, Monroe, and Washington High Schools, they also took an active role in improving the quality and accuracy of school-level data. Each team experienced its own set of issues in facilitating data

use. Their experiences revealed four strategies that influenced their progress and effectiveness: (1) broad representation in membership, (2) proactive modeling of data use, (3) a project-based approach to data use, and (4) staying the course through complex change. Examples of these strategies are presented below.

Broad Representation. From the beginning of the study, Monroe High School elected to make the school's leadership team responsible for promoting more widespread use of data. The leadership team had broad representation from within the school and also included district representation of K–12 academic directors. The broader representation of this team meant that it had a wide range of influence. Based on its analysis of quarterly and annual data, the leadership team advised the high school and house (SLC) principals as well as the K–12 directors and assistant superintendent for curriculum, instruction, and evaluation. Their work opened the door for a wide-ranging discussion of grading policies when the data suggested inconsistencies in the course grades given by different ninth-grade teams in core content areas. These discussions led to more attention being paid to defining assessment criteria for student work products, and the use of common examinations across all sections of core courses in English language arts and mathematics.

Modeling Effective Data Use. In Jefferson High School, a high-functioning team was established during the first year of the study as a subcommittee of the school design team. The subcommittee was composed of school administrators and representatives of interdisciplinary SLC teacher teams. The school principal played an active role in this group, which became increasingly responsive to school-wide data needs and the data requests of school staff. Members of the subcommittee particularly focused on how they could model effective uses of data. They maintained ongoing communication with the 9th- and 10th-grade interdisciplinary teams that had been established through the high school reform process, and collected and analyzed data that responded to their concerns. They identified annual targets for improvement and worked with the larger design team and other staff to define interventions that would address improvement targets. The work of this group stimulated considerable interest in the use of data at the other high schools in the district. They also hosted groups from other schools to share how data were being used to inform decision making in the school, and traveled to other schools and several conferences to present their work.

A Project-Based Approach to Data Use. Over the course of the study, data team meetings in McKinley and Washington High Schools made it clear that there were only a limited number of important data related issues the teams could address on an annual basis, and that their effectiveness would be improved if they had an agreed-upon set of objectives and tasks they would complete annually. The data coach worked with the teams to develop a project-based plan for school-wide data use with associated actions and timelines. The

project plan focused on four key areas: (1) facilitating a school-wide review of the longitudinal progress of students at different grade levels on different performance indicators such as attendance, academic achievement, and graduation; (2) engaging more staff in setting specific targets for improvement; (3) providing data to individual teachers that was specific to the students in their classes; and (4) creating a more data-driven annual education improvement plan. The data teams in these schools have adopted this project-based approach to data use with assigned responsibility for each of the team members.

Staying the Course Through Complex Change. Adams High School provides a case example of the importance of staying the course in a difficult high school transition process. The progress of this data team was impeded by problems the schools encountered in establishing SLCs and instability in school leadership. In spite of these issues, the data team continued to function, and its work was an integral part of the transition to three SLCs. Nevertheless, the transition itself was a barrier to the team's effectiveness. The effort that the faculty and administration had to dedicate to the school restructuring process combined with the instability that the process caused when school leaders left made it difficult for the data team to foster ongoing data use in the school. By the end of the fourth year of the school reform transition, however, stronger leadership from the SLC directors set the stage for increased stability in the school. Building on the structure the data team had created, each SLC formed a data cadre whose charge was to collect, analyze, and disseminate data to inform organizational and instructional decision making and monitor the progress of the SLC initiative. The data cadre in each SLC worked with the director to develop a data-driven education improvement plan, and each cadre identified critical questions that needed to be addressed through the use of data during the school year. The SLC data cadres also met as part of a school-wide data team to examine school-wide progress.

In summary, the efforts of a school team with assigned responsibility for data analysis and data dissemination functions were important factors in establishing and sustaining a focus on data use in the five urban high schools. The experiences of the different teams provided insights and lessons about strategies that can be useful to other high schools seeking to establish and sustain a data team structure that supports school-wide use of data in the process of high school restructuring.

Timely Access to High Quality Data.

The case study revealed the combination of factors that need to be addressed to resolve the issue of schools having timely access to pertinent data in urban settings. This issue reflects previous literature that cites the lack of information at the right time and in the right formats as a major barrier to data use in schools (Schmoker, 2003; NFIE, 2003). Integrating data use into the high school reform process of the different schools meant that school teams needed timely and accurate data from district information systems. This was a challenge for all of the study sites. During the first year of the study, a

technical review of the district data systems was conducted as a research activity to examine the status of data access procedures and the range of data that would be available to the schools. In all of the districts, the data systems were maintained centrally at the district level, with data being entered at the school level. Two of the districts had recently installed commercially available student information systems and were experiencing significant difficulties in updating their databases. In the district where three of the high schools were located, the information system coordinator had programmed the district data system.

The types of data collected and maintained in these systems included the data variables that are common to such systems: demographic data; attendance data; education program data; student schedules; course enrollment and course grade data; discipline data; withdrawal/dropout data; and, in some cases, graduation data. Schools had access to daily attendance totals and discipline information, quarterly grade distributions, and annual aggregate reports on attendance, discipline, dropout, and course failure rates. Disaggregation of the data was minimal if at all. Teachers could request individual student records. Standardized test data and state assessment data were in separate electronic files and available to the schools in the formats provided by the state and the test companies.

