



Taking a distributed perspective Epistemological and methodological tradeoffs in operationalizing the leader-plus aspect

Taking a
distributed
perspective

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Abstract

Purpose – This paper is concerned with the epistemological and methodological challenges involved in studying the distribution of leadership across people within the school – the leader-plus aspect of a distributed perspective, which it aims to investigate.

Design/methodology/approach – The paper examines the entailments of the distributed perspective for collecting and analyzing data on school leadership and management. It considers four different operationalizations of the leader-plus aspect of the distributed perspective and examines the results obtained from these different operationalizations. The research reported in this paper is part of a larger study, an efficacy trial of a professional development program intended to prepare principals to improve their practice. The study involved a mixed method design. For the purpose of this paper a combination of qualitative and quantitative data, including an experience sampling method (ESM) principal log, a principal questionnaire (PQ), and a school staff questionnaire (SSQ) was used.

Findings – While acknowledging broad similarities among the various approaches, the different approaches also surfaced some divergence that has implications for thinking about the epistemological and methodological challenges in measuring leadership from a distributed perspective. Approaches that focus on the lived organization as distinct from the designed organization, for example, unearth the role of individuals with no formal leadership designations in leading and managing the school.

Research limitations/implications – Limited by the data set, the paper focuses on only four operationalizations of the leader plus aspect of the distributed perspective rather than taking a more comprehensive look at how the leader plus aspect might be operationalized.

Originality/value – The primary value of this paper is that it will prompt scholars to think about the entailments of different ways of operationalizing the leader plus aspect when using a distributed perspective.

Keywords Leadership, Schools, Distributive control

Paper type Research paper



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Introduction

Recent work suggests that viewing school leadership from a distributed perspective has the potential to provide useful insight into how management and leadership unfold in the daily lives of schools. Writing in the area of distributed leadership has identified numerous entities in the school across which leadership can be distributed, including people and aspects of the situation such as routines and tools (Harris, 2005; MacBeath *et al.*, 2004; Spillane, 2006). While there have been advances in articulating conceptual frameworks for taking a distributed perspective on school leadership and management (Gronn, 2000; Spillane *et al.*, 2004), the empirical research base in this area is less developed. With a few exceptions (Camburn *et al.*, 2003; Leithwood *et al.*, 2007a, b; Spillane *et al.*, 2007), most empirical work has involved small samples of schools. But as we argue in this paper, before researchers begin to accumulate evidence on distributed leadership in schools, an important intermediate step needs to be taken which is the translation of theory into measurement. This intermediate step is the primary focus of this paper.

In this paper, we examine the entailments of the distributed perspective for collecting and analyzing data. We then go a step further and examine the results obtained for different operationalizations of a distributed perspective, considering along the way the strengths and weaknesses of each operationalization.

Within the larger domain of distributed leadership, we are concerned with the epistemological and methodological challenges involved in studying the distribution of leadership across people within the school – the leader-plus aspect of a distributed perspective (Spillane, 2006). Researchers who wish to study the leader-plus aspect of distributed leadership face two basic questions:

- (1) What aspects of leadership and management work are hypothesized to be distributed across people?
- (2) Across which school actors do researchers hypothesize leadership and management work is distributed?

These questions surface a number of related methodological questions:

- Who should provide evidence of distributed leadership – leaders, followers, or both? Among leaders, should researchers seek evidence on formal leaders, informal leaders, or both?
- Should evidence on distributed leadership come from self-reports, or from more “impartial” measurement strategies such as the reports of others (e.g., teachers) through network surveys?
- What tradeoffs do researchers make with each of these decisions? In other words, how do these various operationalizations of the leader plus aspect of a distributed framework affect the validity of data?

Ultimately, researchers’ answers to these questions will determine the kinds of inferences they will be able to make about distributed leadership.

Our paper is organized as follows. We first consider what it means to take a distributed perspective and briefly review the empirical evidence on school leadership and management from this perspective. We then provide a detailed account of the data used in this paper, addressing issues of validity where possible. Turning to results, we

examine four operationalizations of the leader plus aspect of a distributed perspective by looking at data for two elementary schools. Based on this analysis, we identify two dimensions along which to examine the issues involved in these four operations of the leader plus aspect. We then consider how well our four operationalizations tap into variation between schools and between activity-types in the distribution of responsibility for leadership and management work.

Our central argument is this: one challenge in using a distributed framework to study leadership and management involves operationalizing core aspects of the framework. In taking a distributed perspective we have to develop study operations that allow us to validly describe and examine constructs in our analytical framework. Study operations are important because they influence the validity of the inferences we can make based on the data we gather. For example, our operationalization of an aspect of a distributed framework (e.g., co-performance) can fail to adequately explicate that aspect, or can confound two or more aspects, and thereby pose a threat to construct validity. Further, relying on a single operationalization (i.e. mono-operational bias) or relying on a single method to gather data on operationalizations of a construct (i.e. mono-method bias) can similarly threaten construct validity and call into question any possible inferences we can draw from our data.

Conceptual and empirical anchors

A distributed perspective is an analytical framework for investigating school leadership and management (Spillane, 2006; Gronn, 2003; Spillane *et al.*, 2003). It involves two aspects: the leader-plus aspect and the practice aspect (Spillane, 2006; Spillane and Diamond, 2007). The leader-plus aspect recognizes that leading and managing schools can involve multiple individuals. Moreover, school leadership and management potentially involves more than the work of individuals in formal leadership positions – principal, assistant principal, and specialists; it can also involve individuals who are not formally designated leaders. The leadership practice aspect foregrounds the practice of leading and managing. A practice or “action perspective sees the reality of management as a matter of actions” (Eccles and Nohria, 1992, p. 13). Defining leadership and management as practice allows for the possibility that people without any formal leadership designations might take a part in that work. While people’s actions are important in studying practice, interactions are paramount in efforts to understand the practice from a distributed perspective. From a distributed perspective, studying the actions of individuals or aggregating their actions is insufficient; a distributed perspective frames practice as a product of the interactions of school leaders, followers, and aspects of their situation. We focus chiefly on the leader-plus aspect in this paper, exploring different operations of this aspect in research.

Prior empirical work suggests that an exclusive focus on the school principal is, indeed, short-sighted (Harris, 2005; MacBeath *et al.*, 2004; Leithwood *et al.*, 2007a, b; Spillane and Diamond, 2007). Defining leadership as a set of organizational functions rather than tying leadership to a particular administrative position, Heller and Firestone (1995) found in a study of eight elementary schools that multiple leaders, including school district personnel and external consultants, were taking responsibility for leadership. A recent study of more than 100 US elementary schools also found that responsibility for leadership functions was typically distributed across three to seven

formally designated leadership positions per elementary school (Camburn *et al.*, 2003). Camburn *et al.* surveyed formally designated leaders in each school to examine the distribution of responsibility for leadership functions. Such positions included principals, assistant principals, program coordinators or facilitators, subject area coordinators or facilitators, mentors, master teachers, or teacher consultants, and other “auxiliary” professional staff, such as family outreach workers. Individuals with no formal leadership designations also take responsibility for leadership activities. Studies that look beyond those in formally designated leadership positions show that teachers also perform key leadership functions and routines (Heller and Firestone, 1995; Spillane, 2006; Spillane and Diamond, 2007; Spillane *et al.*, 2007).

Methods

The research reported here is part of a larger evaluation of a professional development program intended to prepare principals to be outstanding instructional leaders within the context of standards-based accountability systems. The primary objective of the evaluation was to assess the effects of participation in the program on school principals’ practice and knowledge. While a component of the principal development program exposed principals to a distributed perspective on school leadership and the distributed perspective framed our evaluation study, it was not the primary focus of the development program or our research.

Data collection and instruments

The study was undertaken in a mid-sized urban school district in the Southeastern USA. Data collection involved 52 principals and 2,400 school personnel. For the purpose of this paper, we analyzed data from three different research instruments – experience sampling method (ESM) log, a principal questionnaire (PQ), and a school staff questionnaire (SSQ).

The first dataset contained responses from principals that were collected using experience sampling methodology (ESM). ESM is a technique in which principals are beeped at random intervals throughout their work day alerting them to fill out a brief questionnaire programmed on a handheld computer (PDA). In this way the ESM log captures behavior as it occurs within a natural setting. In this study the principals were beeped 15 times a day for six days during Spring 2005. A total of 42 of the 52 participating principals provided multiple days of data. The overall response rate to the beeps spread out across the six-day sampling period was 66 percent[1].

The second source of data was a web questionnaire (PQ) that was administered to principals. For the purpose of this paper, we focused on the question in the PQ that asked principals about formal leadership teams at their schools. A total of 49 of the principals in the sample completed the PQ (94 percent).

Finally, we analyzed data collected using a questionnaire that was mailed to staff members in all 52 schools. The overall response rate for the SSQ was 87 percent; school-level response rates ranged from 73 percent to 100 percent. In this paper we focus on SSQ survey questions that asked staff about formal leadership roles and responsibilities and on social network questions that asked staff to identify who they turned to for advice in reading and mathematics. School staff indicated on the SSQ the specific leadership roles they fulfill in the school as well as the percentage of their time that is assigned to this role. These data provide us with an estimate of the number of

formally designated leaders in each school along with an estimate of how much time they spend on management and leadership-specific responsibilities. On the SSQ, school staff also identified from whom they sought advice about mathematics and language arts.

Examining multiple operationalizations of the leader-plus aspect

The leader plus aspect of a distributed perspective can be operationalized in various ways, some of which also capture the leadership practice aspect of a distributed perspective. Rather than searching for the one best study operation of the leader plus aspect, we, like others (see, e.g. Campbell and Fiske (1959) for perhaps the earliest discussion of the idea), contend that multiple operations are desirable in order to minimize threats to validity. And like others, we argue that understanding what different operations illuminate and capture is a critical step in efforts to generate more robust empirical knowledge about social constructs in general (Denzin, 1989; Camburn and Barnes, 2004), and about school leadership and management in particular. Below we used data from two of the 52 schools in our study, to explore four different operationalizations of the leader-plus aspect. We look at how these operationalizations work and what insights about leadership and management are generated by different operationalizations. These four operations are not the only operationalizations possible for the leader plus aspect of a distributed perspective.

Four operationalizations of the distribution of responsibility

One of the most basic ways in which to understand how responsibilities are distributed across staff members is to examine an organization chart to see which staff members belong to which leadership and management committees or hold formally designated leadership/management positions. On the principal survey, principals enumerated the membership of the school's formal leadership team, thus providing a sense of what a schools' organization chart for leadership and management might look like. By examining how often different roles are included in school leadership teams (e.g., how many schools had the math coordinator on their leadership team or classroom teachers with no formal leadership designation), we gain a broad understanding of the frequency with which leadership and management is distributed to non-principal roles in general, and to particular roles in schools.

Data from the SSQ that identified formally designated leaders based on school staff self-reports provided a second indicator of how responsibility for leadership and management was distributed. In particular, we examined the percentage of staff with formal leadership assignments which was based on the total number of staff who indicated that they held a leadership/management role compared to the total number of staff that completed the SSQ.

A third indicator of how responsibility for leadership and management is distributed in schools is obtained from the ESM log. This approach differs from both the PQ and the SSQ in that unit of study is exclusively the school principal's workday. In the ESM log, principals reported on when they were leading or co-leading the activity and who they were co-leading with – administrators, teacher leaders, specialists, teachers, etc. The ESM log actually provides us with two somewhat distinct indicators. First, school principals reported who had responsibility for the activities that they reported not leading. Second, when principals reported that they were

co-leading they identified who was co-performing with them. In this way, the ESM log enables us to tap into the leadership practice dimension of the distributed perspective by identifying instances of co-performance in the school principal's workday.

The unit of study in the ESM log is the school principal's practice. Although the school principal is the most senior formally designated leader the ESM log data provides a relatively narrow picture of leadership and management practice in a school because only school principals completed it. Having other formally designated leaders such as assistant principals and curriculum specialists complete the ESM log would provide a broader picture of leadership and management practice. Because the principals are prompted to submit this information by random beeps, we can get an overall estimate of the percentage of time they spend leading alone and with co-leaders when we look at all of the data points across the six-day sampling period. The percentages reported from the ESM data in the tables and various analyses below are based on instances where the principal indicated that the activity in which they were participating when beeped was school-related. In our analyses, we calculate the mean percentages differently based on the area of interest. When comparing means (e.g., percentage of time leading alone for administration versus time leading alone for instruction and curriculum) we calculate percentages on all school-related beeps across principals and days. However, if we are interested in analyzing variance between days and/or principals, our percentage of time estimates are calculated for each principal and day and averaged across all principal/day combinations.

A fourth view of the ways in which leadership was distributed across staff members in schools was obtained by examining the social networks through which teachers shared advice on mathematics and language arts instruction. Our approach here differs from the other three approaches in two important respects. First, the social network questions focused on leadership (defined as a social influence relationships or interactions), whereas the other three approaches do not attempt to distinguish leadership from management activities. Second, in our study the social network questions focused on mathematics and language arts rather than leadership interactions writ large. Hence, by focusing on leadership (as distinct from leadership and management) for only two curricular domains these questions focused on a somewhat narrow slice of school leadership and management activity.

We analyzed data from social network questions that asked respondents to list those to whom they went to for advice about mathematics and language arts. Respondents were identified as being leaders in math and/or reading based on the reports of their peers, using a measure called in-degree centrality. In social network analysis, in-degree centrality is a measure of the number of ties directed to actor from other actors. In an advice network, an actor's in-degree indicates the number of people who approach that actor for advice. For purposes of identifying leaders, we make the assumption that any actor who provides advice to three or more others is a leader. Other researchers have proposed more complex methods of identifying leaders using social network data (CITE), though how such calculations relate to leadership in theoretical sense is rather unclear. For the purpose of this paper and without delving into various theoretical debates on leadership, we believe that our admittedly simplistic approach will suffice for illustrative purposes.

By capturing the pattern of influence-relationships among staff, the social-network approach also allows the analyst to move beyond the leader-plus perspective and focus

on leadership practice. We demonstrate this approach by calculating the frequency with which influence relationships or interactions are focused on formal leaders as a percentage of all influence relationships or interactions identified.

Contrasting operations of the leader plus aspect: Canton Elementary and Lowell Elementary

We examine how leadership is distributed among school staff by looking systematically at what our different operationalizations turned up for two schools – Lowell Elementary and Canton Elementary. We selected these schools because analysis of the ESM data suggested that the principals of these two schools differed in the degree to which they involved others in the work of leading and managing their schools.

The two case study schools differ not only with respect to how responsibility for leadership and management was distributed, but also in terms of size and the student populations they served. Lowell Elementary has a staff of 72. Of the 885 students enrolled at Lowell, 28 percent receive free or reduced lunches and approximately one-third (31 percent) are African-American. In contrast, Canton Elementary's staff of 37 serves only 415 students, half of whom receive free or reduced lunches and a little over half (56 percent) of whom are African-American.

The two school principals have relatively similar characteristics and backgrounds. Ms Kite, has been an administrator for 13 years, eight of which have been at Lowell Elementary. Ms Bind has been an administrator for 14 years and principal at Canton Elementary for 11 of those years. Both middle-aged Caucasian women, Ms Kite was a teacher for 12 years and Ms Bind was a teacher for 18 years prior to entering school administration. Our various research instruments suggest that the work of leading and managing Lowell Elementary and Canton Elementary involves multiple people, in varying degrees, in addition to Ms Kite and Ms Bind.

One of the basic challenges facing researchers taking a distributed perspective is identifying the staff among whom the responsibility for leading and managing is distributed – the leader plus aspect. In our study, we used four different operations to identify who these individuals are:

- (1) principals identified who was on the “leadership team” in the PQ instrument;
- (2) principals reported who lead an activity they participated in or with whom they co-lead when beeped on the ESM instrument;
- (3) school staff identified themselves in the SSQ instrument as having a formally designated leadership position in the school; and
- (4) school staff identified people who provided advice about mathematics and language arts in social network type questions (SSQ).

Overall, these four operationalizations suggest some convergence and divergence in identifying who takes responsibility for leadership and management work at Lowell Elementary and Canton Elementary (see Table I). While full-time classroom teachers emerge as leaders in all four approaches at Lowell Elementary, they emerge in only three of the four approaches at Canton Elementary. The assistant principals emerge as players in three of the four approaches in both schools. Both Ms Kite and Ms Bind, the school principals, emerge in two of the three applicable approaches. Further, the social

Table I.
Nominated leaders across
data sources for Lowell
Elementary and Canton
Elementary

	Principal		Assistant principal		Formally designated leader		Classroom teacher	
	Lowell	Canton	Lowell	Canton	Lowell	Canton	Lowell	Canton
Leadership team member (PQ)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Identification as leader or co-leader (ESM)	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Self-identification as designated leader (SSQ)	N/a	N/a	Yes	Yes	14	7	N/a	N/a
Identified as math and/or reading leader (SSQ)	No	No	No	Yes	3	3	10	2

network questions suggest that some ten regular classroom teachers are critical to this work in that school. Similarly, in Canton Elementary, two classroom teachers are identified as math and/or reading leaders according to the social network questions. We examine the four approaches below.

Principal report: “leadership team” membership (PQ data). In the PQ instrument, both Ms Kite and Ms Bind identified who was on the leadership team at their respective schools. From the PQ we learn that the leadership team at Lowell Elementary, according to Ms Kite, consists of the principal, the assistant principal, a variety of specialists, regular classroom teachers, other staff members, and parents/community members. According to Ms Bind, the leadership team at Canton Elementary consists of the principal, the assistant principal, a variety of specialists, various regular classroom teachers, and other staff members. These data suggest that more diverse players are involved in the work of leading and managing the school including parents/community members at Lowell Elementary compared to Canton Elementary. We acknowledge that an exclusive focus on the Leadership Team is limiting and the inclusion of other key organizational routines and committees such as School Improvement Planning Committee, Language Arts Committee, and Mathematics Committee may be desirable to provide a more nuanced account of how responsibility for leadership and management is distributed.

Principal report: who is leading or co-leading (ESM data). We can get a sense of how responsibility for school leadership and management is distributed across staff at the two schools by exploring the extent to which Ms Kite and Ms Bind, the school principals report leading alone, co-leading with others, or not leading an activity when beeped at random during the workday. The principal at Lowell Elementary, Ms Kite, reports co-leading a much larger proportion of the time (62 percent) than does Ms Bind, the principal at Canton Elementary, who reports co-leading just under a quarter of the time (23 percent) (see Table II). Ms Bind tends to lead alone, reporting that she lead alone over half the time (58 percent), while Ms Kite lead alone only 14 percent of the time. The two principals are somewhat similar in the amount of time they report not leading, with Ms Kite not leading 24 percent of the time and Ms Bind not leading 18 percent of the time. At Lowell Elementary, Ms Kite has a tendency to share her leadership role with others, while at Canton Elementary Ms Bind is inclined to lead alone. Thus, through their reports of leading alone, co-leading, or not leading the activities in which they participated, the two principals demonstrated divergent practice.

We get a more detailed picture of how responsibility for school leadership and management is distributed across staff at the two schools by examining principals’ reports of who is leading an activity that they are not leading, and their reports of with whom they co-lead an activity. At Lowell Elementary, for nearly a quarter (24 percent) of the activities in which she was involved over the six-day period, Ms Kite identified someone else as leading the activity. On those occasions where she reported that she

Table II.
Percent of time principal was co-leading, not leading, and leading alone – all beeps

	Co-lead	Not lead	Lead alone
Lowell (<i>n</i> = 63)	62	24	14
Canton (<i>n</i> = 60)	23	18	58

was not leading the activity, the leaders she identified typically were other formally designated leaders including subject area specialists, the assistant principal, and teacher leaders but also included informal leaders such as regular classroom teachers, parents, and students (see Table III). At Canton Elementary, Ms Bind reported that someone else was leading just under one-fifth (18 percent) of the activities she was involved in over the six-day period. During the activities in which Ms Bind was participating but not leading, formally designated leaders such as subject area specialists and teacher leaders were more likely to be leading than were informal leaders. Indeed, classroom teachers, parents, and students were not reported to lead such activities at all. These data suggest that other formally designated leaders and informal leaders are important in understanding the work of leading and managing Lowell Elementary and Canton Elementary, although the extent to which such leaders led differed by school, with informal leaders figuring more prominently in Ms Kite's workday.

Based on an analysis of the ESM data, Ms Kite reported that for a little over four-fifths (81 percent) of those activities where she was leading at least one other individual (sometimes more than one) was co-performing the activity with her; Ms Bind was more likely to lead alone and reported co-leading a little over one-quarter (29 percent) of the activities in which she was leading (see Table IV). While Ms Kite was more likely to report co-performing an activity with another formally designated leader, she also reported co-performing activities with individuals with no formal leadership designations such as classroom teachers and even students and parents. Ms Bind also led activities with both formal and informal leaders (see Table IV).

The percentage of time that Ms Kite and Ms Bind reported leading an activity when beeped varied depending on the type of activity and by principal. While Ms Kite reported leading almost all administration activities (97 percent), she reported leading just under one-half (47 percent) of the instruction and curriculum activities. Ms Bind, on the other hand, reported leading most administration activities (87 percent) and all of the curriculum and instruction activities (100 percent), although she only reported participating in curriculum and instruction activities during two of 60 beeps over the six-day period. These data on the school principal's workday suggest that, depending on the school and the principal, individuals other than the school principal may be even more important when it comes to managing and leading instruction and curriculum,

Leader	Lowell (<i>n</i> = 15)	Canton (<i>n</i> = 11)
Classroom teacher	46.7	0.0
Subject area specialist	46.7	9.1
Parents	40.0	0.0
Other professional staff	33.3	9.1
Other	33.3	36.4
Assistant principal	26.7	0.0
Teacher leader	20.0	18.2
District staff	13.3	9.1
Student	6.7	0.0
Non-teaching staff	0.0	18.2
Community member	0.0	0.0

Table III.
Percentage of beeps
different people led when
principal was not leading
according to ESM

Table IV.
Percentage of beeps different people co-lead when principal was co-leading according to ESM

Co-leader	Lowell (n = 39)	Canton (n = 12)
Subject area specialist	20.5	0.0
Other professional staff	20.5	0.0
Classroom teacher	17.9	14.3
Non-teaching staff	17.9	35.7
Assistant principal	15.4	0.0
Teacher leader	15.4	14.3
District staff	10.3	7.1
Student	2.6	14.3
Parent	2.6	0.0
Community members	0.0	7.1
Other	0.0	7.1

especially at Lowell Elementary. Of course, the exclusive focus on the work of the school principal does not capture a variety of other leadership and management activities that may not involve the school principal. For example, some school principals may delegate certain leadership and management activities to other formally designated leaders such as an assistant principal and the ESM data would not capture these activities.

Of the activities Ms Kite reported leading, she worked alone for one-fifth (18.7 percent) of them, and a co-leader was present for the other four-fifths (81.3 percent). Ms Bind, on the other hand, was much more likely to lead alone. She led alone almost three-fourths (71.4 percent) of the activities she reported leading, and reported co-leading for the other fourth (28.6 percent). When co-performing an activity, Ms. Kite reported working with one other person 85 percent of the time, while 15 percent of the time there were two or more other people co-performing with her; Ms Bind reported working with one other person 100 percent of the time when co-leading. Ms Kite reported spending her time co-performing with a variety of people, including subject area specialists, other professional staff (e.g., guidance counselors, social workers), classroom teachers, and non-teaching staff among others. At Canton Elementary, Ms Bind co-performed primarily with non-teaching staff, teacher leaders, classroom teachers, and students (see Table IV)[2]. When Ms Kite was not leading an activity that she was involved in a variety of people, including classroom teachers, subject area specialists, parents, other professional staff, others, and the assistant principal among others, were the leaders she most frequently identified as performing the activity. Ms Bind identified others, teacher leaders, and non-teaching staff as the most prominent leaders when she was not leading an activity she was participating in (see Table III).

Staff self-report of formally designated leadership position (SSQ). Based on an analysis of the SSQ, Lowell Elementary has 15 and Canton Elementary has nine other individuals with formally designated leadership positions in addition to the school principal. The reader is reminded that Lowell has slightly more than twice as many students as Canton, so this difference in the number of leaders seems in proportion. A slightly larger proportion of the staff members hold formal leadership roles at Canton Elementary (27 percent) than at Lowell Elementary (22 percent). At both Lowell Elementary and Canton Elementary, these formal leadership designations include one

full-time assistant principal who spent all of his time in the assistant-principal leadership position. At Lowell Elementary, the remaining 14 leaders include reform coaches, reading coordinators, math coordinators, other subject coordinators, mentor teachers, etc. who spread their time amongst one or more roles. At Canton Elementary, the remaining eight leaders include mentors, other subject coordinators, school improvement coordinators, etc. who perform one or more role (see Table V). Further, all of these individuals selected “regular full-time teaching appointment” when asked about employment status while the two full-time assistant principals (one at Lowell Elementary and one at Canton Elementary) selected “administration” for this same question. Table V shows the number of people who spent some portion of their time in each leadership position and the average percentage of time[3] spent on each role.

School staff reports on leaders for mathematics and language arts (SSQ). In the SSQ we asked the staff at Lowell Elementary and Canton Elementary to identify those to whom they turn to for advice about mathematics and language arts instruction. Examining these data, we can identify both formal and informal leaders for two core school subjects and gauge how responsibility for leadership and management in these two school subjects is distributed. Using the measure of in-degree centrality[4], we can identify who provides leadership in mathematics and reading at Lowell Elementary and Canton Elementary. For illustrative purposes, we define a leader as any actor with an in-degree of at least three. Such a cut-off allows us to focus on those actors that are more influential in a given subject-area and to reduce sensitivity to random noise in the data. Using a fixed cut-off point also allows for simple comparisons across schools. Using this definition, we identify 13 mathematics leaders and 12 reading leaders at Lowell Elementary and three math leaders and five reading leaders at Canton Elementary. At Lowell Elementary, ten of the math leaders are regular classroom teachers with no formal leadership designation while only three are formally designated leaders: a mentor teacher who teaches first and second grades and two gifted education teachers that have leadership roles as whole school reform coordinators. Similarly, the same mentor teacher is the only reading leader with a formally designated leadership position while the remaining 11 reading leaders are regular classroom teachers with no formal leadership designation. Six of the informal leaders appear in both networks. At Canton Elementary, two of the three math leaders and three of the five reading leaders have formal leadership positions; the remaining

Role	Lowell		Canton	
	No. of people	% of time	No. of people	% of time
Assistant principal	1	100	2	56
Reading coordinator	1	38	0	N/a
Math coordinator	2	69	0	N/a
Other subject coordinator	7	27	2	13
Special program coordinator	1	38	2	25
School improvement coordinator	3	42	3	38
School reform coach	5	23	1	13
Mentor teacher	7	52	3	46
Teacher consultant	3	13	1	13
Other	2	56	4	31
Any formal role	15	63	9	57

Table V.
Average percentage of
time spent on each
leadership role in SSQ

math leader and two reading leaders are classroom teachers with no formal leadership designation (see Table VI).

Using the social network approach, it becomes apparent that classroom teachers are involved in providing math and reading leadership at both schools. The social network questions identify more informal leaders at Lowell Elementary than at Canton Elementary. The difference in school size (Lowell Elementary is more than two times as large as Canton Elementary) could be a contributing factor in the differing levels of informal leadership, however, since larger schools may require more reliance on informal leaders.

At both Lowell and Canton, classroom teachers with no formal leadership role account for the majority of advice-relationships related to both mathematics and reading. At Lowell, 23 percent of mathematics advice relationships are directed to formal leaders, with the school-reform coach playing the single most prominent role. Only 13 percent of language arts advice relationships are directed to formal leaders at Lowell. Particularly striking in both networks is that formally-designated language arts and mathematics coordinators appear to play a very small role. At Canton, formal leaders account for approximately one-third of the advice relationships in both mathematics and language arts. Mentor teachers are the most prominent formally designated role in both networks at Canton (see Table VII).

Methodological and epistemological considerations

As illustrated through the Cases of Lowell Elementary and Canton Elementary, these four approaches to operationalizing the leader-plus aspect of the distributed

	Lowell Elementary		Canton Elementary	
	Math	Reading	Math	Reading
Formal leader	3	1	2	3
No formal leadership designation	10	11	1	2
Total	13	12	3	5
Total as a percentage of staff	18	17	8	14

Table VI.
Math and reading leaders: staff with an in-degree of 3 or more

Role	Lowell		Canton	
	Math	Reading	Math	Reading
Principal	1	1	0	0
Assistant principal	1	2	6	8
Reading coordinator	1	1	N/a	N/a
Math coordinator	1	1	N/a	N/a
Other subject coordinator	3	5	9	15
Special program coordinator	1	0	6	0
School improvement coordinator	10	3	9	8
School reform coach	13	2	3	0
Mentor teacher	8	9	21	18
Teacher consultant	10	2	6	8
Other	4	2	6	21
Any formal role	23	13	33	36

Table VII.
Percentage of advice-seeking directed towards formal leaders

perspective allow different ways of understanding how responsibility for leadership and management is distributed in schools – even when the same research instrument was used such as the SSQ. Examining the four approaches we can identify different epistemological assumptions. We can think about the four approaches along two dimensions (see Table VIII). First, we can categorize the various approaches based on the data source; that is, who provides evidence about the distribution of responsibility for leadership and management work. Second, we can categorize the approaches on whether they generate data about the formal designed organization or the organization as lived (Meyer and Rowan, 1977; Brown and Duguid, 1991).

Both dimensions are critical in that they suggest different ways of coming to know and justifying knowledge claims about how responsibility for leadership and management is distributed in the school. The top-down/bottom-up dimension foregrounds that should provide evidence about the distribution of responsibility. The designed organization/lived organization dimension underscores that one can come to know how leadership is distributed in schools either through focusing on the formally designated leadership positions in the school (the designed organization) or through the day-to-day practice of leadership and management (the lived organization). While these two aspects of the organization are related, they are not mirror images of one another.

The top-down approach relies on the reports of the school principals, Ms Kite and Ms Bind, and could be extended to include other formally designated leaders. From an epistemological perspective, examining how leadership is distributed by examining the work of the school principal is sensible given the principal’s position at the top of the organization. In this study, principals’ reports are of two sorts. In the PQ, principals report on the designed organization by listing members of the school leadership team. The designed organization, however, may not be an accurate representation of what actually happens in the day-to-day life of managing and leading the school (i.e. the organization as lived). In the ESM principals are reporting on who actually performs or is co-performing with them particular leadership and management activities. Both approaches show that both formally designated and informal leaders have responsibility for school management and leadership at both schools.

The ESM data, however, goes beyond the PQ data in at least two respects. First, it goes beyond identifying those who have responsibility for leadership and management at Lowell Elementary and Canton Elementary and identifies those individuals who actually do the work. Second, with the ESM data we also get a sense of the arrangements for distributing leadership and management work including tapping into the leadership practice aspect of the distributed framework. For example, we get a sense of the prominence of co-performance of leadership and management work – we can identify situations in which two or more actors co-perform a leadership or management activity, albeit tied entirely to the principal’s practice. Still, this is a situation where we are operationalizing both the leader plus aspect and at least part of

Table VIII.
Epistemology and
methodology

	Designed organization	Lived organization
Top-down	PQ leader team members	ESM
Bottom-up	SSQ – leadership designation	SSQ – social network

the leadership practice aspect. Using the ESM data for Lowell Elementary and Canton Elementary we can gauge the prevalence of co-performance in the school principal's work and examine how it differs by activity type. The principal at Lowell Elementary, for example, is more likely to co-perform an activity tied to instruction and curriculum than one tied to administration. The principal at Lowell Elementary is much more likely to co-perform in general than is the principal at Canton Elementary.

From an epistemological perspective, including the perspective of all organizational members especially those more often than not cast in the follower role – regular classroom teachers – also seems sensible. For leaders and managers to lead and manage, others must agree to be led and managed (Dahl, 1961; Cuban, 1988). Further, people in schools, even school principals and other formally designated leaders, can move in and out of leader and follower roles depending on the task or activity. Hence, we can learn about leadership and management by focusing on the perspectives of all organizational members so that we include the views of those who are chiefly in follower roles in addition to those of the leaders. Items on the SSQ allow us to do this in two ways. First, the SSQ asks organizational members if they have a formally designated leadership position in the school. Second, the SSQ network questions ask organizational members to identify people who they seek advice from in mathematics and language arts.

The two SSQ items that were designed to incorporate the bottom-up perspective generate strikingly different accounts of how responsibility for leadership is distributed among people in the school. While the self-reports on formal leadership positions foregrounds the designed organization as represented in formally designated leadership positions, the network questions focus on the organization as lived and allow for the emergence of both formally designated and informal leaders. At both Lowell Elementary and Canton Elementary, around one-fifth indicated that they held a formally designated leadership or management position, which is a very high percentage of the faculty. (We propose to examine these reports, as the number of leaders is very large.) The social network questions suggest that the distribution of leadership, at least with respect to the sharing of advice about mathematics and language arts instruction, is more evenly distributed between formally designated leaders and informal leaders (i.e. individuals with no formal leadership designation). Of the two principals and three assistant principals at the two schools, only one part-time assistant principal at Canton Elementary emerges as a leader from the network measures. Still, formally designated leaders remain important (three at Lowell Elementary and four at Canton Elementary) and are potentially some of the most important leaders in terms of the number of others who seek advice from them.

Regardless of the way we operationalize the leader plus aspect, the data suggest that the work of managing and leading Lowell Elementary and Canton Elementary involves multiple actors, even according to the top down approach that privileges the school principal. Operationalizations that tap into the organization as lived suggest that when studying the distribution of responsibility for leadership and management, it is important to study school staff with no formal leadership designations. Even the ESM data, looking at leadership and management work from the top-down and only from the school principal's workday, suggests that actors with no formal leadership designations are important to consider when examining how the work is distributed over people.

Variance between schools and between activity-types

An important consideration is whether our study operations of the leader plus aspect manage to pick up variability in how leadership is distributed in schools. In this section, we present a preliminary analysis focusing on variance between schools and between activity types in the distribution of responsibility for leadership and management work using some of our different operationalizations of the leader plus aspect. Our main question is this: Do our various operationalizations of the distribution of responsibility for leadership and management enable us to identify differences between schools and between activity types?

The designed organization

The SSQ instrument provides self-reports of formally designated leadership positions. Overall, 30 percent (622 of 2,070 respondents) spend at least a portion of their time in a formally designated leadership role. Over 25 percent of these actors reported being in one or more full-time leadership positions. These percentages are fairly consistent across schools. The actual number of full-time leaders with administrative appointments is smaller, however, since a large proportion of the respondents who reported having a formal leadership designation also reported having a full-time classroom teaching assignment. For example, approximately three-fourths of the 366 formally designated elementary leaders reported having a full-time teaching assignment. Across schools, the average number of staff members per school who reported having one or more formally designated leadership positions (in addition to the school principal) was 12.0. Table IX displays the number of people (including those with a full-time teaching assignment) assigned to each role, the average number of people assigned to that role across schools, and the average percentage of time spent on each role across schools.

The lived organization

In this section we explore variability among schools and activity types using data generated by the ESM log and the SSQ social network questions that focused on the lived organization. The ESM log captures the organization as lived from the perspective of the school principal whereas the SSQ captures it from the perspective of

Role	No.	Average no. per school	Average % of time
Assistant principal	113	2.2	59
Reading coordinator	108	2.1	47
Math coordinator	81	1.6	36
Other subject coordinator	213	4.1	43
Special program coordinator	164	3.2	48
School improvement coordinator	160	3.1	40
School reform coach	171	3.3	39
Mentor teacher	317	6.1	38
Teacher consultant	201	3.9	38
Other	120	2.3	44
Any role	622	12.0	65

Table IX.
SSQ formal leadership
designations

all organizational members regardless of whether they are formally designated leaders or not.

The principal's work day: using ESM data

We begin by looking at variability in ESM measures by school and then turn our attention to variability by activity type. We use box plots to depict the variance in this analysis[5].

On average, school principals lead 69 percent of the activities they engage in and they lead alone for 52 percent of these activities. Figure 1 displays the distribution of the percent of time principals spend leading an activity. There is considerable variation across schools in the amount of time principals are leading the activity in which they are engaged ranging from 44 percent-90 percent, excluding outliers (see Figure 1). While some principals reported that someone else was leading over 50 percent of the activities they participated in over the six-day period, others reported that someone else was leading only 10 percent of the time. Focusing on those activities where the school principal reported leading, we see even more variation between schools in the amount of time principals' lead alone as distinct from co-leading with someone else, ranging from 19 percent to 91 percent. Overall, the ESM log picks up considerable variability in the frequency with which staff other than the principal lead an activity, and the frequency with which principals co-lead activities with others.

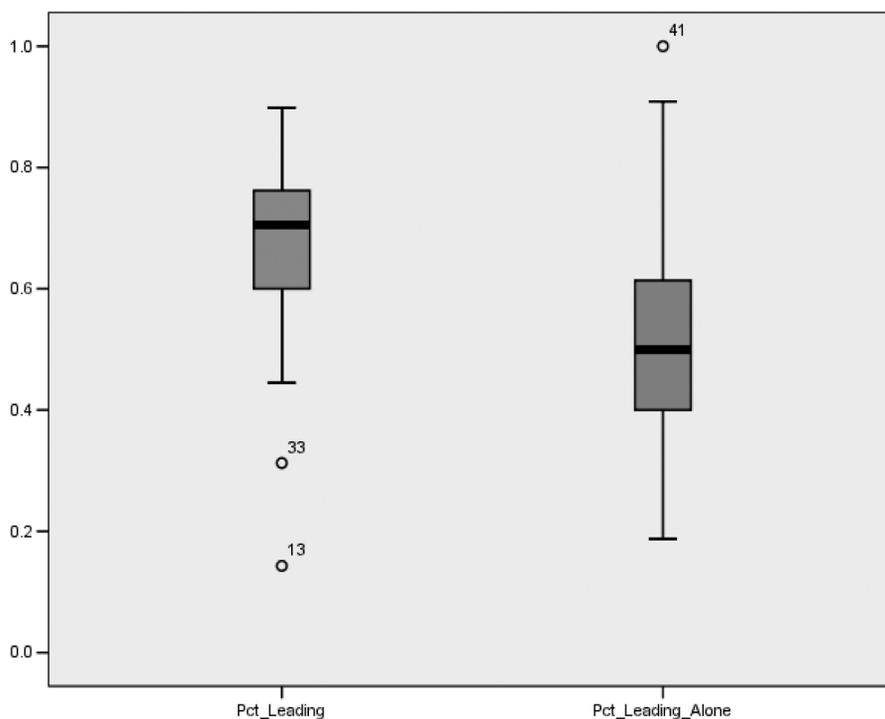


Figure 1.
Percentage of time leading and leading alone

This variation across principals is more pronounced when we consider the type of activity in which the principal is participating. Table X shows the differences in the mean percentages for leading and leading alone by activity type. We find that principals lead the majority of administrative related activities by themselves. In sharp contrast, principals lead just over half of the instruction and curriculum related activities.

There is more variability between principals in whether they are leading the activity or not for instruction and curriculum related activities than for administration related activities (see Figure 2). There is also more variation between principals in whether they are leading alone or co-leading for instruction and curriculum related activities compared with administrative related activities.

Data generated by the ESM log also indicate considerable variability in the staff members with whom principals engage in co-leadership. Overall, principals selected classroom teachers most frequently as co-leading an activity with them, followed by other professional staff, and teacher leaders (see Table XI). Principals were

Activity	Leading	Leading alone
Administration	77.8	55.2
Fostering relationships	65.9	38.1
Instruction and curriculum	55.2	45.5
Professional growth	23.3	46.4

Table X.
Percentage of time
leading and leading alone
by activity

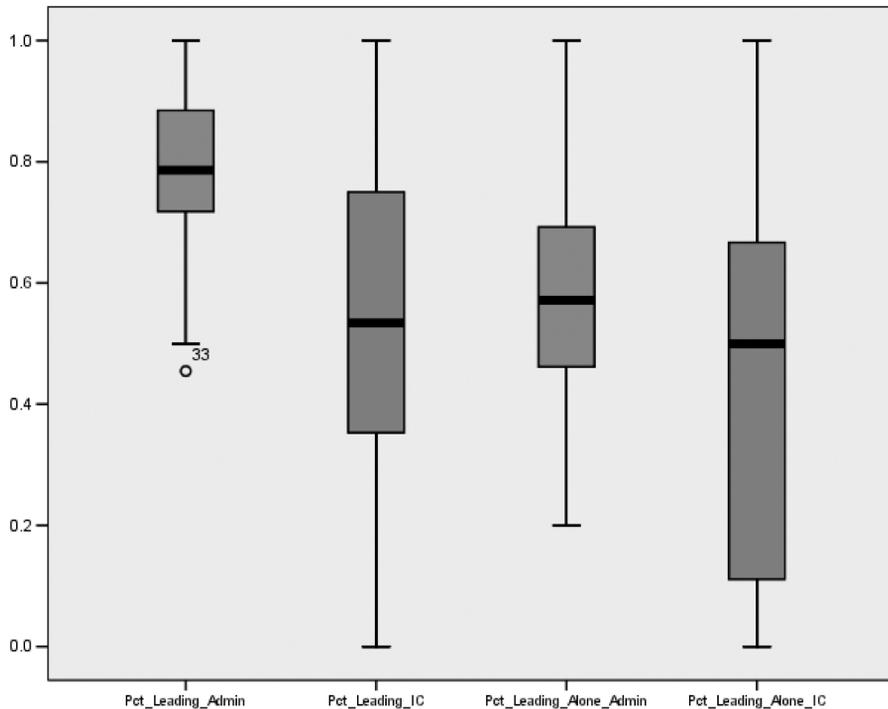


Figure 2.
Percentage of time leading
activities

Co-leader	%
Classroom teacher	29.3
Other professional staff	24.0
Teacher leader	23.8
Assistant principal	21.3
Non-teaching staff	16.0
Student	15.7
Subject area specialist	10.4
Parent	7.2
Other	7.0
District staff	3.8
Community members	2.3

Table XI.
Co-leader participation percentages

considerably more likely to co-lead with classroom teachers than with teacher leaders and assistant principals. The fact that principals spent more time co-leading with classroom teachers than teacher leaders is curious but may be driven by the total number of teachers relative to the number of teacher leaders and assistant principals. On average, principals spend relatively little time co-leading with assistant principals on matters of instruction and curriculum.

Examining the variability in the school principal’s co-leaders by activity, Figure 3 displays the data for the four most frequently selected co-leaders. There was substantial variation between principals in the percentage of time they spent co-leading with teachers (either teacher leaders or classroom teachers) in activities related to instruction and curriculum and less variability for administration related activities. Again, the ESM log seems to pick up considerable variation in how leadership is distributed over people by activity type. For example, comparing the distributions of these co-leaders to one another and comparing distributions within co-leaders across activity-types, we see that the range of variation in who co-leads differs by activity type.

The ESM log also picks up variance by school and activity-type in terms of whether the school principal is leading the activity or not, and if the principal is leading whether she or he is leading alone or co-leading with someone else.

Advice givers: using SSQ network data

In this section we examine variability in the social network measures of leaders by activity type; in this case, mathematics and reading. For the purpose of this preliminary analysis, we defined leaders as any staff member that provides advice to at least three of their colleagues. Using these criteria, we identified 181 math leaders and 200 reading leaders out of a total sample of 2,492 people. Of the mathematics leaders, 45 percent had a formal leadership role, while 49 percent had no formally designated leadership role in the school (7 percent were unknown). Among reading leaders, 44 percent were formally designated as leaders while 48 percent were informal leaders (9 percent were unknown). Overall, principals and vice-principals did not play a large role in leading (defined as a social influence relationship) mathematics and reading instruction according to this approach. Only one principal emerged as a leader in mathematics, and three principals emerged as reading leaders. Assistant-principals were slightly more prominent – nine were identified as math leaders and ten were

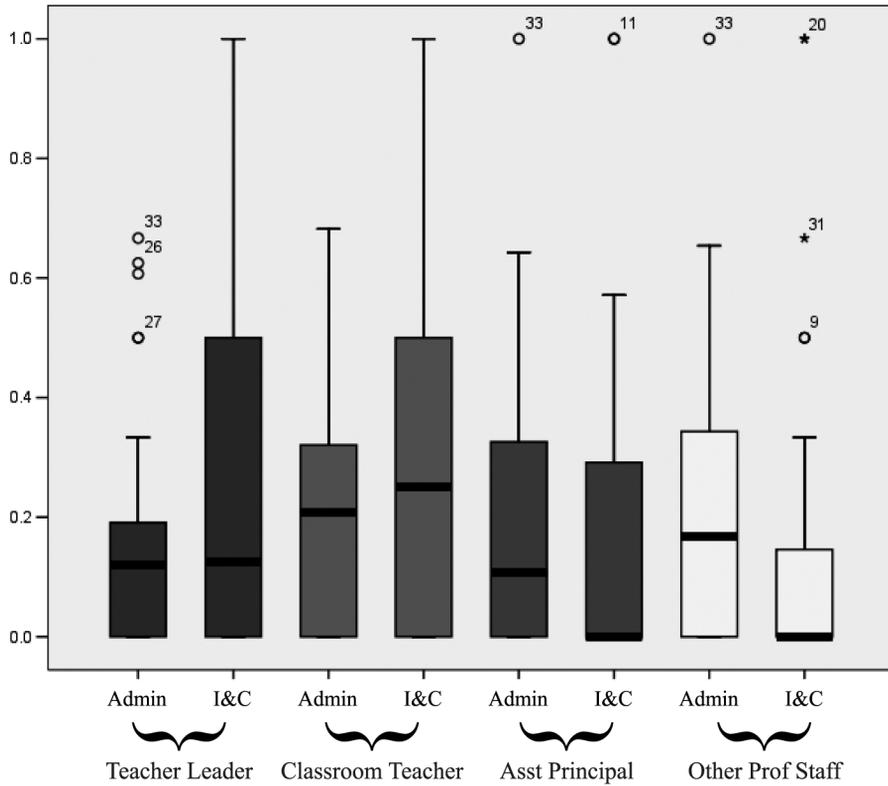


Figure 3.
Percentage of time spent
with co-leaders

identified as reading leaders (see Table XII). More striking is that individuals with formal leadership designations in mathematics and language arts figured less prominently than we might have expected. While 37 percent of the reading coordinators emerged as leaders based on our analysis of the social network data, 63 percent did not emerge as leaders. The situation was similar for mathematics; over 50 percent of mathematics coordinators did not emerge as leaders based on our analysis of the social network data (see Table XII). We need to point out two limitations with respect to operationalizing leadership using social network data. First, we define leadership for mathematics and language arts as a social influence interaction and specifically related to advice giving and therefore our approach is unlikely to pick-up on forms of leadership that may not involve interactions. Second, as noted earlier, the social network questions in the SSQ focused exclusively on mathematics and language arts and therefore are unlikely to pick up on social influence interactions that may be subject matter neutral or generic (e.g., classroom management, student discipline). Hence, we urge caution in interpreting these findings as they are premised on a number of assumptions.

On average, less than a tenth of the school's respondents were identified as math (7 percent) and language arts (8 percent) leaders. The percentage of the school's

Table XII.
Proportion of category considered math and language leaders according to network data

Role	<i>n</i>	% math leaders	% reading leaders
Principal	52	2	6
Assistant principal	113	8	9
Reading coordinator	108	6	37
Math coordinator	81	44	6
Other subject coordinator	213	9	8
Special program coordinator	164	10	14
School improvement coordinator	160	16	14
School reform coach	171	16	13
Mentor teacher	317	16	15
Teacher consultant	201	15	10
Other leader	120	8	14
Any formal role	674	12	13
No formal leadership designation	1,448	6	7

respondents who were identified as language arts and math leaders, however, varied greatly between schools. The percentage of respondents who were mathematics leaders varied from 0 to 18 percent of the staff depending on the school, and the percentage of respondents who were identified as language arts leaders varied from 0 to 22 percent of the staff (see Figure 4).

Across schools, 36 percent of all mathematics advice relationships or interactions and 38 percent of all language arts advice relationships or interactions were directed towards formal leaders in any role (see Table XIII). One might expect that mathematics coordinators would play a large role in the mathematics networks, but they account for only 15 percent of all advice-relationships. Similarly, reading coordinators account for only 17 percent of advice relationships in the reading networks. The social network data revealed considerable variation across schools in the degree to which formal

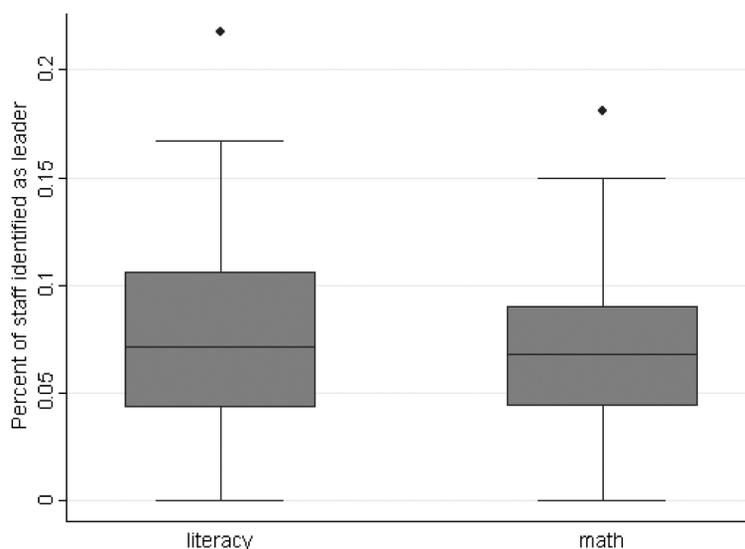


Figure 4.
Percentage of school staff identified as math and language arts leaders

Table XIII.
Percentage of advice relationships directed towards formal leaders

Role	<i>n</i>	Math	Reading
Principal	52	2	2
Assistant principal	113	5	4
Reading coordinator	108	3	17
Math coordinator	81	15	3
Other subject coordinator	213	8	7
Special program coordinator	164	8	9
School improvement coordinator	160	11	9
School reform coach	171	12	11
Mentor teacher	317	20	19
Teacher consultant	201	12	11
Other leader	120	5	7
Any formal role	674	36	38

leaders were involved in advice relationships. Across schools, formal leaders accounted for between 0 percent and 77 percent of math advice relationships, and 0 percent and 82 percent of language arts advice relationships (see Figure 5).

