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Primary school leadership practice: how the subject matters[1]

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Teaching is a critical consideration in investigations of primary school leadership and not just as an outcome variable. Factoring in instruction as an explanatory variable in scholarship on school leadership involves moving away from views of teaching as a monolithic or unitary practice. When it comes to leadership in primary schools, the subject matters. More sophisticated constructions of teaching are necessary that take into account the subject matter (e.g. mathematics or literacy) and the dimension of teaching (e.g. content and teaching strategies). This paper explores how the practice of leadership in primary schools is structured differently depending on the school subject.

Introduction

Though on the radar screen, instruction is still something of a fringe interest in school leadership and school administration scholarship. In most leadership scholarship student achievement and teachers' working conditions (e.g. opportunities to learn, collegiality and academic press) are the outcome variables of interest. Few studies treat instruction as a dependent variable. Another omission is the failure to consider instruction as a key exploratory or independent variable in investigations of school leadership.

In this paper I argue that by treating instruction as an independent or explanatory variable in studies of school leadership we can gain new insights into leadership. Specifically, I argue that factoring teaching in as a dependent variable in scholarship on school leadership involves moving away from views of teaching as a monolithic or unitary practice. More sophisticated constructions of teaching are necessary that take account of the subject matter (e.g. mathematics or literacy) and the dimension of teaching (e.g. content, teaching strategies and materials).

The central argument I develop in this paper is this: the structure of primary school leadership looks different depending on the school subject. Relations between school leadership and the school subject are not well understood because scholarship on leadership treats instruction as a generic variable. Rather than treating 'teaching' as an undifferentiated construct, I see it as situated in particular subject areas or curricular domains.

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I begin by discussing some of the theoretical and empirical ideas that frame the paper and then briefly discuss the research methodology used in the Distributed Leadership Study. Consistent with the theory building and hypotheses generating design of the Distributed Leadership Study, I identify and elaborate on four broad propositions or hypotheses about how the structure of leadership practice differs by school subject. My goal here is consider some of the ways in which leadership practice is structured differently depending on the subject matter. Further, my treatment of each of these differences is broad stroke rather than in-depth; there is much more work to be done that is the subject of ongoing analysis in the Distributed Leadership Study.

Empirical and theoretical anchors

This paper is anchored in three somewhat distinct theoretical and empirical lines of work. After stating my working definition of leadership, I consider the three lines of work that framed the research: a distributed perspective on school leadership (Gronn, 2002; Spillane *et al.*, 2001, 2004), school subjects as a context for teachers' work and work on social structure in sociology and related fields.

Leadership

At the outset it is necessary to say something about what I mean by leadership. Definitions of leadership are bountiful, and bounty is not always good. Many scholars have laboured in the leadership definition labyrinth, often waylaid in their efforts to come up with a better or best ever definition of leadership.

I have a much more modest goal, a working definition, that guides my research and is systematically revised over time based on my empirical work. My working definition is this: 'Leadership refers to activities tied to the core work of the organization that are designed by organizational members to influence the motivation, knowledge, affect, and practices of other organizational members or that are understood by organizational members as intended to influence their motivation, knowledge, affect, and practices' (Spillane, 2005, p. XX). Defining leadership in this way excludes influence relations that are not tied to the core work of the organization: all influence relations in schools are not leadership.

My working definition does not limit leadership to its sense as something that has been accomplished. In other words, in my definition evidence of someone having influenced someone else is not necessary in order to denote leadership. Person A can claim that person B is practicing leadership—trying to influence person A to change their practice or mind in some way—even though person A ends up not changing their practice. Further, my working definition of leadership is not confined to situations in which the outcomes or processes are 'positive' or 'beneficial.' Leadership can influence people and organizations in directions that most of us would find neither 'beneficial' nor 'desirable'.

A distributed perspective on leadership

A distributed perspective on leadership is best thought of as a framework for thinking about and analysing leadership (Spillane, 2005). It is not in my usage, as many commentaries portray it, a recipe for effective leadership. Further, as a framework it is as applicable in leadership situations where school leaders are pulling in different or opposing directions as it is in situations where they are pulling together. A distributed perspective on leadership involves two aspects, a leader-plus aspect and a practice aspect (Spillane, 2005).