The review of the district data systems showed that data quality and data access issues had to be addressed as a first step in the process of data use. All three districts where the study sites were located needed technical assistance in this area if the schools were to have useful information.

Data Quality.

Data issues that were common across the three urban districts related to the accuracy and completeness of data, and procedures for data verification. The districts and schools didn't recognize the extent to which data in their student information systems were not complete and/or accurate until they began to use data more rigorously. More frequent use of the data files uncovered data quality issues that were resulting from a high level of student mobility and high dropout rates between the 9th- and 10th-grades. In many cases, procedures at the school and district levels for updating data systems, coding students who had left the system, and removing them from the currently enrolled student population files were not in place or not followed consistently by personnel. Problems also occurred in the study sites because of the limited personnel available to manage and update district data systems, to conduct ongoing data verification processes, and to produce data useful to the schools. Budget problems and attendant staffing cuts and staff turnover also exacerbated the problem of data quality in all of the districts.

Technical assistance was provided through the LAB to improve the quality and accuracy of the district data systems, and the timeliness of data provided to the high schools. Protocols and procedures for addressing problems in the data systems were collaboratively developed with district and school personnel, and by the end

of the study, significant improvements had been made. Study findings showed that the emphasis on data use in the high school reform process actually acted as a stimulus to improving data quality in several key areas.

- The collection of complete and accurate data at the building level and the export of this information to the central data files was problematic in all sites. The increased use of data made school administrators and other personnel more aware of the problem and the need to improve data collection and data input procedures by clerical and other staff at the school level. Progress was made in this area at all of the study sites.
- The data team in Monroe High School became proactive in helping improve the input of data by house (SLC) secretaries and the guidance department. There were inconsistencies in the recording of standard information across houses, and steps were taken to retrain the house secretaries and establish uniform data entry protocols.
- At Adams High School, student enrollment data were cleaned and systems were put in place to ensure complete and accurate data entry. School administrators examined and improved procedures for recording daily attendance to ensure that students who were not present during the attendance period but arrived to school late were appropriately recorded in the system.
- Staff from the ninth-grade teams in Washington High School worked with the district data and student scheduling departments to clarify procedures for recording the assignment of students to a team. This was the first time that these school staff had taken ownership of data accuracy.

Because of the combined efforts of both district and school personnel, each year the accuracy and completeness of data provided to school staff improved, which had the effect of improving teacher and administrator perceptions of the accuracy and relevance of data provided to them.

Defining a Core Set of Data.

Case study findings highlighted the importance of defining a core set of data that schools would use to determine their progress, and improving communication between the schools and district data system personnel. As an important first step, the school teams identified the data reports that were most important to answering key questions about student performance. For the next step, they developed agreements with district personnel about when these data would be available. Data system staff members were burdened with data requests from multiple projects, often without being informed of how the data would be used. Developing better understandings about the data needed by the schools and when it was needed became an important part of the process of improving ongoing data use.

By the end of the first year of the study and with the support of district data system staff, a formal data access plan was being implemented for the three high schools that were located in the same district. These schools started to receive a core set of quarterly and annual data on a scheduled basis. In the other two study sites (Monroe and Jefferson High Schools), a schedule for annual student performance data was in place by the end of the first year of the study, but the availability of quarterly data was less consistent because of data retrieval issues with the district data systems. However, most of these issues were resolved by the end of the third year of the study. Procedures were established for responding to additional data requests by school staff based on their analysis and use of data.

Schools received quarterly and annual reports that displayed student performance data in several areas.

- These reports included quarterly and annual reports on absence, quarterly and annual reports on course enrollment and course grades, annual and longitudinal state assessment reports, annual and longitudinal grade 9 standardized test results for reading, writing, and mathematics sub-skills in four of the school sites, and grade 11 standardized test results in these areas in three of the school sites. The schools had previously received many of these reports but not in disaggregated formats. The reports could now be disaggregated, as appropriate, by gender, race/ethnicity, disability, language proficiency, SLC, participation in specific programs, exposure to specific literacy or other instructional interventions, and combinations of these characteristics. By request, data also could be disaggregated by course section or teacher.
- Teachers could also request student lists disaggregated for various performance measures, and individual student profiles.
- Teachers at Monroe High School received used sub-skill state assessment reports that showed student response patterns on test items organized by state standards for learning. This allowed school staff to connect state assessment results to their standards-based curriculum and identify student strengths and weaknesses in specific standards-based proficiencies.
- In the district where three of the high schools were located, the director of research and evaluation became very supportive of the focus on continuous data use in the high schools. As a result, during the fourth year of the study, the district had diagnostic content cluster reports for ninth-grade students in the literacy areas of reading, vocabulary, and reading comprehension disaggregated in multiple ways for teacher use in Washington, Adams, and McKinley High Schools.

Providing timely and meaningful data to school staff had a visible impact on data use. By the third year of the study, the schools were getting a much faster turnaround on quarterly attendance and course grade data disaggregated down to the level of the SLC and ninth-grade team structures that had been created in the schools. Staff in the SLC structures could easily determine the extent to which they were having an impact on reducing poor attendance and course failure rates. Interventions could be more systematically planned for students with poor attendance and/or failing grades. School teams also were receiving disaggregated state assessment and other standardized test data as early as possible. This allowed them to use the data more effectively to determine the school's progress in improving literacy skills and to target instruction more effectively for the students assigned to a particular learning community.

The Transition to a Data-Driven School Culture.

All five high schools went through an important transition in staff attitudes toward data. Although data had been available to the schools for some time, there had been no expectation that any group would purposefully examine data, and without the capability of disaggregating data, school staff weren't able to examine how specific groups performed. Providing a core set of disaggregated data on a regularly scheduled basis to the data team and other groups in the school reinforced the expectation that data would be analyzed and used to inform decisions. This was a major culture change in the schools. School administrators and various school teams became more confident that they would receive an ongoing series of understandable reports that would allow them to examine their progress in improving multiple indicators of student performance. Having regular access to data contributed to the use of data by school staff becoming a more pervasive aspect of the school culture. In the words of one data team member:

A pervasive culture is building. We now know we need this kind of data, and it's there. When I started, I didn't know what type of data I needed; it has changed to knowing what I need, using what I need, and asking for more data when I need it.

Field note evidence indicated that school teams increasingly realized that disaggregated data was *their* data and could be used to answer their questions. Having the capability to disaggregate data created a culture in which school teams could examine how their students performed, ask deeper questions about factors that might be influencing performance, and plan instructional interventions more effectively.

Using Key Questions to Focus the Collaborative Review and Analysis of Data.

The process of questioning, exploring, and searching for new understandings about student performance became an important element in the high school redesign process in each of the five study sites. Part of this change resulted from school accountability pressures to improve student performance, and part of it resulted from the emphasis on data use that was a component of each school's reform plan. Involving school staff in collaboratively examining disaggregated data was a major data-use strategy in all of

the study sites, and it helped school staff to identify meaningful questions about the school's progress in improving student learning and achievement.

Focusing on a set of key student performance questions that were most critical to a particular school team not only built staff skills in analyzing data, but also increased their motivation to use the data. Questions were identified by the school design team or data team, by teacher teams in the SLCs, by the principal, or in the school's annual education improvement plan. The issues included

- Achievement gaps in literacy for specific groups of students
- Longitudinal performance trends of specific groups of students, particularly related to reading, writing, and mathematics skill areas
- Whether the smaller learning community structures were improving student attendance
- How students' course grades compared to their results on state assessments and other standardized measures
- Whether grading patterns reflected consistency in grading criteria across learning communities and course offerings as the schools aligned instruction more closely with standards

When high school teams collaboratively developed clearly focused questions, it helped them look beyond the data to examine other pertinent information, and they were far more likely to understand what the data meant for school improvement. The questioning process allowed staff who represented different perspectives in a school—administrator, teacher, guidance counselor, coach—to step back and consider more objectively how school policies, teacher beliefs, conditions for learning, or teaching practices might be affecting students' learning and achievement. When the data revealed the falseness of assumptions or "hunches" about specific groups of students, it became easier to get school staff to recognize the importance of basing decisions on objective data. The use of questions helped school teams maintain a focus on student achievement and how the high school program needed to improve.

Over the course of the study, it became clear that with some initial training organized around specific data-related questions, school administrators and teachers could analyze, interpret, and use data effectively. School staff who initially felt that they did not know how to analyze or interpret data reported that the questioning approach provided them with a framework or "lens" for looking at the data, and gave them more confidence in looking at patterns of student performance and identifying possible implications for school improvement. One teacher commented, "The more that I looked at the data, the more confident I felt about expressing my opinion about what needed to change." A guidance counselor commented, "I thought data was too

complicated for me to use. Now I see that it is not hard to understand, and I am excited about using data.”

Time as a Support and Barrier to Data Use.

In all of the high schools, the lack of time was a significant barrier to the use of data. This was true for the team responsible for facilitating data use as well as for other school staff.

Data Team Time Barriers. To effectively do their jobs, the core team responsible for leading the process of data use in the high schools needed time for meetings, time to analyze data, and time to disseminate data to colleagues. This situation often was complicated by the fact that some team members were on more than one of the various committees involved in the high school restructuring process. In one district, these problems were exacerbated by union regulations that limited the participation of team members in after-school meetings. This led to their reluctance to work on data team tasks outside of contract time. With the exception of Jefferson High School, time constraints occasionally led the data teams to want more assistance from the data coach in analyzing data. This slowed the development of their own capacity to analyze data independently. In some cases, the time pressures undermined the coaching process of building skills through a set of clearly focused questions. The comment made to the data coach by one data team member reflected this time frustration: “We don’t need to spend time answering questions...it would be most helpful if you just told us what the data said and then we could take it from there.”

School Staff Time Barriers. Finding time for different school staff to collaboratively analyze data was a challenge for all of the high schools. SLC staff needed time to examine the quarterly and annual data they were getting on the performance of students assigned to the SLCs. Ninth-grade teacher teams and their instructional coaches needed time to understand the implications of various assessment results. Many of these staff also felt stretched in meeting the time commitments and multiple demands of establishing smaller learning community structures and aligning course offerings with state standards. It was often difficult for school administrators to participate effectively in data analysis meetings held during the school day due to interruptions that were a normal part of the day-to-day operations of their school. In some cases, multiple funding sources created multiple initiatives within the high schools that were not always well integrated. This further limited the time available for staff members to focus on any one initiative and to integrate the use of data in examining the overall impact of the high school restructuring process on student learning.

