

Using Social Network Methods to Study
School Leadership

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Abstract

Social network analysis is increasingly used in the study of policy implementation and school leadership. A key question that remains is that of instrument validity - that is, the question of whether these social network survey instruments measure what they purport to measure. In this paper, we describe our work to examine the validity of the School Staff Social Network Questionnaire (SSSNQ), an instrument designed to study instructional leadership practice. To examine the validity of the survey, we conducted two studies. The first involved administration of the SSSNQ in 22 schools and interviews with a sub-sample of school staff in six of these schools. The second study involved cognitive interviews in which interviewees were asked to “think aloud” as they completed a revised version of the SSSNQ. Our findings indicate that the SSSNQ did identify leadership operationalized as social influence interactions. Furthermore, the SSSNQ allowed us to move away from an exclusive focus on school principals and other formally designated leaders to include non-positional leaders, and allowed us to capture informal leadership interactions that would have been missed had we focused solely on formal organizational routines. In this respect, the SSSNQ offers an important research instrument for examining school leadership.

An extensive empirical knowledge base suggests that school leadership, often somewhat narrowly focused on school principals, can influence those in-school conditions that enable improvement in teaching (Leithwood & Montgomery, 1982; Bossert, Dwyer, Rowan, & Lee, 1982; Hallinger & Murphy, 1985; Louis, Marks, & Kruse, 1996; Rosenholtz, 1989) and indirectly affect student achievement (Hallinger & Heck, 1996; Leithwood, Louis, Anderson & Wahlstrom, 2004). Perhaps responding to this evidence, philanthropic and government agencies have invested more energy and resources on developing school leadership, typically though not always focused on school principal preparation and professional development programs. These investments are increasingly accompanied with demands for program evaluations that show evidence of effectiveness. These developments underscore the importance of research on school leadership, especially work that can systematically document change or improvement in leadership practice. However, in contrast to the expanding empirical knowledge base on measuring instructional practice (Camburn & Han, 2005; Rowan, Camburn & Correnti, 2004; Burstein et al, 1995; Smithson & Porter, 1994; Mayer, 1999), we lack a comparable literature on the measurement of school leadership practice.

Rising to the research challenge requires attention to numerous issues. First, scholars of leadership and management have recognized for several decades that an exclusive focus on positional leaders fails to capture these phenomena in organizations (Barnard 1938; Cyert and March 1963; Katz and Kahn 1966). Though in no way undermining the role of the school principal, this recognition argues for thinking about leadership as something that potentially extends beyond those with formally designated leadership and management positions (Heller & Firestone, 1995; Ogawa & Bossert, 1995; Pitner, 1988; Spillane, 2006). Recent empirical work underscores the need for moving beyond an exclusive focus on formally designated leaders in studies of school leadership to identifying others who take responsibility for this work (Camburn, Rowan, & Taylor, 2003; Spillane, Camburn, & Pareja, 2007). Second, some scholars have called

for attention to the *practice* of leadership in organizations as distinct from focusing exclusively on structures, roles, and positions (Eccles & Nohria, 1992; Gronn, 2003; Heifetz, 1994; Spillane, Halverson, & Diamond, 2004; Spillane & Diamond, 2007). A practice perspective encourages an approach to studying leadership and management that focuses on action (Eccles & Nohria, 1992) or interaction (Spillane, 2006). Together, these two issues pose a critical challenge for research on school leadership – the identification of leadership activity in schools. Third, we need research instruments for studying the practice of leadership in large samples of schools as labor intensive ethnographic and structured observational methods are too costly when samples of 60 or 80 schools are necessary for efficacy trials.

In this paper, we describe our efforts to design and validate a social network survey instrument for identifying leadership practice in schools. Social network surveys enable us to collect data that can be analyzed to understand the structure of relationships among organizational members. Social network analysis is increasingly used in the study of policy implementation and school leadership (Frank, Zhao, & Borman, 2004; Frank & Zhao, 2004; Friedkin & Slater, 1994; Ogawa, 1994; Spillane, 2005). One key question concerns the validity of the inferences we can make about leadership in schools based on the data generated by social network instruments.

Our paper is organized like this: We begin by anchoring our work in a conceptual and empirical literature on school leadership from a distributed perspective. Next, we consider the use of social network methods to study school leadership and then describe the design of the School Staff Social Network Questionnaire (SSSNQ). The School Staff Social Network Questionnaire (SSSNQ) was designed to study school leadership practice related to instruction. We then describe our research methodology for our validation study, part of a larger program of research to design and validate research instruments for identifying and documenting leadership for instruction in elementary and middle schools.

We then report our findings. We conclude with a discussion of our findings with particular attention to how these findings informed our redesign of the SSSNQ.

Anchoring the Work

Our work is premised on a distributed perspective on organizational leadership (Gronn, 2000; Spillane, Halverson, & Diamond, 2001; Spillane, 2006). A distributed perspective includes two key aspects – the leader-plus aspect and the practice aspect.