Our data suggest fewer leaders when we use the social network measure rather than the self-report measure of a formal leadership position. This is to be expected as our social network measure focused narrowly on mathematics and reading rather than instruction writ large and further failed to include activities not directly tied to instruction (e.g., scheduling). Further, the social network questions attempted to zone in on leadership activities (defined as social influence interactions) rather than including both leadership and management activities. Hence fewer leaders might be expected. Comparing the two approaches, one advantage of the social network approach is that it identifies actors with no formal leadership designation as important actors in school leadership. Further, the social network data suggest that a formal leadership designation (e.g., mathematics coordinator, literacy coordinator) may not be

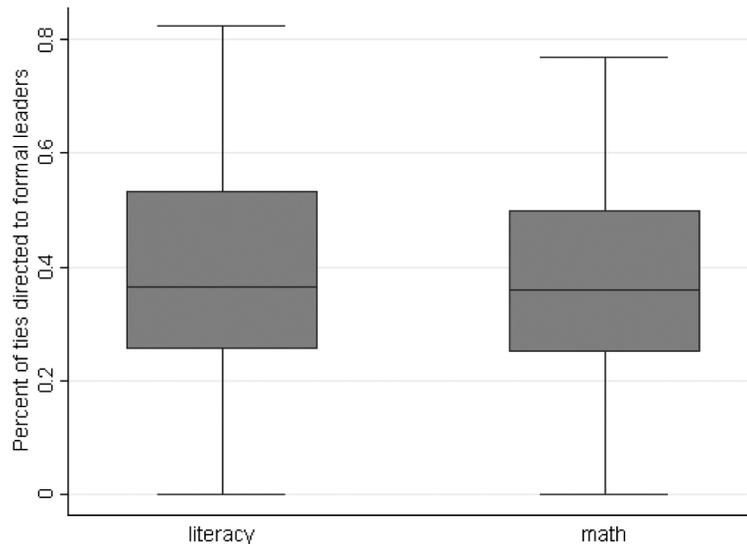


Figure 5.
Percentage of advice relationships directed towards formal leaders

a good indicator of who actual leads in the day-to-day life of the organization. As noted above, two-thirds of the reading coordinators were not identified as leaders for reading instruction by staff. Similarly, 113 individuals identified themselves as assistant principals in the self-identification as formally designated leader SSQ question, only 8 percent and 9 percent of these individuals emerged as leaders for reading and mathematics respectively in the SSQ social network questions.

Discussion and conclusion

We examined evidence of how responsibility for leading and managing schools was distributed across people along two dimensions. First, we examined how the data source – whether data came from principals at the top of the organization or from all organizational members, regardless of whether they were formally designated leaders or not – influenced the conclusions one might draw about leadership distribution. Second, we considered how the target of data collection – be it the designed organization or the lived organization – impacted conclusions about distributed leadership. The various approaches show considerable agreement with respect to the individuals over whom leadership is distributed in schools. While acknowledging broad similarities among the various approaches, the different approaches also surfaced some divergence that has implications for thinking about the epistemological and methodological challenges in measuring leadership from a distributed perspective.

Of the four approaches, the findings about the distribution of leadership generated by the social network questions on the SSQ differed most from the findings generated by the other instruments. This is in part a function of the fact that these questions focused on leadership for mathematics and reading rather than leadership and management for instruction writ large. Still, more than the content focus of the questions seems to be at play. For example, nearly two-thirds of the formally designated language arts leaders and one half of the formally designated mathematics leaders did not emerge as leaders based on our analysis of the social network data. Tapping into the lived organization, the social network questions suggest that an exclusive focus on formally designated leaders may miss an important dimension of how the work of leading and managing schools is distributed over people. We acknowledge limitations inherent in using network data to identify leaders. This approach assumes that providing advice indicates the provision of leadership, an assumption about which we cannot be sure. This technique also relies on a single avenue for the exercise of leadership, namely, advice-giving relationships or interactions. While most leadership theories posit that leadership occurs through social influence interactions or relationships, leadership may also occur through non-interactional means.

Approaches that target the organization as lived (ESM Principal Log, SSQ Network Questions) are important for tapping how leadership is distributed over actors with no formal leadership designation. Regardless of whether these approaches attempt to get at leadership from the top down (i.e. the principals' on the spot reports regarding who is leading or co-leading) or from the bottom up, they appear to capture an important dimension of school leadership that may be missed by data collection approaches that focus exclusively on the organization as designed.

We examined whether the measures picked up variation between schools and activity-type. As one might expect, approaches that target the lived organization

appear to pick up more variation between schools than approaches that focus on the designed organization.

Lamenting the lack of empirical work using a distributed framework, scholars have rushed to gather data that generates knowledge about how leadership and management is distributed in schools and in some cases whether there is a relationship between how leadership and management is distributed and student achievement. While these efforts are commendable, often a critical step in the process of moving from a broad analytic frame to empirical data collection has been glossed over and not subjected to critical reflection. In this paper, we explore various ways of operationalizing a distributed perspective showing how different operationalizations can result in different conclusions with respect to how leadership and management is distributed in schools. In doing so, we argue for much more attention to study operations when investigating leadership and management using a distributed perspective. Steps to generate an empirical knowledge base using a distributed perspective should strive to minimize threats to construct validity by carefully and critically appraise different ways of operationalizing aspects of the framework. Absent this, the validity of the inferences we can make from the empirical data will be compromised.

Notes

1. Response rates were calculated for principals that participated for a majority (i.e. four days) of the sampling period.
2. Note that the percentages in this table, and several other tables, will not total to 100 percent as respondents were able to select more than one category for several of the questions.
3. Estimates for percentage of time spent on each leadership role were provided via a range (i.e. 0 percent, 1-25 percent, 26-50 percent, 51-75 percent, 76-99 percent, and 100 percent). When calculating the average percentage of time spent on each role, we used the midpoint of each of the ranges.
4. In-degree centrality is a simple way of determining which actors are most central in a network. In-degree centrality is measured by counting the number of other actors who report going to a particular individual for advice or information about a given subject-area.
5. The “box” indicates the upper and lower quartiles of the distribution and the median is the dark horizontal line. The “whiskers” show the range of values that are within 1.5 times the box height. All of the values outside of the whiskers are considered outliers.

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