

**Subject Matter and Elementary School Leadership: Leaders' Thinking about
Mathematics and Literacy in the Context of their School Reform Initiatives¹**

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We know that schools matter and we know a considerable amount about the organizational structures, leadership roles, and conditions of schools that have managed to improve instruction. Schools that cultivate in-school processes and conditions such as developing a shared vision and norms about instruction and taking collective responsibility for students' academic success create incentives and opportunities for teachers to improve their practice (Bryk & Driscoll, 1985; Newman & Wehlage, 1995; Purkey & Smith, 1983). The available empirical evidence suggests that instructional improvement is especially dependent on these school level conditions, which, in turn, have an important mediating influence on “external” sources and supports for instructional improvement. School leadership, often equated with what the school principal does, is recognized as important in promoting these in-school processes and conditions (Lieberman, Falk & Alexander, 1994; Louis, et al., 1996; Rosenholtz, 1989; Sheppard, 1996). A recent synthesis of the research confirmed a strong positive relationship between effective principal leadership behaviors (e.g., developing and communicating school goals, monitoring instruction) and teachers’ commitment, openness to innovation, and professional involvement (Sheppard, 1996).

We know less about leadership as a practice of instructional improvement and we know even less about school leadership as a practice of improving instruction in particular subject areas (Smylie, 1998; Griffiths, 1979; Haller & Knapp, 1985). Yet, research suggests that subject matter is an important context for teachers’ work (Ball & Lacy, 1984; Little 1993; McLaughlin & Talbert, 1993; Siskin, 1990; 1991; 1994). Even though most elementary teachers do not have well defined subject matter specialties, subject matter appears to be an important context for their practice (Stodolsky, 1988; 1989), and their efforts to reconstruct that practice (Drake, Spillane, &

Hufferd-Ackles, 2001; Spillane, 2000). Hence, subject matter is likely to be an important context for the practice of elementary school leadership.

In this paper, based on an on-going four-year study of leadership in 8 Chicago K- 8 schools, we investigate subject matter – literacy and mathematics – as a context for elementary school leaders’ work. Recent empirical work investigates leaders' thinking about their work as an important influence on their leadership approach. Pressing on this work we focus on school leaders’ thinking about instruction and rather than treating instruction as a generic variable we systematically examine leaders’ thinking about their work in particular subject areas - mathematics and literacy. Our work is premised on the assumption that subject matter is an important context for leadership for two reasons. First, because elementary teachers’ perceptions, knowledge, and dispositions vary depending on the subject, what it takes to enable them to reconstruct their practice is likely to vary by subject area. Second, the resources available to school leaders to support their leadership practice may vary depending on the subject matter. For example, many elementary schools have reading teachers; relatively few have mathematics specialists. Thus, leaders may have richer resources for facilitating their leadership practice in some subjects compared with others. Our intent in this paper is to map broad patterns in school leaders’ thinking about leading instruction.

Our paper is organized as follows. After describing our methodology we outline the theoretical underpinnings for our work. We then analyze the different ways that leaders’ think about subject matter focusing on three issues – the goals, strategies, and challenges that leaders construct for their mathematics and literacy reform efforts. Part of our analysis here includes an examination of the ways in which leaders convey their priorities and perceptions in their interactions with teachers – their thinking in situ. Specifically, we not only examine leaders’

thinking as represented in their talk about practice but also their thinking as reflected in their talk in practice, systematically analyzing how school leaders in action frame the goals, challenges and strategies of their mathematics and literacy initiatives.

Theoretical Underpinnings

Our theoretical framework is comprised of three areas of education research work on leaders' cognition, work on subject matter as a context for teaching, and work on leadership as a distributed practice. Organizational theorists have investigated leaders' and followers' thinking about their situation and work for over a quarter of a century (Green & Mitchell, 1979; Simon, 1976; Lord, 1976; Pfeffer, 1977; Weick, 1979; 1995). Recent work in education investigates how school leaders use mental representations to understand and order their repertoire of responses to experience (Bolman & Deal 1991; Gardner 1995; Hallinger et al. 1993; Prestine 1995). For example, comparing the problem solving strategies of "expert" and "typical" principals, researchers have shown that "experts" are better able to identify the problem situation and to detect features of the problem that were similar to past problems compared with "typical" principals (Leithwood & Steinbach, 1993; Leithwood & Steinbach, 1995).

A cognitive perspective reminds us that what school leaders do depends on what they think. However, work on school leaders' cognition has not paid a great deal of attention to instruction and in particular to instruction as it relates to particular subject areas (for exceptions see, Nelson & Sassi, 2000; Nelson, 1998; Stein & D'Amico, 2000). Yet, research suggests that subject matter is an important context for work in schools, even at the elementary level. Subject matters and perceptions thereof vary in a variety of ways that are likely to result in variations in how leadership is practiced and its consequences. First, the priority of a subject area in schools vary for different subjects as does the value placed on a discipline by the school and broader

community (Little 1993; McLaughlin & Talbert, 1993; Siskin, 1990; 1991; 1994; Stodolsky, 1988; 1989). In leadership terms, these variations are often reflected in the distribution of resources within a school building. Daily time allocations, staffing, and professional development (time and content) are all shaped in some significant ways by the priority and value attached to each subject matter. Second, there are epistemological differences; that is, the nature of the knowledge of a discipline; its structure, sequence, and desired goals; and the degree to which the subject is defined varies across subjects. Susan Stodolsky and Pam Grossman argue that school subjects vary on at least five dimensions:

- (1) degree of definition – whether or not there is agreement regarding the content of the school subject
- (2) scope – the extent to which a school subject is homogeneous or is composed of a number of disciplines or fields of study
- (3) degree of sequence – degree to which prior learning is perceived as a prerequisite to later learning
- (4) characterization of subject as static or dynamic (i.e., more dynamic fields are characterized by active production of new knowledge, changing theoretical positions, and a continuing need to stay up to date; the content of more static subjects changes less rapidly)
- (5) degree to which a subject is viewed as core or basic.

Variations in the ways that subjects are perceived by teachers are likely to be important in understanding relations between reform and instruction, shaping the degree of curricular control, standardization of curriculum, agreement around practice and coverage (Stodolsky and Grossman, 1995). For example, at the high school level, mathematics teachers report

significantly less control and autonomy over content than social studies and English teachers who report rather high levels of curricular control and autonomy.

While investigation of how teachers' thinking about subject matter play out in elementary school are scarce, the available work suggests that subject matter is an important context for elementary teachers' practice and their efforts to reform their practice (Drake, Spillane, & Hufferd-Ackles, 2001; Spillane, 2000; Stodolsky, 1988). Hence, because elementary schools and high schools represent distinct educational settings we approach the dimensions of subject matter outlined above as a starting point for our work.

Finally, adopting a distributed perspective (Spillane, Halverson, & Diamond, 2001), we view school leadership as extending beyond the principal and assistant principal. In our scheme, leadership practice is not simply a function of an individual leader's ability, skill, charisma, and cognition. While individual leaders and their attributes do matter in constituting leadership practice, they are not all that matters. Other school leaders and followers also matter in that they help define leading practice. Further, the situation of leaders' practice – material artifacts, tools, language, etc., is also a constituting element of that practice and not simply an appendage. Leadership practice (both thinking and activity) emerges in and through the interaction of leaders, followers, and situation. Attending to situation as something more than a container for leaders' practice, we argue that sociocultural context is a constitutive element of leadership practice, fundamentally shaping its form. In our distributed view, leadership practice is constituted in the interaction of leaders, followers, and their situation. Hence, in each school we examine multiple leaders' thinking about leading change in mathematics and literacy, including their thinking in situ.

Methodology

This paper derives from data from the pilot phase and year 01 of the Distributed Leadership Project, a four-year longitudinal study of elementary school leadership funded by the National Science Foundation and the Spencer Foundation. The six-month pilot phase was conducted during the winter, spring of 1999. The first full year of data collection got underway in September 1999 and involves eight Chicago elementary schools, two of which were also part of the study's six month pilot phase. As of June 2000, we completed this phase of data collection having completed between 50 and 70 days of fieldwork in each of our 8 sites.

Site Selection. We used a theoretical sampling strategy (Glaser, 1978; Glaser & Strauss, 1967) selecting schools based on five dimensions. First, all schools in our study are high poverty with a minimum of 60% of students receiving free or reduced lunch (See Table 1). Second, we selected schools that varied in terms of student demographics including seven schools that were predominantly African American, 3 that were predominantly Hispanic, and three that were mixed (See Table 1). Third, while we were chiefly interested in schools that had shown signs of improving mathematics, science, or literacy instruction (in terms of either process or outcome measures), we also wanted some schools that had managed no change in instruction. Further, we wanted to vary schools in terms of the duration of their change efforts. We used Consortium on Chicago School Research's longitudinal database to identify elementary schools that have shown indications of improvement on measures that include "academic press," "professional

community,” and “instructional leadership”² (process measures) and “academic productivity.”³ Our 13 schools fell into three broad categories in terms of instructional change –change efforts in the past 1 or 2 years, tangible indicators of change over past 3 – 5 years, tangible indicators of change over the past 5 – 10 years (see Table 1).

Data Collection. Research methodologies included observations, structured and semi-structured interviews, and videotaping leadership practice. During phase 1 and phase 2 of the study, researchers spent the equivalent of 3 - 4 days per week per school over a ten-week period. Leadership events observed in these schools included grade level meetings, faculty meetings, and school improvement planning meetings, professional development workshops, and supervisions of teaching practice. In addition, we observed a number of other events where leaders discussed subject matter including, homeroom conversations between teachers, lunchroom conversations, grade level meetings and subject specific workshops and meetings.

² The instructional leadership measure assesses teachers' perceptions of principal and teacher leadership (e.g., questions about setting standards, communicating a clear school vision), and interviews with school personnel and observers of the system. Define other measures.

³ While we will use the Consortium’s data on “academic productivity”, a weakness with this measure is that the ITBS is inadequate to assess students’ mastery of the more challenging reading and mathematics content. Further, all of these measures are proxies for a schools’ engagement in instructional improvement and improvement should not be attributed to school leadership.

Table 1. Demographics for Schools in Study

School	Student Enrollment	Low Income	Black	White	Hispanic	Asian	Native American	Limited English
School A	861	93%	100%	0	0	0	0	0
School B	1,048	96%	7	47%	22	24	1	38%
School C	1,498	73%	8	40	19	34	0	48%
School D	287	90%	100	0	0	0	0	0
School E	928	97%	3	0	97	0	0	46%
School F	363	97%	100	0	0	0	0	0
School G	1,054	97%	100	0	0	0	0	0
School H	1,331	96%	4	3	88	5	0	29%

We completed interviews with teachers at the second and fifth grade levels and school leaders (including lead teachers). Interview protocols focused on school leaders' agenda and goals, their responsibilities, and the key tasks they perform as part of promoting instructional

change in mathematics, science and literacy. Our interview questions were designed to get at five core issues about the practice of leadership:

- Getting the leaders to identify the key goals or macro functions they work on (e.g. building a school vision, promoting teacher professional development, improving test scores, etc.)
- Getting them to describe what day-to-day tasks they perform to attain these goals, i.e. the micro tasks (e.g. observing classrooms, forming breakfast clubs, facilitating grade level meetings, etc.) and the subject matter focus of the task if any
- Getting them to describe how they enact the micro tasks; that is their practice as leaders
- Whether and how macro goals/functions and micro tasks are co-enacted; i.e. the extent to which their functions are executed with the help from others in the school.
- What tools and material resources (including designed artifacts, memos, protocols, and organizational structures) the interviewees identified as important in the execution of macro and micro tasks.

We also selected specific instances of school leaders' practices to observe and then conducted post-observation interviews with these leaders about the observed practice.

Observation protocols focused on:

- (6) The nature and substance of the task: what the leader(s) did and the goals of the activities including the subject matter focus of the activity, if any.
- (7) How the task was enacted: including the artifacts/materials used and how they were used to enable practice.
- (8) The timing and location of the task: the physical setting and context of the enactment, and the time of the year, week, or day on which the task was enacted

- (9) The patterns of involvement: including what the leaders/facilitators did during the enactment, whether leadership was shared or not, and role of participants.

To explore relations between leadership practice and teachers' efforts to change their teaching we used classroom observations and interviews at grades two and five in each school. These observations and interviews focused on three subject areas – mathematics, science, and reading. The unit of data here is the focused observation *and* the interview. Refining and developing observation protocols used in previous work (Spillane, 2000; Spillane & Zeuli, 1999), observations focused on dimensions of practice that include materials used, content of academic tasks, and task enactment. Post-observation focused on a) gauging the representatives of the instances of practice observed; b) understanding the nature of changes in practice from the teacher's perspective; c) understanding what has facilitated and supported these changes, especially the influence of particular leadership practices.

Data Analysis. Data collection and data analysis (ongoing) were closely integrated, allowing researchers to check out patterns and working hypotheses as they emerged from data analysis and refining data collection strategies as the study progresses (Miles & Huberman, 1984). Coding categories were developed based on the distributed leadership theoretical framework and initial analyses of our observation and interview data. A commercial computer based qualitative coding program – NUDIST - was used to code all project data. NUDIST allowed us to code the emerging ideas and concepts from the data into free nodes that can be compared and related to each other, forming larger “parent” nodes that can be stored into an index system that hangs together the different components of the project.

For the purpose of this paper, we focused our analysis on two types of data - interviews with formal leaders in each of the eight schools and observation notes from meetings between

one or more of these formal leaders and school staff. As part of this effort, we analyzed interviews with 30 formal leaders across eight schools. We defined formal leaders as individuals who had an administrative or instructional title within the school beyond that of classroom teacher and/or who spent no more than 50% of their time engaged in classroom teaching. We interviewed a total of 30 leaders across eight schools. This included 8 principals, 6 assistant principals, and 16 curriculum and program coordinators. The 16 program coordinators included five literacy coordinators, four math coordinators, three technology coordinators, and four overall curriculum coordinators (see Table 2).

Table 2. Interviewees by School and Position

School	Principal	Assistant Principal	Technology Coordinator	Curriculum coordinator
A	x	x		x
B	x	x	x	xx
C	x			xx
D	x	x	x	x
E	x	x	x	x
F	x	x		xx
G	x	x		xxx
H	x			x

As part of our preliminary analysis, we also analyzed observation data from meetings between formal leaders and teachers. A total of 24 meetings across eight schools were analyzed. This included five school improvement meetings, three faculty meetings; eight staff development workshops organized by the school, eight special project or curriculum meetings (see Table 3). For the purposes of this paper, we selected meetings to analyze which formal leaders had

convened and/or served as active participants. We selected these meetings because we were interested in taking a closer look at how statements made by leaders about mathematics and literacy reforms in context of interviews were reflected [or not] in their interactions with groups of teachers.

Table 3. Meetings Analyzed by Type and School.

School	Faculty Meetin	School Improvement	Professional	Special Project/Curric
		meeting	development	meetings
A		x	x	x
B	x		x	x
C		x	x	x
D		x	x	x
E	x		x	x
F	x		x	x
G		x	x	x
H		x	x	x

For the purposes of this paper, we focused on three index trees within our larger coding system. The first tree focused on identifying formal leaders within the school. The second tree focused on statements about conceptions and beliefs. Four nodes (goals of teacher learning, challenges of teacher learning; goals of student learning, challenges of student learning) were created to code these data. The third tree focused on subject matter. We used five coding categories while coding for subject matter – mathematics, science, literacy, other (e.g., social studies), generic – with the generic category being used when the leader spoke about his/her instruction in general or when it was not clear that the teacher was speaking about a particular subject. Using this coding scheme we were able to analyze formal leaders’ thinking about

mathematics and literacy working from their direct reports about goals, strategies, and challenges to math and literacy reforms in the context of interview and observation data. Coders worked together to code transcripts initially in order to develop a shared understanding of what each code meant. Once coders had developed a “taken as shared” understanding of these codes, they worked independently.

Leaders’ Thinking About Instructional Change

Leaders’ Content Neutral Framing of Instructional Priorities

Leaders’ mapping of school-wide instructional priorities projected a content neutral view of instructional change. Principals, assistant principals, and coordinators commonly identified three types of instructional priorities: ensuring that their school was safe and orderly and met students’ emotional needs; raising students’ scores on standardized tests, and building students’ higher order thinking skills (problem solving, collaboration, demonstration of knowledge). While leaders made frequent reference to both mathematics and literacy in articulating these broad goals, they drew few distinctions between these content areas.

Twenty-five of the thirty leaders in our study emphasized the importance of making their school safe and orderly – an environment that would provide students with the emotional supports that leaders viewed as preconditions to learning. When asked about instructional priorities, one principal responded by emphasizing the role of the school as a home away from home for students:

Teachers may be the only role model – so we try and provide the things that they [the students] do not get at home. Not everything I know. But, we have to fill the gap
high expectations, a safe environment, a warm nurturing environment . . . so that parents

who work will not be worried about their child so that they will be in a safe secure environment.

For this principal and the seven others we interviewed, setting high academic standards for all students required the school first and foremost to create a safe and secure learning environment. Similarly, an assistant principal identified adequate time and affection as the basic ingredient needed for students to perform well at her school.

I have learned that whether I come from this side of town or this side, the children are all the same and they all need the same thing. There is no difference. They need time and affection and if you give them that they will be fine.

These remarks suggest a vision of instructional leadership primarily focused on the conditions under which students learn rather than the content of what they learn.

When asked about school-wide instructional priorities, twenty-two of the thirty leaders we interviewed also emphasized the importance of improving students' performance on standardized tests, even in schools that had posted scores high above the district mean. In describing the pressures of standardized testing at their schools, principals, assistant principals, and coordinators made frequent reference to the emphasis that the school district had placed on test improvements in literacy and mathematics. However, they made few distinctions between what it would take to improve test scores in literacy and mathematics, treating the topic of test score improvement as a generic rather than subject-matter specific problem. A principal at a probation school folded reading and mathematics together when talking about student test scores:

I think the goals that the school has been working on is to get our students to have their reading and math scores at or above national norms. Or at least our goal has been to have 50% or our students at or above national marks. And I'm sure that we have gotten there

in math and we're almost there with reading. And I'm sure as soon as we reach those goals, of course, will be to get more and more students above that level.

While this principal did make reference to mathematics and reading in describing instructional priorities, he drew no distinctions between the two subjects - the task of improving student achievement was identical whether one was focusing on mathematics or reading. Similarly, an assistant principal lumped reading and mathematics in describing current benchmarks for instructional improvement at her school.

We still are aiming for national average being at 50%+ in both reading and math and we feel that we can get there even with the 40+% mobility rate. It's not difficult to remain up because we still have a challenge ahead of us and we are working vigorously on it.

The assistant principal framed improving standardized test scores as a general goal that required collective effort on the part of the faculty rather than subject specific strategies.

A third pattern, evident in the thinking of 27 of the 30 leaders in our study, focused on the need to integrate problem-solving, collaboration, and demonstrated learning across the curriculum, but drew no distinctions between subject areas when discussing these skills. For example, the leaders we interviewed described effective teachers as playing a facilitative role in classrooms. A principal explained:

Teachers are – are moving about. They're working with students. They're not necessarily giving the students the information. They're providing questions or prodding questions to help – or guiding questions, I should say, to help the students to discover what it is they hope for them to discover. . . . I've seen the teacher . . . make sure that things were set up properly at the group table. Or, you know, provide that guidance. You know 'you found this out, well maybe you might want to try this and see what else

you might find out about this.’ So the teacher is really more of a facilitator at that particular time. The teacher is not a lecturer. The teacher opens, the teacher may give some introductory information, but then the kids have it. You know the kids are engaged. The kids are discovering.

While this principal constructed a concrete picture of the facilitative role that teachers should assume within the classroom, it was content-neutral. Nowhere here or in subsequent discussion did she try to distinguish how the teacher’s role as a facilitator might be subject matter sensitive. Leaders also described the value of group work and collaborative learning at the primary level and in these and other statements of instructional priorities the subject matter seemed interchangeable. Thus, at the level of broad instructional priorities, what constituted good instruction for these school leaders appeared the same regardless of whether one was considering literacy or mathematics.

Leaders’ Thinking About Instructional Change: How The Subject Matters

If we were to cease our analysis here, we might conclude, that the subject matters little in elementary school leaders’ thinking about the work of leading instruction. The instructional goals articulated by elementary school leaders suggest that for them the subject matter was peripheral. School leaders’ priorities and concerns appeared to rest with more general learning conditions and skills and what constituted good instruction for these school leaders appeared the same regardless of whether one was considering literacy, mathematics, or science. However, when we moved beyond general statements about instructional priorities, and examined how leaders constructed the goals, challenges and strategies of their own mathematics and literacy reforms, important differences emerged. Our situated analysis of leaders’ beliefs reveal the

different ways that elementary schools leaders' think about mathematics and literacy . From this, we consider the implications these beliefs have for how principals, assistant principals and curricular and program coordinators lead instructional reforms in these content areas.

School Leaders' Instructional Goals: Mathematics and Literacy Compared

Leaders constructed the goals of mathematics and literacy reforms differently. In describing their school's current efforts to improve literacy instruction, twenty-six out of 30 leaders emphasized efforts to encourage teachers to integrate reading and writing into other aspects of curriculum.⁴ In contrast, leaders articulated goals for reforming mathematics that were primarily focused on improving the sequencing of mathematics instruction from grade to grade.

With respect to literacy, leaders described efforts to integrate vocabulary building throughout the curriculum as evidenced in the comments of this assistant principal.

I'm not a component of spelling books you teach spelling across the curriculum that will help to increase the vocabulary and also encouraging having books for students to read that also builds their vocabulary...So in the classroom we teach the spelling vocabulary

⁴ Our analysis focuses on predominant belief patterns about math and literacy across 30 elementary school leaders representing eight schools. For the purposes of this paper we coded for emphasis and deemphasis and presence of absence. In other words, leaders identified as exceptions to the pattern were not direct opposites. They either made no mention of a content area dimension or otherwise through their statements, seemed to place little emphasis on the dimension.

across the curriculum. You get vocabulary from every subject, math, science, of course the language arts.

In his description of how his school tried to improve reading and writing and the leadership he assumed within the effort, the assistant principal conveyed a view of literacy as a content area that was integral to learning in other content areas. Similarly, a principal described literacy reforms underway at his school as helping his faculty “become more self conscious about recognizing that we’ve got some literacy instruction – some reading and writing strategies that we want to be thinking about as part of science delivery system.” For this principal, as for the other leaders we interviewed, the goal of literacy improvements involved not only helping students become better readers and writers but also improving their skills in other content areas.

Leaders also identified literacy skills as a central and general measure of student progress across the curriculum. For example, a principal described the importance of writing portfolios in assessing students’ overall learning progress.

But I think it’s [writing] really important because it integrates so many things. It integrates thinking. It integrates being able to organize. It integrates spelling and language and many different things. So, I thought it was a good way for me to get kind of a snapshot of what’s happening and what people are doing in this school. It forced teachers to actually teach writing as a subject and not just as a homework assignment and encouraged them to use the writing as an integrated thing, not as a stand alone.

For this principal writing was not only a subject that cut across and integrated disparate aspects of the elementary curriculum but also an important means of gauging what’s happening with respect to instruction in his school. Describing the reform initiatives underway at their

school, leaders' characterized literacy as a cross-disciplinary instructional priority – the goal of which was to improve students' comprehension in a variety of subject areas.

Our analyses of school-level meetings in which formal leaders led or in which they actively participated, support the patterns in school leaders' thinking about literacy identified above. First, in 11 out of 17 meetings where literacy issues were discussed, leaders identified the integration of literacy across the curriculum as paramount. For example, in the context of teacher staff development, school leaders encouraged their faculty to “think about reading and writing as an element of every content area.” In school-wide planning meetings, they talked about the need to “infuse literacy throughout the curriculum in order to build a school of readers.” In curriculum planning meetings, program specialists shared strategies for improving students' comprehension across different subject areas. Consider the following vignette of a half-day professional development session at one school which reflects leaders' thinking about reforming literacy instruction. The first portion of the meeting focused on reading and writing strategies. The second half on mathematics scores.

At about 12:30, Ms. Eaton [principal] made an announcement that a staff meeting was beginning at 12:30 in the media center. She said, “Today we were supposed to have a monitor [assigned to the school as part of district's accountability policies] come in...but since today is a half day so I called to reschedule her. They [the district] are looking at what we are doing in Reading and Math. Mr. Fernandez [district staffer assigned to school because it is on probation] says he wants improvement on the ISAT [standardized test].. I'm not saying it's a bible, but follow it. We all got copies of that [the standardized test] last year.

Eaton then explains that she has particular expectations for how teachers will approach reading. She says that she wants every teacher to make “reading a priority, every day no matter what.” She emphasizes that teachers’ bottom-line goal should be to prepare 5th grade students to be able to comprehend 5th grade material “regardless of the publisher, regardless of the nature of the assessment.”

The focus of the workshop is on the use of graphic organizers. These are tools incorporated as part of the district’s new reading program. The idea is to help students create a visual map of main elements of a story, however the presenter emphasizes that use of these tools applies not only to narrative but also expository writing used in other content areas. There is a handout with a Venn diagram to illustrate the overlap in the tools used in different kinds of writing – with the idea that the graphic organizer will help students systematically unpack the meaning of any piece of writing by deconstructing its components. Teachers participating in the workshop have the opportunity to try out the graphic organizer with two pieces of text, a piece of historical fiction focused on an escaping slave and a copy of an actual historical artifact on President Lincoln and Frederick Douglas.

Both the principal and assistant principal at this meeting emphasized the importance of helping students develop comprehension skills that could be used across content areas, a pattern that was repeated in almost 65% of the meetings where literacy was a featured topic.

Leaders constructed the goals of their reform initiatives in mathematics differently. Only four out of 30 leaders talked about the need to integrate mathematics approaches into teaching in other content areas. For example, one principal made brief reference to efforts underway at her school to increase collaboration between math and science teachers, commenting, “We have a

process in that we have teachers involved in science who are involved in mathematics and to me mathematics and science are tied hand in hand.” Instead, most school leaders’ descriptions of their efforts to reform mathematics reflected an orientation towards the discipline as a distinct and somewhat isolated school subject; a stand alone part of the elementary curriculum embodying a distinct set of skills with little application to other content areas. Leaders expressed no interest in integrating mathematical skills and concepts into instruction in other content areas. Similarly, none of the leaders talked about mathematics skills as measures that could be used to assess students’ development in other content areas.

In describing the goals of their math reforms, sixteen out of 30 leaders placed considerable emphasis on tightening the sequence of mathematics instruction in their school, viewing mathematics reform primarily in terms of students’ mathematical competency. In contrast to literacy, they had little interest in integrating mathematics into teaching in other content areas, talking about improving mathematics instruction as an issue of sequencing rather than integration. Leaders worried that any omissions or break-down in the sequencing of mathematical skills [typically defined as addition, subtraction, more advanced computation, estimation] might leave students unable to perform effectively as they advanced into new grade levels and or to perform satisfactorily on standardized math tests. Four leaders also expressed some general concern for the sequence of instruction in literacy but not at all to the degree that they did for math. In other words, leaders expressed some concern that students possessed the basic decoding skills that they needed in order to distinguish words in order to comprehend the larger meaning of the text. However, beyond basic decoding, no other literacy skills were identified as prerequisites to comprehension. This contrasted to the battery of skills leaders typically identified as encompassing effective math instruction.

Leaders' concern with plotting out what kinds of mathematical skills students would learn not only from year to year but quarter to quarter were reflected in statements such as,

We try to stay away from the straight textbook type thing. We try to have it to where we think it would best benefit the kids and when it comes to standardized tests, to maximize the time that can be worked on those things. So each grade level team will sit down and decide a plan of action for the year, like what should be taught in the first quarter, the second quarter, third quarter, and fourth quarter.

For this principal, as for fifteen out of 30 other leaders we interviewed, creating a highly detailed plan for what math skills would be taught at what grade levels was viewed as a important or primary dimension of math instruction. Similarly, an assistant principal at another school recounted how his school community became aware of need for better sequencing of the mathematics curriculum.

We learned some very important lessons when we put math teachers together for first through eighth grade. And we looked at the fact that, you know, all our kids were having a hard time in math. And it seemed to point to place value. And first grade teachers said, "oh we didn't think place value was important. We thought you all taught it later on. We didn't know we had to build a framework in first grade that would be built upon later on".

Mathematics improvements at this school involved making teachers more aware of particular skills to teach at particular grade levels and encouraging them to structure their curriculum accordingly.

Leaders' often expressed concern for mathematics sequencing in reference to an emphasis within their school on higher order thinking. For example, a curriculum coordinator described

the importance of making sure that students had basic computational skills before attempting more complex mathematical reasoning.

It starts without building the skills, very basic skills with children who come under-prepared for school period. And especially we can see it with my kids who come . . . very, very under-prepared, you know, for second grade. And it has them starting with thinking about computing and developing their reasoning skills which is all well and good but they are lacking basic skills, computation skills. And its is a shame to see how they count on their fingers – developing higher order thinking and you know counting at the same time on their fingers.

In explaining her role in leading change in mathematics instruction, this curriculum coordinator moves beyond general statements in support of higher order thinking and identifies a particular set of priorities for math instruction.

These patterns in leaders' thinking about improving mathematics instruction were reflected in the school-level meetings which formal leaders led or participated in, with leaders focusing teachers' attention on discrete mathematical skills and/or creating school-level guidelines for when (including what time of the year) particular skills should be taught. Specifically, in 5 out of the 7 meetings that focused primarily on mathematics instruction and its improvement reforms this was the dominant pattern. For example, when the issue of math arose in the context of school improvement meetings, discussion focused on making sure “our students leave here with the basics – that they know how to add subtract and multiply”. In the context of grade level meetings, curriculum coordinators met with teachers to create detailed plans for how and when they would teach particular mathematical skills. Consider a vignette of a mathematics workshop we observed:

Later that morning, the curriculum coordinator shares strategies from a math workshop she attended. Schindler addresses the group. “Last year we went to a conference on math and we also went to the board...now we have knowledge we would like to share with you. Now what I’m about to give you are two sheets of paper...I’m going to ask you to discuss this at your table. Ask what questions you would ask yourself at specific phases. This was a part of a workshop where we looked at our students’ test scores and analyzed them”.

Schindler continues fast paced, “Ok, let’s go on. Now in 5th grade what we are doing every single night is choosing various multiples and having drills to have the kids work on for homework. Sometimes kids ask me when this would end. I told them that after 6 weeks if the students’ pass the basic facts test, they don’t have to do the homework anymore. (A teacher in the room (Mr. Baller) claps). Shindler smiles and continues, “Now, what we believe is that all this higher order stuff is for the birds if the kids don’t know the basic facts.” A number of teachers show their agreement. The teacher who clapped raises his hand and makes a comment before he is recognized, “Before we get to multiplication, let’s talk about addition. These kids are counting on their fingers and their toes....”

The school leader in this situation emphasizes the importance of building students’ mathematics skills in the right order and making sure that the development of basic mathematical skills precedes instruction on mathematical concepts. This contrasts sharply with the views leaders expressed in literacy events. While in both literacy and mathematics events, leaders were concerned with making sure that students developed more than a superficial understanding of their content area, leaders presented teachers with different objectives beneath the goal of

improved mastery. In literacy, the objective was to develop students' ability to comprehend written material regardless of where they encounter it, while in mathematics, the primary objective is to make sure students acquire particular mathematics skills before they move onto more advanced mathematical concepts and applications. In math, instructional improvement is dependent on a tightly sequenced mathematics curriculum.

In sum, when describing the particulars of the mathematics reforms underway at their schools (and leadership strategies in relationship to these reforms) few leaders constructed mathematics and their efforts to improve instruction in that subject area as related, let alone salient, to other aspects of the curriculum. The situation was reversed for literacy. Rather than emphasizing the need to integrate mathematical concepts *across the curriculum*, they emphasized the need to improve the sequencing of instruction *within the math curriculum*. In the context of these comments, we find leaders with considerable concern for the order in which mathematical skills are taught. In contrast, in literacy, leaders did not place anywhere near as much emphasis on sequencing with literacy typically discussed in terms of a general set of skills that teachers were expected to develop across subject areas and grade levels.

Defining the Reform Challenge: Mathematics and Literacy Compared

The reform goals that leaders framed for their mathematics and literacy programs created for them a particular set of reform challenges in each content area. Leaders' viewed literacy as a crosscutting instructional priority that involved or affected their entire faculty regardless of grade level or training. However, in reviewing reform progress, they expressed concern over lack of coordination in their faculty's efforts to integrate literacy. They believed this was problematic and saw developing consensus among around literacy approaches as a reform challenge. In contrast, leaders viewed mathematics as a content area that required systematic and sequenced

instruction in established mathematical procedures. In reviewing reform progress, leaders expressed concern that their faculty lacked expertise to effectively teach math skills to students. They viewed the lack of expertise as problematic and saw addressing the shortage or unevenness of mathematics expertise as a major reform challenge. We explore these patterns below.

Twenty out of 30 leaders framed the challenges of leading change in literacy instruction in terms of creating more coherence in the approaches to literacy instruction used by teachers. Here, coherence was defined in terms of consistency in instructional philosophy and approach rather than sequencing of material across grade levels. A principal explained:

Well, again, you know, a question of dialogue we had three sometimes four or more classrooms at a given level and the teachers weren't talking to one another. We had a situation where it almost seemed we had a different [reading] program in each classroom. The curriculum was being implemented differently and in some cases, I also found that some teachers had a strength that other teachers may need some insight on and they weren't talking and sharing that information.

I said "it doesn't make sense for – if all of you are going to be talking and planning and doing the same, you know, lesson plan or similar things" in language arts – because everybody's a language arts teacher first at Adams school, then I don't need to have a language arts plan from each person. I can just have the language arts plan for the group..

For this school leader, the major reform challenge in reforming literacy instruction was understood as developing a more coherent instructional program. At her school, as for the seven other schools in our sample, leaders framed literacy as a cross-cutting priority that every teacher regardless of their training or expertise was expected to address. Given the expectation that

“literacy was everyone’s business” the challenge became creating conceptual consistency in how teachers approached the teaching of instruction.

Similarly, the principal at a another school, described how his school’s efforts to integrate literacy throughout the curriculum had made it difficult to define what to incorporate into literacy instruction and what to exclude. He commented,

Okay well let’s see during the last couples of years literacy development the middle school level has really been an important thing for us. Literacy development at the middle school level is really complicated because a lot of people, well part of our challenge has been within the frame of defining for ourselves what is literacy instruction, at the middle school and what does it involve. It is not as much as about the decoding anymore or structural analysis then what exactly is it? How much of it is specific to the reading process and how much of it is more general to how you think and make general connections and other things.

Focusing on all grades, the assistant principal at this school similarly framed the challenge of leading instruction in literacy in terms of inconsistency in instructional approach and underlying philosophy.

People in this school pretty much do what they want to do in reading. We call it a literature based program – But do people know what that means? They all do what they think they should do or talk to a neighbor and think something up from that.

Likewise, an assistant principal at another school voiced concerns over her schools’ ad-hoc approaches to integrating literacy throughout the curriculum.

Everybody always say they do reading all day long so – sometimes I think they’re very hesitant to try something different they say ‘oh we do that already.’ They’re forever

saying ‘we do that already.’ I think one of the good things that accountability has changed is that we’re able to say yes you do that already but now we have to document it. Which sort of makes them more responsible for what they’re doing, it’s not just so on the fly. ‘Oh we did that and we do this.’ Now you have to really show that you do it.

Understanding literacy as an integrative content area incorporating skills that transcended disciplinary boundaries, these and other leaders understood the challenge of literacy reform as the development of a more coherent program that would enable more evenness of instruction of what teachers did under the rubric of literacy instruction. Because literacy infused so much of the curriculum, leaders worried that literacy instruction within the school was in danger of becoming fragmented. Leaders also expressed concern with coherence in math instruction as evidenced in the preceding analysis of math reform goals. However, in math, leaders tended to frame coherence in instruction as an issue of skill sequence independent of instructional philosophy. In literacy, coherence primarily involved developing consensus around instructional philosophy.

For other leaders, the very nature of literacy made developing coherence in approach next to impossible. A curriculum coordinator explained,

Literacy has come up a lot. I feel like, as a school, we’re very much drifting because to me, if nothing changes in the classrooms, then it’s worthless. The discussions aren’t useful. If it’s not going to change what I do as a teacher, or improve what I’m doing as a teacher, then the discussions aren’t fruitful. So – and a lot of the discussions have been – they’ve tried to ground them in – in – in what teacher’s do, but they’re talked about in such abstractness. They’re not talked about in a practical sense. It’d be like teaching algebra and just talking about all of it’s abstractions and not thinking about let’s come up with a practical problem to teach this to kids. I mean it’s the same kind of parallel. It’d

be like teaching the kids about the seasons and never showing them a globe or, you know? It's, it's – and then we're kind of all over the place.

This curriculum coordinator is especially troubled by the abstractness of efforts to improve literacy instruction and the resulting lack of specificity about instructional approaches which she perceives as “all over the place.” Here again the challenge of leading change in literacy instruction is framed as creating more focus and consensus with respect to instructional approaches. Leaders embraced a view of literacy as a content area of considerable scope and then worried about the challenge that instructional fragmentation posed for their reform efforts.

Leaders constructed challenge of leading mathematics reforms somewhat differently. Eighteen out of 30 leaders framed the challenge of reforming mathematics instruction as one of teacher inexperience, resistance or mathematics anxiety rather than lack of consensus in their school's approach to mathematics instruction. A curriculum coordinator described how teachers' resistance to a new mathematics curriculum impeded changes in classroom practice.

Math/science, that's what was one of the goals of the math/science study group. Nothing really happened in the classrooms, except for the adoption, which was a big one. The adoption of saying ‘yes we're going to use All in One math even though we're going to fight it and we don't necessarily believe it, we're going to do it.’ You know some teachers were just stomping their feet ‘no!’ This is not what we want to do and eventually they were kind of sold and they decided to do it.

Similarly, when asked about mathematics leaders in the school, one principal disparaged about the overall shortage of mathematics expertise within the system:

No I don't see any math [leaders]. I really don't. I think there is such a shortage in the system. Look at the whole staff resumes that I have received this school year. Look at this pile. There is no one strong in math.

With four exceptions, the leaders that we interviewed tended to be somewhat tentative about the sources of the problem in mathematics instruction. For example, the principal quoted above expressed concern that teachers were not actually utilizing the new mathematics curriculum that the school had purchased. Unsure why this was the case, she sought advice from a colleague at another school,

The Principal at the Lafayette Academy a very good school talked about the [mathematics curriculum] in her school that works really well. That was a program that was developed by the [local University] and our teachers are resisting it. I don't know if it was a lack of support to helping the teachers in the transition or it was not introduced to it and our teachers are still not using it and resisting it but in her school she said her teachers really liked it.

While this principal was more convinced of the value of externally developed curriculum in mathematics after he conversation with this colleague, she remained somewhat uncertain why the curriculum was so difficult to implement at her own school. Similarly, a curriculum coordinator at another school anticipated obstacles to teacher involvement in math reforms,

And now that they're doing it in mathematics I guess that's good but it was really hard because now it's kind of like people just have a different feeling about mathematics and I don't know why and it seems to be that math anxiety. People just really do. So I think they're gonna have a harder time with math than they are with reading.

This coordinator suggested that the challenge of leading mathematics instruction at her school had to do in part with teachers' mathematics anxiety, though she also remained somewhat tentative about her interpretation of the problem.

Differences in how leaders framed the challenges of their mathematics and literacy reforms were also reflected in their leadership practice. Seven out of the seventeen meetings that were primarily focused on issues of literacy included discussion about the varied approaches to literacy instruction in the school. Discussion within the meetings framed teachers' tendency to "do their own thing when it came to literacy" as a problem, that contributed to some unevenness in the quality of instruction from grade to grade. In contrast, 5 out of 7 meetings that focused on mathematics instruction focused on teachers' resistance or inability to implement the standard math curriculum selected by the school. To illustrate this pattern, compare the discourse of two separate curriculum meetings occurring within the same school. Each meeting was organized as part of larger discussion on student performance on standardized tests:

Then Linda [outside consultant] asks the group (smiling gently, interested) "can you tell me something about the writing portfolio' and the instruction occurring in class?"

MK (curriculum coordinator): "There's lots of variation," and last year her grade was looking for "more conformity," and "it's really a big issue," different people and different grade levels all seem to have different approaches"

LK "And we're (School) so big"

MH "Its very difficult to get that going, the agreement across the school.

Then J comments that as librarian, with Mary's students, Mary is in her third year with her students, so with Mary's students "we are doing a lot of writing activities." As

librarian she tries to work with teachers on projects, but among the teachers there's "lots of different backgrounds" and they are "all over the place"

Linda "Do all teachers value writing the same?" and the group responds with a resounding "NO" and break out into laughter

Without any hesitation, leaders framed variation in teachers' approaches to literacy as a "really big issue."

Compare the leaders' perspective in the literacy meeting to the stance taken in a mathematics-focused curriculum meeting at the same school.

[ZP] principal asks ES [assistant principal] to give a brief report on teachers' progress with the All in One Math program [as I learn later, he has assigned the new principal the responsibility of sitting in on 5th and 6th grade math committee meetings]. Two years ago, the school adopted a math/science curriculum similar to that used in higher grades. ZP has analyzed test score data in math and is worried about the slump that occurs in the middle grades. He is convinced, he tells the group, that the slump has to do with fact that some fifth and sixth grade teachers simply are not using the new textbooks. "I bet if I went outback to the Dumpster, I'd find some right now." He turns back to the assistant principal and asks, "So, tell us, are JH [5th grade teacher] and others who come to the math/science meetings talking up the curriculum." ES nervously responds, "well we have only met twice and the real issues coming up in those meetings was that people felt that they didn't have the materials, the ramps and rulers and other materials to do the activities required." I've heard that excuse before, ZP responds as he turns to me and smiles. Assistant principal says, "Maybe we need [outside university consultant] to come in again and do some workshops for new teachers.

The construction of the mathematics challenge contrasts with the perspective adopted in literacy. In the context of literacy, teachers' expertise was never seriously questioned; the issue was how to harness diverse expertise, instructional approaches, and philosophies. In the mathematics-focused meeting, both principal and assistant principal assigned responsibility for the slow adoption of the mathematics reform to teachers' resistance and lack of expertise.

School Leaders' Location of Expertise: Mathematics and Literacy Reforms Compared

We also found differences in leaders' thinking about the locus of expertise for improving mathematics instruction compared with improving literacy instruction. Leaders tended to view their own school community as the primary sources of expertise for literacy improvements, quick to identify the role that they singly or in concert with other members of their faculty had played in some of the more successful literacy changes underway at their schools. In contrast, leaders were much more likely to refer to the curriculum and/or training associated with an external program in describing their schools' successful efforts in mathematics. We explore these patterns below.

With respect to mathematics, 22 out of 30 leaders attributed mathematics improvements at their school to the existence of an established mathematics curriculum associated with an external program. Explained an assistant principal,

In math, we have the [math curriculum developed by local university]. In math and science we have these manipulative programs where teachers have seen actual results and we've instituted so many programs here it is really incredible. Some of them have been very successful. Our math has gone up wonderfully. We're almost at the 50th percentile. I put the directed attribution to [math curriculum developed by local university] and all of

the math and science programs that we've added, manipulative type programs, hands on, all that stuff works very well.

This principal attributed recent improvements on standardized mathematics tests to the external programs that the school had instituted and did not assign any credit for the improvements to the school itself above and beyond the decision to add new programs. Likewise, a principal at another school asserted that his schools' steady improvements on mathematics standardized tests would not have occurred without the presence of externally developed tools in the form of,

Good solid curriculum materials. I mean you know there's just no substitute for a good solid curriculum materials. Why? Because there's no way that you know as people who are spending most of our time dealing with youngsters and adults, there's no way we can also construct curriculum from scratch. You know, we currently can add to it. We can, you know we can augment it, we can bring a lot of ourselves to it. But to create good solid curriculum, especially good solid um, scope and sequence across grades, there's just no way that we can do that without leaving huge holes.

While the principal did refer to the ways that his school community could improve on externally developed curriculum, he also insisted that in-house expertise in mathematics was insufficient. In this principal's view, if the school community was left to its own devices in creating the mathematics curriculum, students would suffer.

Similarly, a curriculum coordinator at another school described mathematics improvements at the school as a direct outgrowth of an externally developed mathematics curriculum. By comparison, she displayed much less confidence about teachers' ability to sustain the curriculum.

Okay. The [nationally known standards-based curriculum] program, very cool. The – so that’s [nationally known standards based math curriculum]. I like it a lot as a curriculum. It’s proven, to us, very having pulled – I mean data doesn’t lie. I mean it’s kind of – we’ve done really well in our lower – in elementary grades. We just have to figure out how to carry that on now, I think.

Statements such as these reveal leaders’ tendency to view expertise outside of the school as a critical dimension of math reforms and to have little faith in more in-house forms of math expertise.

Leaders’ reliance on outside expertise in mathematics was further displayed in 18 out of 30 leaders reference to the importance of external forms of mathematics training. For example, leaders such as the following principal described the value added of having faculty attend staff development workshops hosted by the district.

Math and science all the math and science programs we’ve put into – they’re all wonderful and we have a couple of wonderful teachers who go to constant staff development, go to classes, math and science, so they know what they’re doing. They’re not turning the page okay now we’re on this, they really have the background. Very important. Very bad when you work page by page, two steps ahead of the kids. Very bad. Gotta have the background.

Note the leader’s emphasis on having teachers’ acquire the necessary background from outside experts in mathematics before attempting new things in their classrooms. Leaders also emphasized the importance of outside expertise in their own mathematics professional development. Explained one curriculum coordinator,

How do I help myself to make this better. With, in the math/science stuff – I guess a lot of ways I turn outside the school for guidance. I don't know why. I guess in some of these things – the areas of expertise, there isn't a lot within the school even though there is in another way. I mean the whole 'All in One math' thing [curriculum developed by outside university] that's really a huge source of expertise. I mean they basically had 'All in One' coming and saying this is what you're going to do and tons of support.