The leader-plus aspect recognizes that the work of leadership in schools can involve multiple individuals. People in formally designated leadership positions and those without such designations can take responsibility for leadership work. Recent empirical work suggests that the work of leadership extends to multiple individuals beyond the school principal, including regular classroom teachers with no formal leadership designations (Heller & Firestone, 1995; Camburn, Rowan, & Taylor, 2003; Spillane, Camburn, & Paraja, 2007).

A distributed perspective also foregrounds the practice of leadership and frames it in a particular way; leadership practice takes shape in the interactions of leaders and followers as mediated by aspects of their situation (Gronn, 2002; Spillane, Halverson, & Diamond, 2001; 2004). Hence, we do not equate leadership practice simply with the actions of individual leaders. Efforts to understand the practice of leading must pay attention to interactions, not simply the actions of individuals in formally designated leadership positions. Foregrounding practice in studies of leadership is important because practice is where the rubber meets the road - “the strength of leadership as an influencing relation rests upon its effectiveness as activity” (Tucker, 1981, p. 25).

Similar to others we define leadership as a social influence relationship or, perhaps more correctly given our focus on practice, a social influence interaction. We define leadership practice as those activities that are either understood by, or designed by, organizational members to influence the motivation, knowledge, and practice of other

organizational members in an effort to change the organization's core work (Spillane, 2006). By the organization's core work we mean teaching and learning – classroom instruction. In our working definition evidence of someone having influenced someone else is *not* necessary in order to denote leadership practice: Person A can claim that person B tried to influence Person A to change their mind or behavior in some way— even though person A ends up not changing.

We see teaching as not simply an outcome or dependent variable but also a potentially powerful explanatory or independent variable. Specifically, school leadership practice can differ depending on the school subject. 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; Grossman & Stodolsky, 1994; Little, 1993; McLaughlin & Talbert, 1993; Siskin, 1991, 1994). More recent work on elementary schools suggests that leadership arrangements differ depending on the school subject. Recent work on K-8 schools shows that leadership arrangements and practice differ between language arts, mathematics, and science (Burch & Spillane, 2002; 2004; Spillane, Diamond & Jita, 2003; Spillane, 2004). Rather than treating “teaching” as an undifferentiated construct, then, we see it as situated in particular school subjects. Further, we contend that efforts to understand leadership practice for instruction must take account of these different curricular domains. Hence, we designed a research instrument that would capture similarities and differences in leadership practice across school subjects.

Designing the SSSNQ

Social network analysis is a potentially powerful tool for investigating leadership when taking a distributed perspective, in that it allows us to move beyond an exclusive focus on the formal organization (e.g., formally designated leaders, formal organizational routines) to attend to the informal organization such as *informal* interactions that are

intended or understood by school staff to influence their practice. Studying what formally designated leaders do or the performance of formal organizational routines such as performance reviews gets at one aspect of leadership, but this approach underplays the organization as lived as distinct from the designed organization (Spillane, Camburn, Pustejovsky, Pareja, & Gomez; in press). In an organization, many potentially influential interactions related to instruction are informal, taking place before schools in informal gatherings or exchanges between classes or over lunch. Studying leadership as a social influence interaction in schools necessitates attention to both the formal or designed organization and the lived or informal organization (Meyer & Rowan, 1977; Dalton 1959, Downs 1967 and Homans 1950 as cited in Meyer & Rowan, 1977).

To examine leadership for instruction we designed a School Staff Social Network Questionnaire (SSSNQ), an online survey in which school staff are asked to identify who they have gone to for advice or information related to teaching particular subjects over this school year. Our decision to go with an online, rather than paper-based, survey was two-fold. First, it makes it possible to easily distribute the questionnaire to large numbers of respondents at remote locations and to immediately access the data generated from their responses. Secondly, an online survey has the advantage of reducing the response burden on subjects in that the questions subjects are presented with can be determined based on subjects' earlier responses (such that respondents are not required to answer or sift through questions that are not relevant to them).

Our survey design work involved multiple iterations. We made four design decisions which held consistently across all iterations. First, we ask about *advice- and information-seeking* (rather than simply asking people who they interact with in-general) because this would allow us to focus on interactions that were *intended* or understood by the participants to influence instruction. Second, we designed the SSSNQ to focus on *subject-specific* interactions because prior research suggests that the school subject is an important consideration in school leadership. Third, we asked survey participants about

who they have gone to for advice *in the past year* because we wanted to “cast a wide net” and pick up on infrequent leadership activities as well as leadership activities that happen regularly. Fourth, for each name given in response to the advice prompt, we ask respondents how frequently they seek advice from that advisor, as well as how influential they perceive that relationship to be, enabling us to examine the strength of the ties among school staff.

We changed our survey questions and survey layout over time based on our pilot studies. Rather than describing each of our design iterations in detail, here we focus on the two versions of the survey that were the focus of our validation work.

SSSNQ Version 1. In our early version of the SSSNQ online survey, school staff were asked:

- “To whom have you turned for advice or information about **teaching in general**?”
- “To whom have you turned for advice or information about **math** teaching strategies and content?”
- “To whom have you turned for advice or information about **literacy** teaching strategies and content?”

For each question, respondents were able to select multiple names from their school roster (which appeared in a drop-down menu), and were also able to fill in names of people who did not appear on the roster (see Figure 1 for a screen shot of the math survey page).¹ For each name the respondents identified, they were asked to indicate how frequently they interacted with that person (daily, weekly, quarterly, or yearly) and indicate how influential that person was on their practice using a five-point Likert scale. Using this version of the SSSNQ we collected data in 22 urban schools in Winter 2005.

[Insert Figure 1]

¹ We suspect that providing respondents with school staff rosters may have resulted in respondents focusing on internal names over external names.

SSSNQ Version 2. In later iterations of the SSSNQ online version, we gathered more detail data on the content of teachers' subject-related advice. In particular, for each subject-area, we wanted to gather data on the dimensions of instruction that the advice covered (such as planning and selecting course content, approaches to teaching content, assessment, etc.). So, respondents were first asked a general question about who they went to for advice about a particular subject, and then, once they listed *all* of the people they went to, they were given the opportunity to indicate what *types* of advice they sought for each advisee listed (by selecting from a predetermined list of topics).² The topics from which they could select included “deepening your content knowledge”, “planning or selecting course content and materials”, “approaches for teaching content to students”, “strategies specifically to assist low-performing students”, “assessing students’ understanding of the subject”, and/or “other” (see Figure 2-4 for sample screen shots). If respondents chose “other”, they were then given the opportunity to explain what “other” was. As with the previous version of the survey, teachers were then given the opportunity to indicate frequency of interaction with their advisors and how influential each advisor was on their teaching practice.

[Insert Figure 2]

[Insert Figure 3]

[Insert Figure 4]

We also tailored the subject prompts that respondents were presented based on the school subjects they taught. All respondents were asked about math and RWLA, though the wording of the prompt they responded to depended on whether they taught the subject. For example, a teacher who taught math (either because s/he was a generalist or because s/he taught math as a primary subject) would be asked, “To whom have you turned for advice or information *about teaching mathematics?*” A teacher who did not teach math would be asked, “During this school year, to whom have you turned for

² In this second version of the survey we did not provide staff with rosters.

advice or information *about Mathematics as it relates to your classroom teaching?*

Based on responses to earlier questions about teaching assignments, teachers who taught a primary subject other than mathematics or reading were asked “During this school year, to whom have you turned for advice or information about teaching [PRIMARY SUBJECT]?” We used this version of the SSSNQ for collecting data in Fall 2006 with teachers in 10 middle-schools in a mid-sized mid-western city, and again in Winter 2007 with teachers in 23 elementary and middle-schools in a large urban school district.

Research Methodology

To examine the validity of the survey, we conducted two studies. The first study involved administration of Version 1 of the SSSNQ in 22 schools and interviews with a sub-sample of school staff in six of these schools. Our intent with this first set of interviews was to determine whether the advice-seeking interactions interviewees described were instances of leadership for instruction operationalized as social influence interactions.

The second study involved cognitive interviews in which interviewees were asked to “think aloud” as they completed Version 2 of the SSSNQ. Concerned about whether the SSSNQ captured leadership for instruction, we had two primary purposes. First, we wanted to know whether survey respondents interpreted the survey prompts as we had intended. Second, we wanted to identify aspects of leadership that might not be picked up by the SSSNQ prompts.

Sample

Study 1. Our first study involved administration of the SSSNQ to staff in a purposeful sample of 22 schools in a large urban school district. These 22 schools consisted of 16 public schools, 4 Catholic schools, and 2 charter schools. Five of the public schools were middle schools; the other schools were K-8. Schools ranged in size from 13 to 65 faculty members, and from under 300 to over 1,100 students. All teachers and administrators at each school were asked to take the survey online.

In order to validate the survey, we conducted qualitative interviews with a subset of teachers at six of these 22 schools in early Spring 2006. We selected a purposeful sample of schools to maximize variation so that the sample included two public schools (an elementary and a middle school), two Catholic schools, and two charter schools. We selected interviewees based on our analysis of the SSSNQ data. Using a purposeful sampling strategy we selected in each school: formal leaders (i.e., Principal, Assistant Principal, Math Specialist, Literacy Specialist³), informal leaders (i.e., two teachers who were not formally designated leaders but had more people go to them for math advice relative to other people in their school)⁴, and followers (i.e., two to four teachers who were not formal or informal leaders). We interviewed 49 staff members across the six schools.

Study 2. Our second validation study involved conducting cognitive interviews with 10 elementary and middle-school teachers from different schools in Spring 2007. We intentionally selected teachers who had not previously taken the survey, recruiting volunteers from a Masters of Education program. Our sample included 5 middle-school teachers and 5 elementary school teachers. