Leadership for Effective Data Use

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Introduction

Accountability policies such as those included in the federal No Child Left Behind legislation (NCLB) have brought needed attention to the reporting of student data. Under these policies, reporting of data is required and sanctions are applied to under-performing districts and schools. Beyond reporting data, these policies deliberately leave to local educators to decide choices and strategies about how to best use data for educational improvement in their context.

As a result, there is a burgeoning research base about best practices for the use of data. One commonly-identified theme in this research is the importance of leadership (Copland, 2003; Knapp et al., DATE; Wayman, Cho, & Johnston, 2007; Wayman & Stringfield, 2006). The present study adds to this research base by describing the leadership practices from districts and schools that have shown success in effectively using data.

We begin this paper with a brief literature review on leadership for effective data use. Following this review, the study is described. The study findings are then presented, followed by a discussion section that considers these results in light of the larger leadership picture.

Research on Effective Data Use

While accountability policies do not stress teacher involvement in data-based decision-making, it is rational to hypothesize that teacher involvement will be a key element of a fully successful data initiative. Sound leadership can facilitate faculty involvement (Copland, 2003; Murphy, 2002).

While teachers are often critical of accountability data, preliminary evidence suggests that they will embrace a data initiative when it is soundly implemented and responds to the learning needs of their students (Chen, Heritage, & Lee 2005; Lachat & Smith 2005; Massell 2001). Ingram, Louis, and Schroeder (2004) and Massell (2001) showed that while teachers

expressed concerns about the appropriateness of and importance assigned to assessments, they also recognized the new information afforded by assessments, along with the stimulus for new ideas brought about by inquiry. Research has shown a variety of ways that teachers can realize improvement through involvement in a data initiative (Chen et al. 2005; Lachat & Smith 2005; Murnane, Sharkey, & Boudett 2005). Research also suggests that data use can be a facilitator in helping move faculties toward more professional, collaborative cultures (Chen et al. 2005; Symonds 2003; Young, 2006). Further, it has been suggested the most effective application of data use is to involve *all* teachers on a faculty (Wayman , 2005; Wayman & Stringfield, 2006).

Teacher use of data has historically been hampered by access issues. Education historically has produced a plethora of data, but these data have typically been stored in ways rendering them inaccessible to most practitioners. Even successful data use initiatives conducted without technology have been shown to entail an undue amount of effort (Kerr, Marsh, Darilek, & Barney, 2006; Stringfield et al. 2001; Supovitz & Klein 2003). Recently, this situation has changed with the advent of computer systems with user-friendly interfaces that allow rapid, easy access to student data for teachers and other educational professionals (Wayman, Stringfield, & Yakimowski,. 2004). Consequently, the current emphasis on data use requires that schools integrate data delivery technology in order to make best use of data for educational improvement, particularly when teachers are involved (Lachat & Smith 2005; Supovitz & Klein 2003; Wayman et al. 2004). In response to this problem, new computer technologies have been developed that offer unprecedented, efficient, flexible data access along with user-friendly interfaces that support all types of users (Wayman et al., 2004). These technologies are necessary for a sustainable school data initiative, but they are not sufficient. Few educators are prepared to make efficient use of this abundance of data, so these systems must be supplemented with

professional support and leadership that helps educators turn student data into information that can inform classroom practice.

The Present Study

In the present study, we examined the data use practices of three schools identified by commercial software vendors as employing effective data initiatives school-wide. In doing so, we interviewed administration and faculty from these schools, along with district officials. In a previous study, we examined these data from to uncover the challenges and successes that may be realized in teacher data use (Wayman & Stringfield, 2006). One theme that emerged was the role that leadership plays in involving teachers in a data initiative. Since we focused on teacher data use, there existed a need to examine data from this study relative to leadership. Consequently, the goal of the present study is to describe leadership components that can aid in effective educational data use. In accomplishing this goal, we will address two overarching research questions:

1. What leadership practices are present in these schools that are helping the success of their data initiatives?

2. When viewed in light of prior research, what strategies to these data suggest may be effective in improving leadership practices for effective data use?

We will first present the methods used in our prior study. Following this, we will present results, focusing on leadership aspects from these data. Finally, we will provide discussion of the implications these results carry.

Limitations. This study has limitations that are important to acknowledge. First, these schools are not supposed to be representative of the general school population. They were chosen specifically for their success in using data; in this way, we hope to be able to identify a

larger amount of quality leadership practices than if we had sampled schools not known for their data use. But we are careful not to reify the results from this study – these practices are not "truth." Second, these schools were operating in a technology-rich environment; such an environment is known to be conducive to effective data use (Mieles & Foley, 2005; Lachat & Smith, 2005; Wayman, Stringfield, & Yakimowski, 2004). Again, we hoped this methodology increases the number of quality leadership practices to be observed. Third, although we group our results by themes, we did not analyze the data for *common* leadership practices, but for *effective* practices. Consequently, the results often cite a practice that was in use only by one school. Fourth, this study is not intended to describe the full range of possible effective leadership practices for using data. Instead, we highlight the effective practices from these schools and view these practices in light of prior research.