Using Regularly Scheduled Meeting Time. During the third year of the study, the teams responsible for data use in all of the high schools started to address the time problem by developing and implementing data dissemination strategies that integrated the use of data into staff meetings already occurring in the school, such as department meetings, design team meetings, meetings of SLC directors, or the common planning time of ninth-grade teacher teams. The dissemination strategies focused on (1) the major groups/individuals in the school who would receive specific quarterly and annual data on multiple student performance indicators, (2) when they would receive it, and (3) how they could request and obtain additional data based on their review and analysis. The intent of these strategies was to target data use to the specific issues and questions that were important to the various groups and staff members in the school.

During the fourth year of the study, all of the schools started to experience success in integrating the use of data into the agendas of regularly scheduled meeting times for various groups. School officials continued to examine how they could increase the use of data throughout the school. The availability of common planning time for ninth-grade teacher teams was particularly helpful in supporting data use by teachers. Instructional/literacy coaches and teachers in the three schools located in the same district used this time to analyze disaggregated data on literacy sub-skills in order to make decisions about instructional interventions.

School Leadership in Supporting Data Use.

The case study provided evidence of the mutual roles played by school leaders in the process of institutionalizing data use in high schools. The use of data in the high schools was strongly influenced by the leadership of the principal. It was also influenced by the shared leadership roles played by other administrators and teacher leaders in the schools. The efforts of data team members were central to increasing communication among school staff about trends and issues that were shown in the data. The involvement of assistant principals, SLC directors, department chairs, and teacher leaders from the interdisciplinary ninth-grade teams also was essential in establishing multiple types of data use in the schools. Transition coaches and instructional/literacy coaches provided follow-up assistance to various data users in the school, and played an important role in motivating teachers to use data. The case study also provided evidence about the collaborative role of a data coach in guiding a high school's transition toward a culture where data is used strategically throughout the school.

Summarized below are key dimensions of the roles played by the principal and data coach in facilitating data use.

Role of the Principal. The case study confirmed previous research that underscores the central role of a principal in supporting data use. Principals in Jefferson, Monroe, and Washington High Schools played active roles on their data teams and established a shared leadership structure that supported the use of data by different school staff. In the other two high schools, changes in principal leadership over the course of the study had the visible effect of slowing down and reducing the extent to which data use became established in the school. There were several key roles that the three involved principals played in motivating the use of data by school staff. The principals

- *Created a vision of data use in the school*, and communicated clear expectations that staff would use data.
- *Emphasized the use of data for both accountability and improvement.* School staff were expected to use data to examine the school's progress in improving student performance in areas related to attendance and academic achievement, and to identify areas where further improvement was needed.
- *Modeled the use of data.* All three of the principals were active data users and vocal champions of data use. They engaged with school staff about what the data were showing, what additional data might be needed, and how to use the data to evaluate school programs and set improvement goals.
- *Supported the use of data* by providing time for staff to analyze and use data. All three principals also visibly supported the work of the data team and the data coach.

Principals play a key role in stimulating and motivating data use. While the emphasis on data use had been defined as a core component of the high school reform process in all of the schools, the perception of most school staff at the beginning of the study was that data were analyzed for someone else's purposes, and they didn't view the analysis and use of data as part of their jobs. The principals in Jefferson and Washington High Schools were particularly effective in establishing the expectation that improving student performance was part of everyone's job and that it included the analysis of data. The Washington High School principal took the data team's analysis of data and modeled how to use the information with the design team, department heads, and teacher teams. The Jefferson High School principal effectively set the agenda for the data team and interdisciplinary teacher teams by having them research specific questions about student performance in the school.

These two principals also played a key role in reducing staff concerns about the use of data while still building a data-use culture based on student results. School staff were often defensive when faced with data that showed low student performance, and some of the staff resistance to data use stemmed from the view that data would be used against them. Part of this view reflected pressures on the schools to improve student scores and reduce achievement gaps on state assessments. Although the orientation toward accountability did motivate greater interest in looking at annual results, it did not motivate strong interest on the part of teachers or department chairs to collegially examine data in depth in order to identify problem areas and seek new solutions. The leadership orientation of the principals was a key factor in overcoming staff resistance to data use. They modeled the positive and constructive use of data, encouraged staff to set improvement goals, and celebrated whatever progress the school made in improving student performance. As expressed by one principal, “If the principal’s attitude is that the use of data is to address problems, not to punish people, this attitude will start to pervade a school.”

Role of the Data Coach. The primary role of the data coach in the study sites was to provide technical assistance on various aspects of data use, and to also serve as a participant observer of each school’s progress toward a culture of data-informed decision making. The data coach was a coach in the true sense in that various uses of data were modeled but that school staff were responsible for the analysis and interpretation of the data. Documentation of how the schools used the coaching assistance sheds light on the importance of the coaching role in helping school staff with limited previous experience in data analysis develop the skills to use data effectively. The case study data from the five high schools suggest that the use of a data coach can reinforce a data team structure and help team members learn how to foster ongoing data use by school personnel whose time and energy is consumed by the daily demands and requirements of high school restructuring.

Key types of assistance a data coach can provide in a high school restructuring process include:

Procedural Assistance.

- Help schools develop procedures with data system personnel that improve timely access to data.
- Help school and district personnel identify and address data quality issues.

Modeling and Skill Building Assistance.

- Model the use of critical questions in analyzing and interpreting data.
- Model how SLC teams can use data to monitor the progress of their students on multiple measures.
- Model how department chairs, teacher teams, and instructional/literacy coaches can use data to examine the effectiveness of instructional strategies.
- Model how data can be used to identify areas of strength in student learning and achievement, as well as areas for improvement.
- Model the use of data in developing and monitoring the school's annual education improvement plan.

The work of the data coach and the evolution of a data team structure varied somewhat in the different high school sites based on the unique context of the school. In all of the sites, the case study data showed that as data teams mature, the role of a data coach decreases as team members and other school staff develop deeper understandings of the institutional function of data use in the school. In three of the five high schools (Washington, Adams, and McKinley), the data coach set the stage for the data teams' direct involvement in developing and monitoring a data-driven education improvement plan. Framing this role for the data team improved the quality of the plans, and school staff started to use the plans to monitor school progress on improvement goals.

Limitations of Study Findings

The findings presented in this paper are the results of initial analyses conducted on a selected set of the study's data sources. The data sources used for this paper are still being coded and analyzed at deeper levels, and this paper does not present all of the findings identified to date. Although evidence of various dimensions of data capacity and data use in schools is available in the research and practice literature, evidence-based research on data use in high school reform is limited. Therefore, it is difficult to situate this study within a larger body of research. It also must be acknowledged that the LAB technical assistance provided to the districts in the form of data system technical support and the provision of a data coach are factors that had some influence on the case study findings presented in this paper. The rationale for this technical assistance was described in the Methodology for the Study section: it provided school access to data that was essential to the purpose of the case study and allowed ongoing participant documentation through the coach that contributed to in-depth case study field evidence of school staff use of data.

Key Findings and Implications for Policy and Practice

The evidence presented in this paper summarizes initial findings of a case study that is examining the use of data in five low-performing high schools. Case examples provided evidence of how the use of data engaged different high school staff in examining and addressing student performance issues. Examples also illustrated how various uses of data connected to the larger context of high school reform. The key findings from the case examples reflect many of the major themes that have been highlighted in the research and practice literature on data use in schools, including supports and barriers to school-wide uses of data. These findings also foster deeper understanding of the implications for policy and practice in high schools.

For high school leaders seeking to establish a school-wide process of data use, the case study holds many lessons about factors that contribute to success. Not all of the high schools were equally successful in the progress they made over the four-year period in establishing and sustaining effective data use by multiple school staff. However, they all made some progress, and they were all strongly committed to a continuous process of data use by the end of the study. An important aspect of this commitment was the fact that the use of data for continuous improvement was viewed as a central element versus just an activity in all of their reform plans. The lesson is that school leaders need to view and champion data use as integral to school reform processes. As shown in previous research and in the case study evidence, data-driven decision making is a multifaceted concept that requires three core capacities:

- 1 Access to high-quality and timely data
- 2 Leadership structures that support data use
- 3 Processes that support collaborative inquiry

Establishing and sustaining these capacities is challenging and requires that supportive policies, structures, and practices be in place. The policy and practice implications of these core capacities for high schools are discussed below.

Policies and Practices That Support Access to High-Quality and Timely Data

The rigorous use of data in a high school reform process can help school staff develop a more informed understanding of the need for complete and accurate information, and act as a catalyst in establishing procedures that improve the quality of data in

district data systems. An important finding from the study is that many schools and districts would profit from a technical review of their procedures for collecting and updating student data. In an education reform context that requires the use of high-quality disaggregated data for purposes of accountability and improvement, the policy implication is that many districts need stronger data verification, data integration, and data management procedures to ensure the accurate and timely collection, storage, and analysis of essential data. Addressing data quality issues, data disaggregation capabilities, and data access issues are important steps in building the capacity to use data at the school level.

The study findings affirm current research that cites the capacity for data disaggregation as being essential to effective data use (Bernhardt, 2002; Holcomb, 1999; Johnson, 2002; Love, 2000). All of the high schools had previously received student performance data with minimal or no disaggregation. The fully integrated database that was created for each site provided the capacity to disaggregate data by combinations of demographic characteristics, SLC assignment, participation in specific programs, and exposure to specific literacy or other instructional interventions. This system allowed more targeted uses of data to address student performance issues in these low-performing high schools. The use of disaggregated data also helped overcome a narrow over-reliance on aggregated state assessment and standardized test results. When the results of these measures were disaggregated in different ways, they became more meaningful to school staff and were used more effectively in making instructional decisions.

The case study also affirms research that cites the importance of data warehousing technology in providing high-level data disaggregation and the capability to integrate or link multiple types of student performance data, demographic data, and data on students' educational experiences (Wayman, Stringfield, & Yakimowski, 2004). In an education reform context that requires the use of high-quality disaggregated data for purposes of accountability and improvement, district leaders need to develop better understandings of this technology.

As highlighted in previous literature (Lachat, 2002; NFIE, 2003), the case study also shows that effective data use requires procedures for providing timely data to school staff. In particular, as high schools make the transition to SLCs, teacher teams need pertinent information about the students assigned to an SLC. Data access policies that help high schools get timely information on the characteristics and past performance of incoming freshmen can also have a positive impact on the school's ability to immediately provide interventions that reduce literacy achievement gaps. This is particularly important in high-poverty urban settings where many students enter high schools with poor literacy skills. The study also highlights the need for better communication between school personnel and the people who control data in a district. This is essential to ensuring the efficient transfer of data and to helping schools move beyond their role as data providers toward the role of data users.

Leadership Structures That Support Data Use

The implementation of a school-wide data use process in low-performing high schools is greatly enhanced by leadership structures that mutually involve the principal and other administrators, teacher teams, and department chairs. The case study suggests that the multiple roles played by different school staff contribute to more widespread use of data. In addition, the combined strategy of using a data team and a data coach sheds new light on the importance of ongoing facilitation and support in building staff skills to interpret and apply data in order to achieve the goal of greater equity and higher achievement for students in high-poverty urban high schools. Not all principals, even if they support data use, have all of the skills or time needed to move a data-driven decision making process forward productively, especially in high school settings where the restructuring process is particularly complex and demanding.

The Principal.

Leadership and support from the school principal is essential to establishing a culture of data-driven decision making in high schools. Principals must create a clear vision of data use; communicate clear expectations that staff will use data for accountability and improvement; model the use of data; and provide time for school staff to analyze and use data. Lack of visible support from the principal is a barrier to the effectiveness of a data team. The principal must champion the work of the team in using data, monitor the progress of the team, and hold the team accountable for achieving its purpose.

The Data Team.

The case examples from the five high school sites contribute new knowledge about the role of a data team in high school reform. Because data team members are peers of other school staff, they can play a key role in overcoming staff perceptions that data are inaccurate, not timely, not relevant to their particular concerns, or not displayed in formats that can be easily analyzed. The roles of a data team may incorporate improving the quality and accuracy of school-level data files, ensuring the timely retrieval of data from the district, disseminating data to different groups in the school, helping staff analyze and interpret data, targeting and monitoring goals for improvement, and responding to additional data requests by school staff.

To increase their effectiveness, the data team should be representative of school leadership, teachers, SLC structures, and department structures. Membership should include administrators and teachers, as well as professional support personnel such as instructional coaches and transition coaches who can provide important follow-up assistance to school teams in analyzing and using data. Broad involvement increases the potential for school-wide data use. It can be accomplished by maintaining a relatively small data team with a nucleus of permanent members, and including other personnel in targeted data use meetings and follow-up activities.

Defining a clear purpose, expectations, and benchmarks of progress for a data team are important elements in providing direction for its work. There are only a limited number of data-related issues a team can address on an annual basis, and team effectiveness is improved if members have an agreed-upon set of objectives and tasks that they complete annually. A data plan template can provide data teams with a very useful structure for setting annual goals, defining the key performance/progress questions that should be addressed through the use of data, identifying pertinent data that should be disseminated to various populations in the school to address key questions, developing a schedule for data dissemination and analysis, and describing a process for follow-up and action steps.

The Data Coach.

Emerging research cites the positive contributions of school coaches and external facilitators in supporting multiple aspects of high school reform (Center for Collaborative Education, 2001, 2002, 2003; Greene, 2004; RAND, 2002). However, research about the specific role of a data coach in helping to institutionalize data-driven decision making is limited. The study illustrates the types of assistance a data coach can provide in building the capacity of school staff to use data (such as procedural assistance in improving data quality and data access) and modeling various uses of data by different school staff. The study suggests that this type of facilitation contributes to school-wide use of data for accountability and improvement, and is an important factor in building the skills of a data team or other group who can then lead the process of data use throughout the school. The mutual roles played by a data coach and a data team can act as strong forces in sustaining a focus on data use in the midst of extensive high school restructuring.

Processes That Support Collaborative Inquiry

The case study confirms the importance of teacher collaboration in analyzing data that focuses on a set of clearly defined questions. It is a potent strategy for building staff skills and keeping the focus on student learning and achievement. This approach is supported in the literature (Holcomb, 2001; Love, 2000). However, the study also suggests that the process of organizing data use around clearly focused questions should be established as an operational policy by the leaders who champion the use of data in the school—the principal and other administrators, the teacher leaders, department chairs, the data team, and school coaches. Their modeling of the use of questions to focus the collaborative examination of data can be a key factor in reinforcing this approach to school-wide data use.

The most critical questions raised in low-performing high schools focus on student engagement with school, student achievement, and the quality of instruction provided to students. The questions lead staff to a more systematic examination of school progress in improving student attendance, aligning instruction and grading criteria with standards, improving literacy and decreasing achievement gaps, and improving

longitudinal student performance. The practice of focused collaborative inquiry offers many potential benefits as low-performing high schools struggle to make the transition to higher quality learning environments. The process can

- Confirm or discredit assumptions about students and their performance.
- Target skill areas where specific groups of students need the most assistance.
- Reveal inconsistencies in staff expectations and assessment criteria within subject areas.
- Identify successes and areas for improvement in the SLCs.
- Identify the school's progress in improving the performance of specific student groups on multiple performance indicators.

Overcoming Time Barriers to Collaboration.

School leaders need to recognize that the practice of collaborative inquiry requires sufficient time for staff to have data-driven conversations. Securing adequate uninterrupted meeting time is essential to examining the implications of data and exploring options for improvement. Contract issues and the multiple demands on school staff during high school restructuring processes need to be recognized as potential barriers, both in scheduling adequate time for data team members to meet and for various school teams to review and use data. School policies and practices that integrate the use of data into staff meetings already occurring in the school, such as department meetings and SLC meetings, can overcome time barriers. Schools that have established common planning time for teacher teams can set an expectation that teachers will schedule time on a regular basis to examine a variety of student performance data.

In summary, this paper presents initial results of a study that is examining the use of data in five low-performing high schools. The findings build on current research and practice literature that underscores the potential of data use in helping schools build their capacity to improve student learning and the quality of instruction provided to students. Equity, accountability, and improvement cannot be achieved without an ongoing examination of performance and progress, and the use of data is essential to this process. The paper illustrates both the challenges and the possibilities of data use in the context of restructuring low-performing, high-poverty high schools. A more extensive and detailed body of evidence will be presented in the study report.

References

- American Association of School Administrators. (2002). *Using data to improve schools: What's working*. Retrieved August 24, 2004 from <http://www.aasa.org/cas/UsingDataToImproveSchools.pdf>
- Armstrong, J., & Anthes, K. (2001, November). How data can help: Putting information to work to raise student achievement. *American School Board Journal*, 188(11), 38-41.
- Bernhardt, V. L. (1998). *The school portfolio: A comprehensive framework for school improvement* (2nd ed.). Larchmont, NY: Eye on Education.
- Bernhardt, V. L. (2000, Winter). Intersections. *Journal of Staff Development*, 21(1), 33-36.
- Bernhardt, V. L. (2002). *Databases can help teachers with standards implementation*. Education for the Future Initiative. Retrieved on September 24, 2004, from <http://www.educationadvisor.info/documents/OCIO2001/DatabasesCanHelp.pdf>
- Brimijoin, K., Marquissee, E., & Tomlinson, C. A. (2003, February). Using data to differentiate instruction. *Educational Leadership*, 60(5), 70-73.
- Center for Collaborative Education. (2002, April). *The role of external facilitators in whole school reform: Teachers' perceptions of how coaches influence school change*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.
- Center for Collaborative Education. (2004). *The challenge of coaching: Providing cohesion among multiple reform agendas*. Research and Evaluation Program, Boston, MA.
- Chrispeels, J. H. (1992). *Purposeful restructuring: Creating a climate of learning and achievement in elementary schools*. London: Falmer Press.
- Cizek, G. J. (2000, Summer). Pockets of resistance in the assessment revolution. *Educational Measurement: Issues and Practice*, 19(2), 16-33.
- Codding, J. B., & Rothman, R. (1999). Just passing through: The life of an American high school. In D. D. Marsh & J. B. Codding (Eds.), *The new American high school* (pp. 3-17). Thousand Oaks, CA: Corwin Press.
- Cromey, A. (2000). Using student assessment data: What can we learn from schools? *Policy Issues*, 6. Oak Brook, IL: North Central Regional Educational Laboratory.

- Earl, L., & Katz, S. (2002). Leading schools in a data-rich world. In K. Leithwood and P. Hallinger (Eds.), *Second international handbook of educational leadership and administration*, (pp. 1003-1024). Dordrecht: Kluwer.
- Feldman, J., & Tung, R. (2001). Using data-based inquiry and decision making to improve instruction. *ERS Spectrum*, 19(3), 10-19.
- Greene, T. (2004, July). *Literature review for school-based staff developers and coaches*. Oxford, OH: National School Development Council.
- Holcomb, E. L. (1999). *Getting excited about data: How to combine people, passion, and proof*. Thousand Oaks, CA: Corwin Press.
- Holcomb, E. L. (2001). *Asking the right questions: techniques for collaboration and school change*. (2nd ed). Thousand Oaks, CA: Corwin Press.
- Johnson, R. (1996). *Setting our sights: Measuring equity in school change*. Los Angeles, CA: The Achievement Council.
- Johnson, R. (2002). *Using data to close the achievement gap: how to measure equity in our schools*, (1st ed.). Thousand Oaks, CA: Corwin Press.
- Kennedy, E. (2003). *Raising test scores for all students: An administrator's guide to improving standardized test performance*. Thousand Oaks, CA: Corwin Press.
- Keeney, L. (1998, May). *Using data for school improvement*. Tools for Accountability Project, Report on the Second Practitioners' Conference for Annenberg Challenge Sites, Houston, TX. Providence, RI: Annenberg Institute for School Reform at Brown University. Retrieved September 1, 2004, from http://www.annenberginstitute.org/images/using_data4.pdf
- Killion, J., & Bellamy, G. T. (2000, Winter). On the job: Data analysts focus school improvement efforts. *Journal of staff development*, 21(1), 27-31.
- Krippendorff, K. (2004). *Content analysis: An introduction to its methodology*. (2nd ed.). Beverly Hills, CA: Sage.
- Lachat, M. (2002). *Data-driven high school reform: the Breaking Ranks model*. Providence, RI: Northeast and Islands Regional Educational Laboratory (LAB) at Brown University.
- Lachat, M., & Williams, M. (2003). Putting student performance data at the center of school reform. In J. DiMartino, J. Clark, and D. Wolk (Eds.), *Personalized learning* (pp. 210-228). Lanham, MD: Scarecrow Press.
- Lombard, M., Snyder-Duch, J., & Bracken, C. C., (2003, September 6). *Practical resources for assessing and reporting intercoder reliability in content analysis research projects*. Retrieved September 1, 2004, from <http://www.temple.edu/mmc/reliability>

- Love, N. (2000). *Using data/getting results: Collaborative inquiry for school-based mathematics and science reform*. Cambridge, MA: Regional Alliance at TERC.
- Marzano, R. J. (2003, February). Using data: two wrongs and a right. *Educational Leadership*, 60(5), 56-60.
- Mason, S. (2002, April). *Turning data into knowledge: Lessons from six Milwaukee public schools*. WCER Working Paper No. 2002-3. Wisconsin Center for Education Research, School of Education, University of Wisconsin-Madison, WI. Retrieved August 26, 2004, from http://www.wcer.wisc.edu/publications/workingpaper/paper/Working_Paper_No_2002_3.pdf
- NEA Foundation for the Improvement of Education. (2003, Spring). *Using data about classroom practice and student work to improve professional development for educators*. Washington, DC. Retrieved June 20, 2004, from <http://www.nfie.org/publications/usingdataIB.pdf>
- Neuendorf, K. A. (2002). *The content analysis guidebook*. Thousand Oaks, CA: Sage Publications.
- North Central Regional Educational Laboratory. (2003, Fall). Painting by number: Using data to create a portrait of school improvement. *NCREL's Learning Point*, 5(2) Retrieved June 16, 2004, from <http://www.ncrel.org/info/nlp/lpf03/paint.htm>
- Olson, L. (2002, June 12). Schools discovering riches in data. *Education Week on the Web*. Retrieved January 16, 2004, from <http://www.edweek.org>
- Pardini, P. (2000, Winter). Data, well done: Six examples of data-driven decision making at work. *Journal of Staff Development*, 21(1), 12-18.
- Protheroe, N. (2001, Summer). Improving teaching and learning with data-based decisions: Asking the right questions and acting on the answers. *Educational Research Service Spectrum*, 19(3). Retrieved on January 16, 2004, from <http://www.ers.org/spectrum/sum01a.htm>
- Rallis, S. F., & MacMullen, M. M. (2000, June). Inquiry-minded schools: Opening doors for accountability. *Phi Delta Kappan*, 81(10), 766-773.
- RAND. (2002). A decade of whole-school reform: The new American schools experience. Santa Monica, CA: Rand (RB-8019).
- Rudner, L. M., & Boston, C. (2003, February). Data warehousing: Beyond disaggregation. *Educational Leadership*, 60(5), 62-65.
- Schmoker, M. (2003). First things first: Demystifying data analysis. *Educational Leadership*, 60(5), 22-24.
- Schwartz, W. (2002). Data-driven equity in urban schools. (ERIC Document Reproduction Service No. ED467688)

- Streifer, P. A. (2002, July). *Data-driven decision-making: What is knowable for school improvement*. Paper presented at the NCES Summer Data Conference, Washington, DC. Retrieved August 26, 2004, from http://www.edsmartinc.com/faq_main.php
- Thorn, C. A. (2001). Knowledge management for educational information systems: What is the state of the field? *Educational Policy Analysis Archives* 9(47), 1-31. Retrieved August 26, 2004, from <http://epaa.asu.edu/epaa/v9n47/>
- Tung, R. & Feldman, J. (2001, January). *Promoting whole school reform: A closer look at the role of external facilitators*. Paper presented at the International Congress for School Effectiveness and Improvement (ICSEI), Toronto, Canada. Retrieved August 26, 2004, from http://www.ccebos.org/cce_coaching_initial_rpt.pdf
- Visher, M. G., & Hudis, P. M. (1999). *Aiming high: Strategies to promote high standards in high schools [Interim report]*. Washington, DC: U.S. Department of Education, Office of Vocational and Adult Education.
- Wade, H. H. (2001). Data inquiry and analysis for educational reform. (ERIC Document Reproduction Service No. ED461911)
- Wayman, J. C., & Stringfield, S. (2003, October). *Teacher-friendly options to improve teaching through student data analysis*. Paper presented at the 10th annual meeting of the American Association for Teaching and Curriculum, Baltimore, MD.
- Wayman, J. C., Stringfield, S., & Yakimowski, M. (2004). *Software enabling school improvement through analysis of student data*. Center for Research on the Education of Students Placed At Risk. CRESPAR/Johns Hopkins University. Baltimore, MD. Retrieved August 26, 2004, from www.csos.jhu.edu/crespar/techReports/Report67.pdf

Attachment 1

High School Reform Study

Group Interview: Data Team

1 How are you using data in this school to support the high school reform process?

- What kinds of data are being used?
- How are you using it?
- What kinds of data are most useful to you?
- How has the use of data connected to the SLCs you have established in the school?
- How has the use of data connected to the implementation of standards-based instruction?

2 Tell me some of the things that you saw in the data.

- What did you learn from the data?
- What did it tell you about the school or student learning?
- What actions were taken?

3 Has anything changed over the past few years about data use in the school?

- How has it changed?
- Who is now using data?
- What staff are receiving data on a regular basis?
- How are they using data?

4 What conditions or factors supported the use of data in the school?

- What kinds of obstacles have you had to overcome?
- What were the major barriers to data use?
- How would you describe your successes around data use in this school?
- If you had to make a set of recommendations to high schools that wanted to use data more effectively on a school-wide basis, what would you tell them?

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