This leader is definitive about the value of the externally developed curriculum and the staff development that accompanied it. By comparison, she is much more tentative about the expertise housed within the school for math improvements. Indeed, we were struck with how rarely leaders conveyed a sense of expertise in mathematics by directly or indirectly identifying themselves as possessing mathematics content area knowledge in this area. Only 6 out of 30 leaders conveyed a sense of expertise in mathematics and four of them were mathematics coordinator positions.

In contrast to the emphasis on external expertise in mathematics, twenty-five out of 30 leaders attributed improvements in literacy instruction to more in-house forms of expertise. First, in explaining schools' approaches to literacy instruction, fifteen out of 30 leaders made positive reference to one or more literacy programs that the school had developed [each of eight schools had developed at least three literacy-linked activities particular to the school]. For example, six of 30 leaders made reference to special activities designed by the school to get students to read more. Four leaders referred to schools' efforts to tailor externally developed literacy curriculum to the particular needs of the school community [rather than adopt it whole-sale]. In addition, five leaders referred to the efforts of their school to develop alternative forms of assessment. For

example, a principal described the importance of assessments that his school had developed to gather formative data on students' literacy progress.

Our students – our program, in general, has a heavy emphasis on writing. And when – we have the children, you know, constantly writing various things. Can they – really again, can – and put in written form the ideas, the concepts behind what they are working on. Can they do that? We also have a five week assessment here. Because we're a school with a high mobility rate, we felt it was important to have a structure within our school so that we would know, on a regular basis, on an ongoing basis if our students were mastering the concepts. In addition, if they weren't, you know, if there was an opportunity for the teachers to go back and re-teach, to modify, to provide some additional types of instruction, you know, for the students.

What is striking here is the leader's reference to the schools' efforts to develop their own forms of assessment to monitor student improvements in writing and the emphasis on directly providing teachers with the data to improve their practice.

We found differences not only in where leaders located expertise for literacy in relationship to mathematics reforms but also the kinds of expertise that they referenced. Five of eight principals made reference to the importance of faculty evaluation of current texts or peers. For example, one principal described the role of the school's writing committee in helping colleagues evaluate student writing.

We've also developed a language arts committee. Because as we began to look at our writing skills, we felt that if teachers were able to effectively evaluate writing, they would become better teachers of the writing process. So the writing committee enables our teachers to come together, not only to provide workshops for other teachers, but actually

look at the work that's being done by students, so they can hopefully improve and help their peers improve. They are teaching a variety of writing improvement strategies within the school.

Similarly, a principal of another school described the importance of school-wide in-put into the selection of literacy textbooks,

Yes, and more specifically even than that, um, starting from the proposition which _____that even when you have a basal series that you use. Even if the school has gone, has sort of done all that work for you it just, um even if that's all there ___ you know you still have an individual classroom teacher, are confronted with the choice of having to figure out how to reduce the 20 pounds of potatoes to fit into a 10 pound bag. Because the instructional platform here is so, you end up always having to make choices about what concept you're going to do. And so the driving proposition of all this stuff is that um, it's important for us not only from a staff development and professional development point of view but from the point of view of having a cohesive um, program that we offer to the students of our community. That those choices that they be a collective aspect to those choices. That we be talking consciously about those choices.

These leaders' remarks emphasize the value of teachers' actual classroom experience and practical insight within literacy reforms. In the first example, a group of teachers acted as peer coaches to fellow faculty, not just sharing new strategies but actually assuming responsibility for evaluating peer practice through systematic analysis of student work. In the second example, the language arts committee is not only consulted in the selection of a new curriculum [a role also assumed by the math committees described or observed], the group also is expected to use their practical experience to tailor and improve on the curriculum.

Regardless of role, 20 out of 30 leaders were also more likely to convey a sense of expertise in literacy by describing themselves and/or other members of the administrative team as playing a hands on [rather than simply administrative role] in literacy improvements. For example, the principal of one school characterized a literacy focused teacher research group as her brainchild that she also helped to implement through direct solicitation of faculty.

So, you know, in talking with my reading resource teacher I said, you know we've got to do something because there's a lot of new stuff out there. There is a lot of new research. There's a lot of literature out there. How can we really be to, you know make teachers aware and engage them in dialog about, you know, what's taking place? So I offered to provide breakfast. . . . So I sent around a memo and I asked the teachers if some of them might be interesting – interested rather in serving as teacher leaders.

Similarly, a principal at another school identified herself as the primary literacy coach for faculty.

Well, I write notes to every single classroom every single month. And some of it, you know, I try to have it be constructive criticism. I try to give specific things that maybe the class might want to work on and hopefully the teacher will say, “well if the class needs to work on it, that probably means I need to work on it.” And certainly, you know, when – when people come in for their final evaluations or that if I've written in a note – because I keep copies of the notes. I have them on file. When I do evaluations, you know, if people – if I'm continually writing to a teacher, you know, “please work with your children on making sure that their paragraphs are longer than one sentence” and then at the end of the year they're still writing one sentence paragraphs, I think this is a person who doesn't get the message or is not really interested in improving themselves

or their children. So it figures into the final evaluation – into the summative evaluation.

But – and, you know, if someone's having a real difficulty, I have no problem with talking to them personally about it.

This leaders' remarks illuminate her decision to personally to review student writing in every teacher's classroom conveying her sense of expertise and her confidence that her feed back will be valuable to teachers.

Differences in where leaders located expertise for mathematics and literacy reforms were reflected in their meetings with teachers. In 4 out of 7 meetings that addressed mathematics issues, leaders commented on the need to provide teachers with more training and support either in form of workshops or through the purchase of additional curricular materials. In three out of the four meetings, teachers within the school were assigned some responsibility for training fellow faculty in instructional approaches for mathematics. However, in all four meetings, the expectation also was that the training would be supplemented by outside consultants. Leaders located the necessary expertise for literacy reforms differently. In 12 of the 17 meetings that addressed literacy issues, leaders praised home grown literacy activities. These approaches included parent reading programs, supplemental forms of literacy assessment, special activities and teacher mentoring and discussion groups. In 5 out of 17 meetings, leaders supported more opportunities for teachers' to exchange information about literacy instruction in their classrooms, to participate and provide feedback on the progress of literacy reforms and/or to have more time to individually plan new curriculum.

Field notes from a pair of school improvement planning meetings illustrate the pattern that we observed across schools. Both meetings occurred as part of the efforts of one school community to revise its school improvement plan.

At the outset of the meeting, the curriculum coordinator [WG] passes out copies of literacy standards that school has developed in a prior meeting and to review them for the final time. WG [curriculum coordinator] asks faculty members good-naturedly to review the literacy standards or to "forever hold your peace." There was a buzz in the faculty groups as they reviewed the standards. Three or 4 teachers came to WG to make suggestions.

Apparently, the first meeting, which happened last week resulted in a review of the literacy achievements over the past year, and a draft of suggested priorities for the upcoming school year. WG opened the meeting by distributing the notes from this past meeting, and asking teachers to review her summary to see whether there were any changes necessary. The form distributed has the following two sections:

The 2 page form is entitled Section 2 of the SIP process, "Analysis of current conditions using quality assurance internal review" apparently designed to help school communities review past successes.

At the top of the page is a section entitled "Support Area" in which WG wrote the SIP goal for 1999-2000: "reading/language arts instruction to increase student achievement by at least 3%" as measured by the ITBS exam to be administered in May. The rest of the document is divided into three columns: "Focus of analysis", "What is working," and "What needs work". This is a partial list of programs included under focus of analysis and what is working.

Five-week assessments in reading

Provide substitutes for teachers

Integrate curriculum

Language Arts fair and Real Men Read

Supplemental materials

Teacher Leader/Breakfast Club; Teacher Talk

The items under "What needs work" include:

Assessments in writing need to be extended beyond ISAT testing period using creative writing, book reports, writing contests. Topics for book reports will be provided by Resource teacher. Teachers will grade their own papers and discuss them at planned 1/2-day grade level meetings.

Schedule monthly 1/2 day grade level meetings to discuss assessment results and student intervention needs school wide

Devise a system for taking out books at the primary level for students and teachers.

In this meeting focused on literacy improvements, strategies for improvement emphasized teacher input and continuation of homegrown initiatives. In the meeting focused on mathematics (excerpted below) strategies for improvement emphasized the need for more training.

Rather than a cross-section of faculty, the mathematics meeting included the principal, assistant principal and the curriculum coordinator. This meeting contrasted with the first in the following ways. The focal reform strategy proposed by leaders for increasing schools' performance for mathematics involved providing teachers with more training in an established curriculum. While there is some reference to having mathematics teachers within the school mentor other teachers, expectations for teachers' engagement and participation in this effort are low.

WB [principal] comments that there are remedies in place for math that have just not kicked in yet. We are teaching a class through [outside university] for the middle school math teachers that has only just begun, and another class for math teachers across the school on algebra has not yet had its effect.” RM [assistant principal] again comments that “Wade has been asking for more Algebra” which opens up a more general discussion about the professional development of the math teachers. WG comments that “the math teachers are directed toward helping other teachers improve their math instruction, but I’m not sure how much they talk with each other about instruction.” WB remarks that “it is all about ego – they (the middle school math teachers) all think they are experts – that they have nothing to learn.

The strategies proposed contrast with those encouraged in the discussion of literacy improvements, where the focus of school improvement planning is on creating more time and opportunity for teachers to share expertise. In the mathematics discussion, leaders remained skeptical about the quality of mathematics expertise at their school, having little faith that creating more opportunities for teachers to share their expertise will result in actual improvements.

Discussion & Conclusion

In this paper, we have explored how elementary school leaders’ thinking about leading instructional change is situated in particular subject areas. By examining the goals, challenges and leadership strategies that school leaders articulate for their mathematics and literacy programs and their efforts to lead change in instruction in these subjects, as expressed both in interviews and in their leadership practice, we have argued that the subject matters. Our analysis has attempted to understand leaders’ thinking about leading instruction in particular subject areas

as situated in their leadership practice rather than relying exclusively on their statements in interviews about instructional priorities and epistemological beliefs.

Our analysis supports existing research on the salience of subject matter as an important context for work in schools, and extends this literature by focusing on elementary schools rather than high schools and on school leaders rather than classroom teachers. Beneath elementary school leaders' general and subject matter neutral statements about instructional priorities, we uncovered thinking about the work of leading instruction that was subject matter specific. In a reform context that simultaneously presses schools to focus on general principles and procedures of student learning (e.g., cooperative learning, higher order thinking skills), organizational change (e.g., shared decision-making), and subject matter specific instructional reforms (e.g., mathematics standards), leaders' thinking about reconstructing classroom instruction is subject matter sensitive.

The beliefs that we encountered reflect the broad subject area differences that others have documented in teachers' thinking (Stodolsky and Grossman, 1995; Siskin, 1994; Stodolsky, 1988). School leaders in our study viewed both literacy and mathematics as core or priority content areas relative to science and social studies. Rather than interchangeable, however, leaders' thinking about mathematics and literacy were distinct. For example, leaders viewed literacy as a content area of considerable scope – incorporating skills that had application to other content areas across the curriculum. In contrast, they viewed mathematics primarily as a content area that incorporated a distinct and self-contained set of skills – the development of which depended on highly sequenced instruction. Leaders viewed literacy as a diffuse content area where consensus among instructional approaches tended to be low but in-house expertise was highly valued. In contrast, leaders viewed mathematics as incorporating an established set of

procedures and for which expertise resided chiefly beyond the schoolhouse. Our account illuminates the need for greater attention to subject matter as a context for elementary school leadership practice.

Our analysis suggests some new directions for research on the salience of subject matter in elementary school teaching and leading. The characteristics of subject matter subcultures assumed rather particular meaning in the elementary schools in our study. For example, mathematics is characterized as having higher status in high schools (Stodolsky and Grossman, 1995). We also found that mathematics and literacy had the attention of elementary school leaders with the status of both subjects resulting in large part from district testing policies. However, the status of literacy was also linked to leaders' interpretation of literacy as a subject area of considerable scope with leaders explaining the importance of literacy in terms of the salience of literacy skills to the entire elementary curriculum.

Elementary teachers teach multiple subjects and therefore participate in multiple subject matter "subcultures." As a result, subject matter as a context for teaching and leading appears to manifest itself in some distinct ways in the elementary school compared with the high school, creating particular subject specific challenges for elementary school leaders. For example, research by Siskin (1994) identifies degree of cohesion in instructional approach as a distinguishing characteristic of high school English departments in relationship to mathematics departments. Stodolsky and Grossman (1995) suggest that lack of definition within subjects such as English can make English teachers more tolerant of mixed instructional approaches than mathematics teachers. However, assigning degrees of definition to particular subject areas may prove more complex at the elementary level. Broadly framed, the issue of coherence is one that elementary leaders were concerned about regardless of subject area. What interested us was the

distinct ways that elementary school leaders framed the issues of coherence in relationship to literacy and mathematics. In literacy, coherence was framed primarily in terms of building consensus in instructional philosophy. In mathematics, coherence was framed chiefly in terms of improving the sequence of instruction across grade levels.

Finally, our analysis illuminates the dynamism in leaders' conceptions and thinking about subject matter in general and in mathematics and literacy in particular. Leaders' thinking about mathematics and literacy was expressed in their discussions about actual ongoing reforms. In describing efforts to integrate literacy throughout the curriculum, leaders made reference to the evolution of their goals. Recall the principal who talked about his school's efforts to become more cognizant of the kinds of reading and writing skills that are necessary for students to execute scientific inquiry. Take the case of the assistant principal who described fragmentation in teachers' approaches to teaching reading and writing as a function of the school's recent adoption of a literature-based approach. Recall the assistant principal who acknowledged how the focus of school's mathematics reforms may need to shift given increasing emphasis on problem-solving within the district's standardized tests. We were struck by the sense of dynamism that leaders attributed to both mathematics and literacy suggesting that leaders' views about subject matter are not static regardless of the common patterns displayed across diverse school settings. The goals that leaders set for student and teacher learning, the obstacles that they perceive, and the strategies that they identify emerge in large part through their own and their schools' interactions with a wider policy environment.

In the same vein, while not the focus of the paper, our analysis points to the ways that the dynamic nature of the broader reform context influences the ways that subjects matter for elementary school leaders. Leaders' statements about subject matter in their descriptions of

school improvement efforts clearly reflected personally held beliefs. In a majority of instances, leaders described the goals, strategies and challenges of reforms in terms (e.g., this is what my former experience as a teacher has taught me, this is why I am a proponent of) that reflected personal beliefs. At the same time, leaders directly and indirectly referred to an array of policy tools as helping to direct their priorities. For example, leaders' emphasis on reading and mathematics as core subject areas for improvement were frequently made in reference to district accountability policies that had raised the stakes on reading and mathematics. Clearly, the district's emphasis on reading and writing created an important frame [and rationale] for leaders to establish subject specific instructional priorities within their school. Similarly, the local reform context is rich in language arts and mathematics expertise and curricula. For example, the district is the site of two nationally known mathematics curricular projects. These mathematics curricula were a frequent point of reference in leaders' descriptions of the challenges and strategies of math improvements. Leaders frequently referenced these programs in their talk about efforts to reform mathematics and literacy. In these ways, our analysis presses us to look more carefully at the ways in which larger policy environment interact with leaders' own beliefs influencing how they think about subject area reforms.

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