Method

Participating Schools

We asked a number of commercial vendors to recommend schools that were not just using their data systems to examine student progress and inform instruction, but aiming to involve all teachers. Because of the importance of historical student data (Wayman et al. 2004), we contacted vendors who partnered with districts in offering access to a data warehouse, knowing that data-savvy schools would likely also be employing an assessment system. Three schools whose districts had implemented a data warehouse were recruited for this study. These schools offered a diversity of district and school data initiatives to study, with different forms of implementation:

School A was an elementary school (Pre-Kindergarten through fifth grade) from a small district in the northeast United States. School B was large school serving grades five and six,

located in a small suburban district in the northern United States. School C was a middle schools (grades six through eight), located in a large district in the southern United States.

Data Collection and Analysis

Data to inform the present study were collected through focus groups and interviews were conducted with principals and teachers in the study schools and with district administrators. Discussions were based upon a variety of open-ended interview questions about individual and group use of student data to inform instruction and use of the computer systems.

Interviews in Schools A and B were conducted during one-day site visits in Fall, 2004. Data collection for School C was conducted through a series of telephone interviews with diverse participants. A total of 28 participants were interviewed for the present study. These included four district administrators, five principals and assistant principals, and 19 teachers.

At the completion of data collection, recordings of the sessions were transcribed and transcripts of the sessions were examined for common and contrasting themes regarding best practices in using data and data systems to inform instruction.

Results

In examining the data from the present study, we identified many leadership characteristics, strategies, and events that were being used to facilitate data use in our study districts and schools. Four main leadership themes emerged from this analysis: (1) Structures that support data use, (2) Using data to focus conversations on instructional improvement, (3) Implementation of data initiatives, and (4) Making time to save time. We address each of these themes in the following four sections. In doing so, we will often draw upon information presented in earlier sections to describe themes from later sections.

Structures that support data use

Our interview data revealed the existence and implementation of a number of structures that supported data use. *Structures* are the policies, protocols, and habits that guide the practice of data use within a district or school. In understanding this theme, it was helpful to separate into district and school structures. Within both it was further helpful to identify structures that were formally-implemented (i.e., intentionally-implemented and formally-articulated structures) and which were informally-implemented (i.e., habits or routine practices that are not formally-articulated, but occurred frequently as part of the daily business of the district or school).

District structures - formal. At the district level, the formal structures we observed were neither widespread nor systematic. Still, we were able to identify four types of formal structures for using data: structures that centered around technology, instructional vision, curriculum and school improvement, and alignment.

In all three study districts, there was widespread belief that technology was a necessary support for data use. Our districts all supported data use with useful and efficient technology, such data warehouses or assessment systems. Never did our interviewees cite a lack of technology as a barrier to effective use of student data. Further, the administrators we interviewed typically held strong philosophical positions on the service of technology for education.

As a result, we observed some formal structures crafted around technology. Districts B and C had both crafted formally-articulated district-wide plans for the implementation of their data systems to support and increase already-existing data initiatives. District A was supportive of varied school data and technology initiatives (and particularly supportive of Principal A), but the district had not yet established an integrated district-wide data initiative or use of their data systems. Further, technology often served as a practical base in all districts for establishing structures in other areas – particularly, curriculum, alignment, and professional development.

District C had outlined a focused and aggressive plan for simultaneously introducing data system training with their new district-wide data use initiative. The expectation was that all teachers and principals would become involved in use of the data system to examine student data. Under this plan, 500 educators were certified in the use of the data system. In turn, these educators were responsible for preparing groups of colleagues to use the system. This plan was very specific in terms of timelines, and District C was able to prepare educators district-wide within one school year.

Regarding instructional vision, the only articulated, district-wide, established vision was in District B. This vision was integrated with their data use initiative. In fact, a large part of this vision resulted from work done in identifying an effective data system to support their curriculum. In searching for a data system, the district directors of Instructional Technology and of Curriculum and Instruction closely partnered and headed this search. This partnership led to three formally-articulated structures: (1) the development of data initiative goals, based on less-formal versions of the instructional vision, (2) the refinement and formal articulation of the district instructional vision, and (3) a set of needs for a data system.

Linkages between curriculum, school improvement, data use, and technology were also found. Administrators in Districts B and C had structured these linkages; administrators in District A were considering plans toward this end. The formal structures we found around these linkages were varied. For instance, District B specified that the Director of Curriculum and Instruction introduce their new data system to teachers to stress the nexus of technology and curriculum development. District A established a committee that met monthly, consisting of principals, technology specialists and curriculum specialists (this committee named itself the "techno squad"). In these collaborative meetings, principals were encouraged to develop provocative questions about their school's performance. The entire group took on these

questions and they brainstormed on how to use multiple sources of data available through the data systems to answer those questions. Finally, District B created a plan with a variety of forms of district-sponsored professional development for data technology use (e.g., individual development, group development, study groups). These opportunities were aligned with state standards and thus were focused on curriculum and instruction, with data and technology presented as supports for the larger curriculum goal.

Formal structures were also observed in two forms of alignment: (1) alignment of instructional goals with technology, and (2) alignment of assessments. Personnel in District B formed a committee, including district leadership and parents, to align the instructional goals of the district with the goals of the technology systems. Once these goals were established, they were used to developed a rubric by which the district chose a data system vendor.

In our data, we observed the beginnings of formal district structures to align assessments. The problems with haphazard alignment became obvious in all districts as teachers and district personnel began to access these data through data systems and use them for educational improvement. Unfortunately, all three districts were wading through a grab bag of diagnostic tools used at different grade levels. The problem was most stark in District A: There were seven assessments used between kindergarten and fifth grade and a student could be subject to up to four different types of assessment within one year. The fact that the some of the assessments used in one grade were unrelated to assessments used in another grade was an important barrier to utility. All three districts were addressing this problem by establishing formal alignment structures for their assessments. For instance, District A was planning a district-wide initiative to employ assistance from teachers; this initiative was being piloted in School A.

District structures - informal. In all three districts, there are a number of informal structures that have arisen around data use, most involving informal relationships between

individuals or district entities, formed because of mutual interests. As an example, all three districts were very supportive of the principals we studied, but no structures defined this support in any formal way. As another example, the partnership between the Directors of Instructional Technology and Curriculum and Instruction in District B (described earlier) has resulted in many useful contributions, but the relationship is yet unspecified in any formal way.

A more specific form of informal structure was the valuation of data and data use by district leaders. District leaders who were invested in data had taken on the responsibility of touting data use throughout the district and community. Further, they described the importance of finding varied ways to remind their stakeholders of the value of data and finding ways to make data useful to educators. A District B administrator saw valuation in terms of educator work, noting, "if we don't keep putting this in front of teachers, it won't stay a part of their professional lives." An administrator in District C promoted valuation by tying data use and data systems to curriculum work, noting that teachers have traditionally been invested in curriculum work. The Superintendent of District A described valuation in terms of district success, noting the importance of "having evidence that we are doing a good job." She also described how the district had used data to reach out to the community for help with a problem: district personnel integrated quantitative growth measures, qualitative interview data, and national averages of growth to show that the district was not pushing their top kids to grow.

School structures - formal. Given incomplete systemic district structures to support data use, leaders at the school level often formed formal structures that fit their context. As with the district level, formal structures also lacked a systemic focus at the school level; most had been created as problems arose. Still, these formal structures in place were critical to the success of data use in these schools. Threaded throughout all of these structures was the expectation that all faculty would use data and that data would be a part of the culture in these schools.

First, we noted that each principal had centered their data initiatives around specific, measurable goals. In each school, these goals were the cornerstone of all data use. These goals provided guidance and gave concrete results from using data.

Second, principals built formal data structures from already-existing structures. All three principals used staff development days to enable their faculty to learn methods and examine student data. Other structures were specific to the school context. For instance, Principal C described a system for creatively working the contractual planning time into her data initiative. Principal A leveraged a variety of meeting structures already present in the school to use data for learning decisions. Principal B was requiring analysis and discussion of data to be a part of all meetings: in faculty meetings, team meetings, principal-teacher meetings, and parent meetings, teachers were required to bring data summaries that provided insight into a particular problem.

Third, we observed new structures that these principals had invented for their schools. In all three schools, structures existed for triangulation of data[1]. Recognizing that no one data source would describe student learning, the schools and districts in this study had employed multiple sources of data in an effort to gain a whole picture. As Principal B pointed out, "you need lots of data to understand kids." A good example of triangulation comes from School A, where early literacy was a focus. In School A, decisions made about student literacy learning required at least three data points, one of which was the teacher's professional judgment.

Other new structures varied by the context of each school. Principal B, for instance, had established a School Improvement Team that worked closely with both the principal and faculty in tying together data analysis with faculty-set school improvement goals. Because they had longitudinal data available from their data warehouse, School C had recently changed to a "vertical teaming" structure that teamed teachers from sixth, seventh and eighth grades within

[1] Triangulation is the use of multiple sources of information about a student in order to gain a complete picture of student learning.

subject. These teams met weekly and Principal C joined them bi-weekly, with conversations focused around instruction.

School structures – informal. There were a number of informal structures also observed in these schools. Most informal structures arose from the principal's particular leadership style, personality, and view of how data should be used. The two most common types of informal structures were encouraging collaborative work and using data in a non-threatening way.

Participants cited many and varied ways that their professional collaboration had improved as a result of the data access provided by these systems. Principal A commented that data brought together staff who ordinarily would not have collaborated because of roles or style. Besides providing mutual support, this provided opportunities to see others being successful in similar situations. Principal A noted, "you can only rationalize so long that your kids are doing poorly because they started poorly when someone else is doing well with a similar group." In all schools, we heard of varied informal support networks forming to better understand data, and although some of these networks were led or formed by the principal, we saw none that were because of established formal structures.

Collaboration happened in varied ways across the study schools. In School A, the principal and teachers cited a strong ethic of collaboration that had been made better by introducing frequent assessment and feedback. For example, two teachers described an instance where a third grade teacher and a second grade teacher found the assessment levels of their classes were similar. They devised a plan to create working pairs and groups of students that enabled students to help younger students on selected learning objectives. In another example, School A teachers devised a system that formed various groups of students from the entire third grade based on assessment scores. Every faculty member involved with third grade worked with every group on different topics (e.g., the special education teacher taught the enrichment group

one day). Teachers reported this to be helpful to the students and "made us stretch" in a positive manner.

School C teachers reported a marked increase in collaboration resulting from a feature of their data system that allowed them to share notes in a student learning plan. Principal C noted that teachers were slow at first to embrace this feature. To alleviate this, she grouped teachers by team and charged them with entering comments into the system. This sparked interest, and once on board, teachers reported enthusiasm for this feature. Many reported that this module allowed them to connect to a broader set of techniques – one teacher noted, "before, we had to find each other in the hall, or just not at all. This makes our job a lot easier."

The teachers in School B also cited the data system as one impetus for improved collaboration in their school, noting that using the system enabled a common language and allows for fine-tuning of instruction. To improve collaboration about data use, Principal B was infusing data use into school teaming structures, and sometimes used faculty meeting time to explain data methods.

The principals in the present study also were very careful to make data use a non-threatening activity for their faculty. Principal B pointed out that her leadership goal was "not to punish, but improve and celebrate." Teacher interviews showed the principals' efforts to be successful. Teacher descriptions of their data use were in line with goals established by their principals and many teachers directly stated that they felt comfortable with data use because of the tone set by principals.

The attitudes of all our principals were summed up by Principal A, who said she was sure to structure any data use session carefully so that it is not a "gotcha" event. For example, Principal B met with a team of teachers and asked the teachers to use their months of experience with the students to rank their students from strongest to weakest with regards to reading

comprehension. The teachers compared each of their lists with the rankings of students on standardized reading tests. Principal B facilitated discussions around the discrepancies between the lists, and teachers were able to make instructional decisions based on a mixture of their judgment with data provided by the assessment. Principal C noted that in parent-teacher conferences, she is able to pull up on screen past test scores, attendance records, past report cards, and Individual Education Program information on the individual child. This allows all parties involved to make important decisions about a child's education based on multiple sources of data.

Using data to focus conversations on instructional improvement

Another aspect of leadership for data use was the use of data to focus conversations on instructional improvement. Whether it be administrator to teacher, teacher to teacher, or any educator with parents, the leaders in our study believed data made it easier have honest, needed conversations about education. As Principal B said, "We can have wonderful conversations…not pointing fingers, but the reality is we are doing some things really, really well. And some of the things we thought we were doing ok in, we are not doing as well as we should be doing for those children. And I think that is an honest conversation to have."

We saw principal leadership throughout these conversations, often using the formal and informal structures described above. Principals worked directly with specific teachers around improved pedagogy and reported this successful in building buy-in. Principal C described the positive effect of working directly with faculty, saying, "You have to teach teachers and bring them along, help them to see how to think about their instruction in light of this information." Conversations about instructional improvement fell into four groups: (1) early conversations prior to implementation of a data initiative, (2) conversations about instruction and practice, (3) collaborative conversations, and (4) conversations resulting in teacher leadership.

Early conversations. All of the study districts were characterized by a philosophy of continual assessment and instructional intervention. Consequently, before ever implementing a data initiative or data system, administrators had been talking with teachers and communities about the importance of using assessment as tool to improve instruction.

A School A instructional specialist described the development of early conversations around assessment and data use, starting as the district attempted to develop local achievement tests. These initial conversations focused on how their early district assessments affected instructional time and whether they allowed for improvement of instruction. Later, state assessments instigated more conversations around the timeliness of score returns. In these conversations, teachers noted that while it was helpful to see student outcomes, it was impossible to diagnose and react to student needs in a timely matter. As the data initiative was implemented, these conversations changed to diagnosis of needs and the dynamic response of instruction to those needs.

In School B, the principal recalled that teacher attitudes around assessment began to change when teachers started writing their own curriculum and assessments. She empowered her teachers to set their own goals; they soon became interested in assessing how well they achieved these goals. Over time, these early conversations began to shift from getting students to pass a certain assessment to an interest in how students had grown.

In District C, the focus on data had developed out of a middle school reform that began years prior. The reform initiated conversations around the use of data to drive instruction. In the early stages of District C data use (prior to a data system), Principal C met with teachers and disaggregated by hand state testing data, down to the class level. She reported this to be an important part of the planning process for the year – teachers would not only know what

percentage of their students had passed various objectives, but had participated in this inquiry process.

Conversations about instruction and practice. Principal A noted that conversations involving data have helped teachers to feel pride in their work as they learn to professionally analyze and fine tune their craft. This type of observation characterized a common theme from all three principals: positive conversations about how data can help improve teacher instruction and practice. These conversations were both a focus and a by-product of their data initiatives.

Our principals reported, that using data to improve practice is difficult and that these conversations do not always happen organically. Principal C put it well, saying, "It really takes someone who is willing to push those conversations. Because sometimes individual teachers will do that on their own and sometimes it just takes someone planting that seed and pushing that conversation as little deeper." Consequently, principals reported a variety of examples of how meeting with individuals or groups of teachers to examine data from the data system and connect these data to daily practice.

One such example came in writing assessments. Principal B identified this activity (see *School structures – informal* above) as important in pushing conversations about improving practice. She was leading teachers in writing their own assessments to learn and reinforce this connection; School B teachers reported this effort to be successful not only in helping them understand the meaning of data, but in identifying specific aspects of their instruction that could be improved. As a result of a planned district-wide initiative, Principal A had begun piloting a similar process with selected teachers to learn successes and barriers.

Principal C noted that she had to dose out an inquiry process over time with her teachers. Over the semester in each team meeting, she led conversations around data and instruction so her

teachers could begin to assess their own teaching and compare it with the vision of success for all students.

Lastly, Principals B and C both reported positive initial results in using student data reports to support teacher evaluation. These professional conversations were not yet structured, but are interesting to note.

Collaborative conversations. We found that the collaborative nature of conversations were frequently mentioned as important to the success of these data initiatives. Teachers in all three schools spoke of having a common language ("now, one person's 80 is another person's 80") and frequently noted that data created more opportunity and need for interaction. Teachers also spoke of collaboration that was more academic and professional as a result of using data.

The stimuli for collaborative conversations were varied. They typically happened in informally-structured ways as described earlier. Most happened at the school level, often either created by the principal or involved the tacit approval of the principal. For instance, teachers in School B had formed much of their conversation around use of the data system. Educators in School C reported frequent collaborative conversations through their vertical teaming and teacher note-sharing. District A involved community members in collaborative conversation as a result of the analysis presented by the "techno squad."

Conversations resulting in teacher leadership. A less-common, but interesting type of data conversation was one that created teacher leadership roles. Principal B felt that the consistent use of data empowered teachers to advocate for their needs. She described these new leadership roles in terms of the questions teachers ask now, saying: "They now ask, Ok, what does this mean? What can we do better? What more do we need? How do we get that? So that it is meaningful for our instruction."

Two examples were found in our data. First, a teacher leader in School A had taken leadership in encouraging other teachers to invest in understanding the assessment-instruction link. As a result, she has been relieved of lunch and recess duty so that she can model for other teachers how she improves her own practice through data use. Second, a complaint arose from the School B community that the middle school was not welcoming to parents. In discussing the issue, a group of teachers decided to collect data. They developed a survey identifying which parents felt alienated; the survey also asked for feedback on how they could improve.

Implementation of the Data Initiative

A third leadership theme that emerged from our data was the implementation of a data initiative. Regarding this theme, we uncovered leadership issues at both the district and school levels. There was not full systemic support for implementation in any district, so principals also dealt with implementation issues in their own contexts. Within the implementation theme, three sub-themes were found: (1) Implementing so teachers see the connection between data use and instruction, (2) Ready infrastructures, and (3) Coordinated professional development.

Implementing so teachers see connection between data use and instruction. Administrators in all three districts stressed the importance of continually directing attention toward the use of data for classroom improvement and worked with teachers to create connection between assessment and instruction. All three principals stated a goal of leading their faculties to become independent users of student data rather than creating dependence on principals. Principal C noted her goal was that her faculty eventually saw data use and improvement as one entity

In previous sections, we have discussed strategies and structures that have helped principals work toward this goal. Still, this portion of implementation has not always gone smoothly. For instance, there were concerns in all schools related to the time taken away from

instruction to administer assessments. We heard brief comments regarding these concerns in Schools B and C. More concerns were expressed in School A, where more assessment was being done. Frustrations expressed were typical of a comment by one School A teacher: "Let's add up all the days we spend gathering information, how much time do we actually have to teach?" There was also a feeling that assessment was occurring at expense of other practices. Teachers who expressed this concern were ambivalent, as evidenced by a School A teacher who said, "I can see my students growing through these scores, but I've dropped some things I know to be good."

Administrators at both the school and district levels were aware of these issues and were addressing them through ongoing practices such as conversations, collaboration, and other structures discussed above.

Ready infrastructure. Every district reported that it was fundamental to ensure that a district has the infrastructure in place to support data use, both in terms of hardware and in terms of the data themselves. All districts noted that the network must be reliable, with large enough bandwidth to support the transfer of information. In fact, Principal C noted that down times during network upgrades had been an important barrier to increasing buy-in from resistant teachers.

In District B, leaders said that data entry practices of data entry must be carefully aligned and perfected so that the data that goes into the system is reliable. A district leader remembered how this slowed their rollout process: "It took a lot longer to provide the [data] than we anticipated. I think what schools might not be aware of, that we didn't know, is that our data was sloppy, our student data was sloppy, our student records. We just had no idea how bad it was. We did not know that we had double records of kids, double records of teachers…you know we contract those services….We spent a long time doing that. So we got off to a slow start."

Coordinated professional development. Earlier, we described various professional development issues addressed by leadership. In addition, these leaders also described how they attempted to make the implementation of their data initiatives coordinated with professional development that supported the instructional mission of the district.

At the district level, one way this was done was to train key individuals first. All three districts learned that it was important to first train the principals so they could articulate the data initiative. District C used a "train the trainer" model, employing key individuals to take training to their schools or offices(see "*District structures – formal*" above). An Instructional Technology person in District B described an informal model he was using where he was focusing data and system training toward a few individuals in each school, then tracking which individuals they worked with.

Another method was to focus on educator-friendly development opportunities. For instance, District C administrators focused on replacing informational meetings with hands on training. They also systematically introduced various functions of the data system – the system was first introduced as a vehicle for parent contact information and teachers commented that this feature increased their efficiency and made them look at favorably on the data system. Later, teachers were introduced to more and more data points that were used to help them improve the instruction.

Leaders in all districts pointed out that it was important to provide many different times and ways for staff to learn the data system. Districts offered group classes, one on one training, as well as notebooks so that teachers could engage the data system on their own at home.

Further, these leaders looked to integrate with existing development. Many teachers felt integration made this development valuable to their practice. For instance, District B held a session where staff were divided into teams consisting of teachers, special education teachers,

social workers and the educational psychologists. Teams discussed how they could use data to help them improve an existing multi-cultural education initiative, increase differentiation and streamline their assessments. Each team identified a teacher leader who would be responsible for becoming expert in the data system. Charts were created to methodically track the progress of the various teams.

Making Time to Save Time

Research on data use is clear that time is a critical element for successful data use, and as described earlier, principals were formally structuring time into the school day in many ways. However, the leaders in this study were also investing time in efficiency, believing that short-term investments of time would lead to long-term benefits in time and efficiency. We found evidence of two ways this was happening: (1) time to organize and (2) time to learn.

Time to organize. Districts A and B devoted time and resources toward organizing and aligning goals of data use system use with district instructional goals. In District A, this was done through a committee process which included district leadership and parents. In District B, this was done through work described earlier (see *District structures – formal* above) on development of a rubric for choosing a data system. These efforts were seen as useful; an administrator in District A said teachers felt like leaders were "weeding the garden rather than planting something new".

Time to learn. Teachers in these districts also appreciated that their districts set aside time for teachers to learn. As described above, efficiency was found by not just offering development sessions, but by linking these sessions to issues that were tractable to teachers and valuable to their practice. The variety of ways and times in which these sessions also lent efficiency because it allowed teachers tailor the use of their learning time to their personal context.

Discussion

In this study, we examined data use strategies of leaders in three schools and districts, chosen because of their skill and accomplishment in using data for educational improvement. Our results revealed a number of leadership strategies that were conducive to good data use.

We found that the leaders in these schools had defined a number of formal structures at both the district and school levels to support data use. In addition, we uncovered a number of undefined – informal – structures that also supported data use. We also found that leadership worked to focus conversations on instructional improvement and made ardent use of data in doing so. These conversations mostly happened at the school level, but we also saw evidence of district leadership in this area. In addition, we found the leaders in this study to be attentive to the way their data initiatives were implemented. This occurred often because of district support, but since initiatives were not necessarily infused throughout the district, principals also were conscious of implementation in their own contexts. Finally, we noted time-using strategies that were implemented with an eye toward efficiency.

The results of this study revealed many leadership strategies, actions, and positions that help facilitate an effective data initiative. It was clear that the districts, schools, and educators in the present study were doing well using data. But the research on data use – and the participants' own comments – suggest there was ample room for improvement. In considering these results, we identified three areas that are important to consider if the field is to improve leadership for data use: (1) A systemic perspective on data use, (2) Building a culture of data use, and (3) The role of the principal. In the following sections, we will discuss these issues in light of prior research and results of the present study.

A Systemic Perspective on Data Use

Research on systemic reform and educational systems suggests that data use may be more effective if educational leaders look toward systemic alignment of their data uses and educational goals (Wayman et al,, 2007). One example that data use research suggests to be critical is the establishment of a system-wide educational vision and the alignment of data use and practice to this vision (Knapp et al., 2006; Supovitz & Klein, 2003; Wayman et al., 2007).

Our results showed that districts and schools were working toward this objective in various degrees. Unfortunately, progress toward this objective was not as thorough as research has suggested is optimal – research suggests that such vision and alignment should happen district-wide (Knapp et al., 2006; Supovitz & Klein, 2003; Wayman et al., 2007). District B was the only district which had established a district-wide educational vision. District B had also aligned numerous data use practices with this vision. Districts A and C had partially worked toward this aim, but much of the work in these districts involved goals and aligned practices at the school or classroom level.

Despite their attempts at alignment, our data suggest that these districts are still loosely coupled learning organizations. The principals in our study principals were left to do a large amount of systemic work on their own, some of which could have been established at the district level. For example, much of the goal-setting and alignment discussed above happened at the school level. Also, each principal described a variety of creative measures they had taken to leverage district-provided time so it was more effective for data use. As a result, these and other measures understandably were build without regard for any systemic focus. With a more systemic focus, support for these activities could come from the district level. This could not only provide a more tightly-coupled focus, but could free the principals to focus on more context-dependent structures.

That these accomplished data-using districts were having trouble establishing a systemic focus underscores the difficulty of this task. Research has long suggested a systemic focus can be effective in schools; the tenets suggested here are not unlike those of previously studied organizational improvement concepts applied to education, such as Organizational Learning (Argyris & Schon, 1996), or High Reliability Organizations (Stringfield & Land, 2002). Unfortunately, concepts such as these have advanced educational research but are not necessarily in widespread application by practitioners. Given the current attention to data brought by NCLB, information exchange in a "flat world" (Friedman, 2005), and new technologies for providing data access (Wayman et al., 2004), the concept of increasing district organizational capacity based on the effective use of data may well gain traction and scalability where other concepts have not.

Research to this end has recently begun. Studies such as those provided by Datnow et al. (2007) and Halverson et al. (2006), have provided preliminary information for districts looking to become more systemic in their data use. Wayman et al. (2007) described a *Data-Informed District*, one where vision, practice, and the use of data were aligned vertically and horizontally throughout a district. In doing so, Wayman et al. (2007) provided a comprehensive set of recommendations for a specific district to become more *data-informed*

Building a Culture of Data Use

Many researchers note the importance of culture-building in maintaining a data initiative. Using terms such as "culture of data use" or "culture of inquiry," these researchers have cited empirical examples of successful data using schools that focused on building such a culture (e.g., Copland, 2003; Datnow et al., 2007). Ingram et al. (2004) showed a counterexample, where a culture not conducive to data was interfering with effective data use.

Consistent with this research, the educators, schools, and districts in the present study were very focused on building and maintaining aspects of a data-using culture. To this end, two particular themes stand out from these results: (1) Structures, and (2) Valuation of data.

Structures. In order to build a strong data-using culture, it has been suggested that establishing structures will support the use of data (Wayman et al., 2007). Our results showed the participants employing a number of sound structures that promote a healthy data-using culture, such as defining an educational vision, efficient technology, opportunities for learning, opportunities for collaboration, and ample time to examine and reflect upon data. In our opinion, these structures were more responsible than anything in the success of data use for these educators.

Still, there is room for caution in examining these structures. Most concerning is the fact that many of these structures were informal structures that had not been formally articulated as district or school policies. Important structures such as relationships in the central office, innovative ways to structure time, and an ample variety of training opportunities were not systematically established or implemented.

All of these informal structures came about as a solution to a problem. Our data and the success of these schools suggests that these structures are good solutions and they are working. However, these structures and their implementation are dependent on individuals; rather than a product of reflective, systemic inquiry, these structures were good solutions from excellent educators to pressing problems. This raises the concern that these informal structures are too person-dependent. Research has shown that data use is neither scalable nor sustainable in an culture that is too dependent on the actions of individual leaders (Stringfield et al., 2001). Consequently, leadership in these and other districts should look to formalize their effective

structures so these structures will not leave when key leaders leave and so that that leadership elsewhere in the district may benefit from these ideas.

Finally, a structure that rates specific mention was the use of technology. It was striking to see technology surface so frequently in the data and play such a role in the success of these schools. Granted, the schools in the present study were chosen because of their success in using technology to support their data use, so it is possible they are unusually dependent on technology. Even so, there appears to be a lesson here for other leaders about the effective use of technology. These educators were using their data systems in many of the ways described as sound by research (Lachat & Smith, 2005; Mieles & Foley, 2005; Wayman, 2005; Wayman et al., 2004) and were absent many of the problems that have arisen using data in low-technology environments (Kerr et al., 2006; Supovitz & Klein, 2003; Wayman et al., 2007).

Valuation of data. It is common in data use research to cite the need for a "champion" of data, someone who can promote initiatives and maintain momentum. Other researchers have issued caution in this regard, concerned that initiatives too dependent on individual effort are difficult to sustain (Stringfield et al., 2001; Wayman et al., 2007; Wayman & Stringfield, 2006).

Results from the present study suggest an interesting alternative: the valuation of data. Certainly, the leaders in this study were strong supporters and promoters of data user. But even more so, leaders in this study searched for ways to show value in data – to make public the learnings that have come from data and to make clear the benefits and efficiencies of using data. We believe that finding ways to structure valuation such as this could be an effective way to maintain support for a data initiative. As seen in these three study schools, other studies are beginning to demonstrate that helping teachers see value in data can help increase capacity using data and informing practice (Copland, 2003; Lachat & Smith, 2005; Young, 2006).

Additionally, one recent study suggested that an important function of the central office should be publicly valuing data (Moll, 2009).

The Role of the Principal

The most prominent finding from the present study was the frequent and critical role played by the principals of these schools. In each school, the principal was the main driver of the data initiative and nearly every teacher agreed that their principal was responsible for the success of their school's data initiative. In the present study, principals' fingerprints were seen on nearly every aspect of data use. This result is not surprising, as many other studies have also described the critical role played by the principal in the success – or failure – of a school data initiative (Copland, 2003; Deike, 2009; Lachat & Smith, 2005; Wayman et al., 2007; Young, 2006). In fact, Wayman (2005) said, "data use lives and dies in the principal's office.").

The districts and schools in the present study were fortunate to have such leaders. Our research and anecdotal experience suggests that these principals are among the best we've seen at leading for data use. Unfortunately, we fear these initiatives may be too dependent on the personal talents of these principals.

In analyzing these data relative to teacher data use (Wayman & Stringfield, 2006), we believed these principals had established data initiatives that would be sustainable beyond their departure because they worked hard on building capacity for teacher use. In analyzing these data more relative to leadership, we now see that much of this capacity building is based on informal structures. Consequently, we are concerned that any principals who follow these principals will be placed in the unenviable position of implementing their own leadership style while sustaining structures that are built on relationships and personal knowledge.

This finding raises some interesting leadership questions. First, how may data initiatives be structured such that they will not be damaged by turnover in building leadership? In this

paper, we have taken the stance that creating a systemic focus and formally structuring effective practices may be a solution. Research from Copland (2003) and others suggest that distributing leadership roles throughout the organization may diffuse dependence on the principal. Further study will be needed to identify whether these and other strategies may be effective.

Second, how scalable is a principal-centered model for data use? We know of no study describing an effective data initiative that does *not* result from a principal unusually adept at using data and leading faculties. If this turns out to be true for most schools, we believe it is unlikely that there are enough principals of this caliber to realize data use that is scalable to any context.

If it is true that "data use lives and dies in the principal's office," how may the field help non-"hero" principals lead their faculties in effective data initiatives? Again, the results of this study suggest that effective, formal structures and a systemic approach may hold promise. Also, effective training in how to lead faculties for using data is an obvious but important (Deike, 2009; Lachat & Smith, 2005; Wayman & Stringfield, 2006, Wayman et al., 2007). Further research will be necessary to ascertain the effects of these and other strategies.

Conclusion

The present study has described the leadership strategies of individuals in three schools and their associated districts, chosen for their success at using data for educational improvement. It is clear from this study that there exist sound leadership practice to effect data use in a way that helps the practical educator and improves student learning. However, while this study highlighted the practices of these exceptional individuals, the study also showed that there is much more to be done in identifying leadership practices that can be scalable to the general school population. Research is underway in many contexts that may offer answers over the net few years and we eagerly anticipate these results.