The leader-plus aspect of a distributed view recognizes that leadership work involves multiple leaders—both formally designated and informal leaders—who don't necessarily always pull in the same direction. In this way a distributed perspective acknowledges the work of all individuals who have a hand in leadership. While the leader-plus aspect is vital, it is insufficient on its own. The practice aspect is the other component of taking a distributed perspective that is essential, but more often than not gets dropped in discussions.

From a distributed perspective leadership practice is central. Most important, a distributed perspective frames leadership practice in a particular way; it sees leadership practice as a product of the interactions of school leaders, followers and their situation. The issue is not whether leadership is distributed but how it is distributed. Most important, the interactions among leaders and followers (as distinct from an exclusive concern with leaders' actions) are central in studying leadership practice.

Subject matter as context for school work

A substantial body of empirical research, mostly at the secondary school level, suggests that school subjects and teachers' perceptions thereof shape teachers' work and their response to efforts at reforming their practice (Ball & Lacy, 1984; Siskin, 1991, 1994; Little, 1993; McLaughlin & Talbert, 1993; Grossman & Stodolsky, 1994). Secondary school teachers differ in their conceptions of the subjects they teach, and these differences have consequences for curricular practices such as teachers' control of content and curriculum coordination and standardization, differences that may mediate the influence of reform on practice. Subjects vary on dimensions that include their definition, scope, sequencing of material and whether the subject is static or dynamic (Stodolsky & Grossman, 1995). Secondary school teachers respond differently to reform depending on their school subject. For example, English teachers supported efforts to create multi-ability classrooms in one secondary school while foreign language teachers argued against the reform (Ball, 1981).

Although primary school teachers do not typically have well-defined subject matter specialties and do not work in situations where subject matter departmental structures support subject matter identities, the subject matter still appears to be an important influence on their practice (Stodolsky, 1988) and their efforts to

reconstruct that practice (Spillane, 2000; Drake *et al.*, 2001). This empirical work on the influence of subject matter on teaching and teachers suggests that instruction in particular subject areas may be an important context for or influence on school leadership.

Social structure

I use the construct of social structure to examine leadership practice across different school subjects. Social structure refers to the organization or organizing of social life. Though frequently used in sociology and related fields, the concept of structure has its share of definitional problems. Some scholars focus on institutional structure, others relational structure and still others on embodied structure (Lopez & Scott, 2000).

Institutional structure refers to the cultural or normative ideas that organize how people interact with one another; structure as a cultural phenomenon that guides social action—roles, positions, expectations and so on. Relational structure refers to the actual social relations themselves, focusing on the interconnections and interdependencies among people. Embodied structure refers to the skills, habits and behavioural dispositions that are inscribed in the human body and mind. As reflected in Bourdieu's notion of habitus, embodied structure underscores that individuals develop dispositions to act in one way or another in certain situations and these dispositions may not be at the level of conscious decisions. Embodied structure takes into account the physiological as well as the cognitive (Foucault, 1975; Bourdieu, 1994). An in-depth discussion of these constructs is beyond the scope of this paper. While distinct conceptual tools, I see institutional, relational and embodied structure as complementary, foregrounding different aspects of human practice (Lopez & Scott, 2000).

The study

This paper is based on data from the Distributed Leadership Study, a 5 year longitudinal study of school leadership in kindergarten to Grade 5 (K–5) and kindergarten to Grade 8 (K–8) schools in the Chicago area. The research team conducted a 6 month pilot study during the winter and spring of 1999 and the first full year of data collection commenced in September 1999. Eight schools were studied intensively for anywhere from 18 months to 5 years, with structured interviews being conducted in an additional seven schools.

We used a theoretical sampling strategy (Glaser & Strauss, 1970; Glaser, 1978), selecting schools based on five dimensions as summarized in Table 1. The schools were either K–5 or K–8, with the exception of one located within the Chicago Public School District. All schools were high poverty with a minimum of 60% of students receiving free or reduced lunches. We selected schools that varied in terms of student demographics.

The Distributed Leadership Study involved a mixed methods longitudinal design including observations, structured and semi-structured interviews, social network questionnaires and videotaping leadership routines. Structured and semi-structured observation protocols were used to enable researchers to collect comparable data across sites (see http://www.distributedleadership.org). Researchers observed grade level meetings, faculty meetings, school improvement planning meetings, professional development workshops and supervision of teaching practice. We also observed informal interactions in schools, such as lunch room conversations, and shadowed school leaders, conducting post-observation interviews about the observed practice.

Data collection was integrated with data analysis, allowing researchers to check out patterns and working hypotheses as they emerged and refine data collection strategies as necessary (Miles & Huberman, 1994). We developed a variety of coding categories to analyse observation and interview data. Teachers' responses to the social network questionnaire were analysed using the UCINET software package (Borgatti *et al.*, 2002). In addition to constructing maps of each school's advice networks, we also calculated some standard measures, including density, centrality (in-degree and out-degree) and cut-points.

School leadership practice and subject matter

At one level, leadership practice in primary schools looks rather similar from one school subject to the next and much leadership work is not subject specific. School leaders talked about leadership for instruction in subject matter neutral terms. Leadership functions, such as teacher development, monitoring instruction, programme implementation and so on, targeted multiple school subjects.

Still, these similarities mask substantial differences among school subjects in how leadership is arranged and carried out in primary schools. The institutional structure as represented in leadership positions and routines and school leaders' thinking about their work, who school staff talked with about instruction and what they talked about and how leaders and followers interacted in leadership routines differed by school subject.

Institutional structure

Positions and routines. By defining formal positions, schools manage the practice of school leaders and other staff. The institutional structure designed to connect administration and instruction varies among school subjects. These differences were reflected in formally designated leadership positions, leadership routines, the involvement of school administrators in performing these routines and the resources devoted to supporting the formal structure.

Multiple individuals from full-time administrators to full-time classroom teachers performed leadership routines, sometimes though not always occupying a formally designated leadership position. Six of the eight schools had language arts

coordinators who had reduced teaching loads and in some cases no classroom teaching duties. Lead teachers, often with official designations such as 'mathematics teacher leader', typically took responsibility for leadership routines related to mathematics. In some situations these lead teachers had release time from teaching, but mostly they did not. With the exception of the 'science lab teacher', formally designated science leadership positions were rare. Across all schools in the study formally designated leadership positions for literacy outnumbered similar positions for mathematics three to one.

Formal routines included leadership team meetings, grade level meetings, curricular committee meetings, school improvement planning meetings and so on. Routines refer to a repeated and recognizable pattern of interdependent actions involving two or more individuals (Feldman & Pentland, 2003). In most schools these routines did not appear to privilege literacy over mathematics, at least in theory. However, things turned out differently in practice. The designed organization as captured by official accounts looked different from the lived organization as captured in the daily work of schools.

There were fewer leaders involved in the performance of mathematics-related leadership routines compared with literacy-related routines, and fewer still for those related to science. For example, the performance of leadership routines related to literacy instruction typically involved the principal and/or assistant principal, a language arts coordinator and lead teachers. Leadership routines related to mathematics were typically performed by a couple of lead teachers (who usually taught full-time). Leadership routines related to science instruction, when they happened, were typically left to one or two classroom teachers. Depending on the school, external consultants were involved in the performance of some leadership routines across school subjects.

The involvement of school administrators, especially the school principal, was much greater in literacy-related routines than in either mathematics- or science-related routines. Further, school principals and assistant principals were more likely to be involved in the performance of leadership routines for language arts, less likely to be involved in leadership routines for mathematics and even less likely still to be involved in leadership routines for science. For example, at one K–8 school literacy featured in 54% of the 48 formal leadership routines (e.g. grade level meetings, faculty meetings and school improvement planning) over a 4 year period. Mathematics was discussed in only 14% of these routines. Further, three or four formally designated leaders (e.g. principal, assistant principal, language arts coordinator, special needs coordinator or lead teacher) were always in attendance and more often than not actively involved in performing routines related to literacy. In contrast, for mathematics-related routines school administrators were not always in attendance, and when they were it was typically only one and they rarely contributed.

Similar patterns were evident at another school. Though official accounts suggested that leadership routines for mathematics and literacy were similar, in practice things turned out differently. The mathematics curriculum committee met less frequently than the literacy curriculum committee, despite identical charges.

Further, while the literacy coordinators played a major role in the literacy meetings, informal leaders, classroom teachers, took on responsibility for a variety of tasks over time. In contrast, in the mathematics committee the chair, a full-time classroom teacher, was the primary mover and shaker in the performance of this routine. As one member of the mathematics committee put it, '[the chair] is working very hard on trying to get us organized and get focused and get us going somewhere'. There was no evidence of regular classroom teachers taking on responsibility for mathematics leadership.

Culture and norms

Leaders portrayed reading and mathematics as the core of the school curriculum and as the priorities in their work on instruction. Science was not a priority for these leaders.[2] A curriculum coordinator noted 'Nothing but reading and math ... that's where our focus is. We have [school district] pressure to meet certain guidelines'.

Still, despite these similarities, how school leaders thought about their work in mathematics and literacy differed. They viewed literacy as a subject that pervaded the entire curriculum. An assistant principal explained, 'You teach spelling across the curriculum—that will help to increase the vocabulary. ... You get vocabulary from every subject: math, science ...'. Regardless of their position, most leaders' visions for instructional improvement involved integrating literacy throughout the day rather than treating it as a stand-alone subject. Further, leaders' understood literacy as an overarching measure of student and school progress (see Table 1).

In contrast, leaders constructed their responsibilities with respect to mathematics as getting teachers to follow the curriculum in order that students would do well on standardized tests. Mathematics was a priority mainly because of district policy. These views are consistent with research on secondary teachers' views of mathematics as highly sequenced in which mastery at one level was essential for work at subsequent levels.

Leaders' thinking about the expertise for instructional improvement also differed depending on the subject matter. Most leaders saw their own school as the primary source of expertise leading change in language arts. Expertise was in-house and home grown. School leaders held these views even though they drew on external

Table 1. School subjects and school leaders' thinking about school work

Subject matter view	Literacy	Mathematics
Core to curriculum	80%	83%
Skills support learning in other subjects	83%	17%
Skills should be taught in a particular sequence	16%	53%
School has primary expertise	80%	13%
External community has primary expertise	2%	63%

$n = 30$.

sources for guidance and resources. A school principal explained with respect to selecting literacy textbooks:

> 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 [vision], ... that there be a collective aspect to those choices [textbook selection]. That we [school staff] be talking consciously about those choices.

Among other things, school leaders' emphasize the importance of teachers' practical knowledge and staff participation in decision-making about literacy.

In contrast, leaders talked about the expertise for improving mathematics instruction as external, beyond the schoolhouse. The engines of change for mathematics were outside the school in the curricula and training provided by external programmes. Leaders placed much less emphasis on school staff, with teacher participation in decision-making figuring less prominently. As one leader put it, 'in the math stuff—I guess a lot of ways I turn outside the school for guidance'. Leaders attributed improvements in mathematics to the established mathematics curriculum and other external programmes they had brought into the school.

Relational structure

Although important, formal structure is not everything. A distributed perspective allows for the possibility that individuals without a formally designated leadership position take on leadership work. Further, the formal leadership routines as captured in official documents and organizational charts are not the only sites for leadership in schools. Informal routines, from the fifth grade teachers early morning 'coffee clutch' to the senior grade teachers' bimonthly lunchtime support group for mathematics, are also potentially important sites for leadership. Similarly, the brief though regular hall exchanges that the second and third grade teachers manage daily may also be important. As informal leadership routines rarely make it into official accounts, it is important to focus on the lived organization as well as the designed organization.[3]

Analysing the relational structure, the actual social relations among school staff about instruction, is one way to get at the formal and informal leaders. Specifically, by examining teachers' and school leaders' social networks about instruction we can develop a more comprehensive picture of who the movers and shakers are when it comes to leadership for instruction.

The propensity of teachers and school leaders to seek out others for advice about instruction, who they sought advice from, the primary advice givers, the centrality of formally designated leaders in the advice network and the overall integration and cohesiveness of the advice network differed across school subjects. To begin with, school staff were more likely to seek out others for advice about literacy instruction than about mathematics instruction. There were consistent differences between mathematics and literacy in the mean out-degree centrality across the six schools.

Analysis of interviews and field note data support this pattern. For example, while noting that 'collaboration of the other teachers' was very important for her literacy instruction, a second grade teacher remarked, 'I don't think anybody talks about math. . . . With reading we're sharing books and we're sharing ideas . . . [with] math we're not. . .'. Similarly, a second grade teacher drew a similar distinction, noting that with reading instruction her team 'talks about everything', while with respect to mathematics instruction she noted, 'I don't really go to anyone else to help me strategize or plan for my math'. Taken together these analyses suggest that teachers were more likely to seek advice about literacy instruction than about mathematics instruction. This is one way in which school staff, in a follower role, can contribute to defining leadership practice. In this way followers, by virtue of their advice seeking, can play a role in shaping leadership practice.

The most central givers of advice about instruction differed depending on the subject matter. In general, there were more central advice givers in literacy compared with mathematics or science. Differences in mean in-degree centrality measures ranged from 28 to 400% (see Table 2). While the central advice givers in literacy overlapped with the central advice givers in mathematics in some instances, there were also important differences by subject area.

With the exception of one school, school administrators did not figure prominently in subject-specific advice networks. They were more prominent in advice networks about instruction that were not subject-specific. When they did figure in subject-specific advice networks, it was in literacy rather than mathematics. In literacy advice networks, reading specialists and K–2 teachers were the most central advice givers. In mathematics networks, formally designated leaders were not nearly as prominent compared with literacy, in part reflecting that such formal positions were more plentiful in literacy. Intermediate grade teachers (Grades 3–5) were more central advice givers in the mathematics network.

Overall, school staff communicated with more of their colleagues about literacy instruction than about mathematics instruction, with advice networks for literacy on average one third denser than those for mathematics (see Table 3).[4] Moreover,

Table 2. Mean in-degree centrality measures in advice networks

School	Literacy	Mathematics	Increase from mathematics to literacy (%)
Baxter	0.726	0.473	53%
Bittman, year 1	1.38	0.88	57%
Bittman, year 2	1.33	0.88	51%
Fieldman	0.950	0.597	59%
Costen	0.86	0.67	28%
Kelly	1.00	0.20	400%
Wayne, year 1	2.06	1.192	73%
Wayne, year 2	2.393	1.425	68%

Table 3. Advice network density by school subject

School	Literacy	Mathematics	Increase from mathematics to literacy (%)[a]
Baxter	.0163	.0145	12%
Bittman, year 1	.0382	.0293	30%
Bittman, year 2	.05	.0365	37%
Fieldman	.0453	.0217	109%
Costen	.0096	.0075	28%
Kelly	.1944	.045	332%
Wayne, year 1	.0312	.0234	33%
Wayne, year 2	.0435	.029	50%

[a]There is no gold standard as to what might count as a significant difference between networks on various measures (Wasserman & Faust, 1999). I follow the lead of Fischer and Yoss (1995) and use percentage difference to measure the difference between networks.

advice networks in literacy were more integrated than those for mathematics. Specifically, school staff were more likely to be connected with one another either directly or indirectly with respect to literacy instruction than with respect to mathematics instruction. As captured in Figure 1, in the advice network for literacy at Kelly School staff are more more likely to be connected with one another than for mathematics, where three distinct and unconnected hives of relations are evident. These patterns were found across all six schools, ranging in staff size from 29 to 81, for which network data was available.

These relational patterns, though analytically distinct from formal structure (e.g. positions and routines) are not independent of it. The presence of formally designated leadership positions with school subject specification appears to make a difference. For example, individuals with designations as literacy specialists played a prominent role in the reading advice networks. Similarly, because formal leadership routines focus on literacy more than mathematics the opportunities for school staff to seek advice from their colleagues may be enabled more by the formal structure in literacy. For example, several teachers at one school pointed to the lack of professional development offered in mathematics, particularly in comparison with reading. As one teacher put it, 'the Board has in place the programs for reading staff development, and they haven't quite gotten there in math yet'. As described earlier, leadership routines were devoted more to literacy than to either mathematics or science.

Still, formal structure was not everything; it does not determine those individuals that teachers seek out for advice. At one school, for example, a mathematics teacher was a more central player in the literacy network than the school's formally designated literacy specialists. Similarly, at another school a science teacher was a more prominent advice giver than the literacy specialists in the literacy network. When teachers were provided with opportunities though formal school routines to

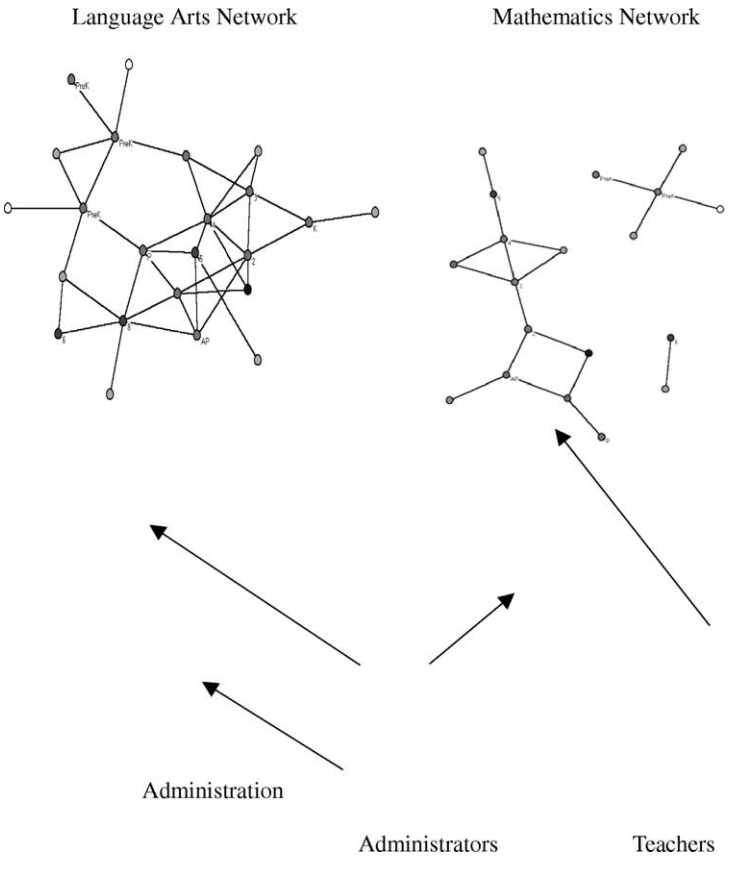

Figure 1. Reading and mathematics network at Kelly School

advise their colleagues they were more likely to address literacy than mathematics or science. As an assistant principal reported, 'most of the teachers, when they get up and make presentations [at staff in-service days], it's a reading . . . or writing . . . it's usually in the language arts area'. Teachers appear more willing to informally take on leadership responsibilities for literacy compared with mathematics and these choices contribute to defining leadership practice differently across school subjects in primary schools.

Another matter concerns what is talked about when people communicate with one another about instruction. Instruction is a multidimensional activity, including content, academic tasks, teaching strategies and materials. In both mathematics and literacy conversations in formal (e.g. grade level and curricular committee meetings) and informal routines (e.g. lunchtime conversations) focused on such issues asclassroom materials, lesson plans and lesson coverage and time shortages. Typically, discussions about mathematics were limited to these issues. Discussions about literacy, however, also focused on teaching strategies, student

thinking and learning and even teacher learning. At one school, for example, formal (e.g. staff meetings) and informal interactions (e.g. lunchtime conversations) frequently addressed literacy and centred on scheduling and its impact on reading instruction, the curriculum, the importance of reading to other school subjects and how best to encourage a love of reading among students. Mathematics rarely figured in these formal and informal interactions and when it did centred exclusively on the textbook; what people liked and disliked about it and the lessons they had covered.

Interaction patterns

The practice aspect of a distributed perspective also presses us to examine how leaders and followers interact with one another. Interactions are critical to understanding leadership practice. Analysing leadership routines in practice suggests that interactions among leaders and followers and aspects of their situation (e.g. tools) differ depending on the school subject. Specifically, the ways in which leaders and followers interact with one another, the manner in which they reason about issues and construct knowledge and the way in which they use tools in these interactions (e.g. the curriculum and student test data) differed by school subject.

In leadership routines related to literacy there is much more of a balance between formally designated leaders' talk and teachers' talk than in routines related to mathematics, where the designated leaders do most of the talking. Routines related to literacy are characterized by a lively, back-and-forth dialogue among participants, including administrators, specialists, teacher leaders and teachers. Teachers with no formal leadership designations frequently contribute, raising questions, suggesting solutions and arguing about the pros and cons of various proposals with examples from their classrooms. The interaction patterns are distinctly different in routines where mathematics is the topic of conversation, with formally designated leaders, usually full-time classroom teachers, doing most of the talking. Teachers typically listen and when they do talk they typically ask clarifying questions or acknowledge that they agree or understand.

Interactions among the formally designated leaders in co-performing leadership routines also differed by school subject. In mathematics-related routines leaders played similar roles, whereas in literacy-related routines leaders engaged in both similar and different roles. In mathematics-related routines knowledge and ideas came almost entirely from the formally designated leaders, who relied mostly on external sources of expertise such as books and commercial programmes. In contrast, in literacy-related routines examples from the classroom were also an important source of knowledge and ideas. (My analysis of interaction patterns in leadership routines is ongoing and part of a larger endeavour to understand embodied structure.)

Discussion and conclusion

My account shows how leadership practice in primary schools is structured differently across school subjects. My aim in this paper was to preview some of the ways in which leadership practice is structured differently depending on the school subject. Our ongoing work in the Distributed Leadership Study involves a more in-depth analysis of the various issues introduced in this paper. The leadership challenge with respect to classroom instruction can differ from one subject area to the next, even in primary schools. Hence, efforts to study and improve school leadership might be well advised to pay attention to subject matter as an explanatory variable. Treating instruction as a monolithic or unitary practice contributes to over-simplifying the work of leadership in primary schools.

Structure is essential for human action (Archer, 1995). However, structure should not be construed as determining leadership activity. While structure enables and constrains leadership practice, structure is also reproduced and potentially transformed in leadership practice. In this way structure is both the medium and the outcome of practice (Giddens, 1979, 1984). Hence, investigations of leadership practice have to pay attention to how social structure is both constitutive of and constituted in practice. Relations between structure and human agency, however, are hotly contested by sociologists and, although important in efforts to understand leadership practice, are a topic for another paper. There were differences across schools over time in the structure of leadership practice for literacy and mathematics.

While I have confined my account to the school level, treating the school as a closed system is problematic. As some of the evidence discussed earlier suggests, the role of subject matter in the structuring of leadership practice is linked to the broader institutional environments of schools, school districts, state and federal agencies, and the expansive extra system of test and textbook publishers (see Spillane & Burch, in press).

Notes

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2. For a more detailed analysis of the issues discussed in this section see Burch and Spillane (2003) and Spillane and Burch (in press).

3. For a more detailed discussion of the issues addressed in this section see Hayton and Spillane (2005).
4. Density is a measure of the proportion of potential links between people in a network that are actualized. Hence, if every staff person in a school has a tie to every other member the density is 1.0; if only half of the possible connections are actualized the density is 0.5.

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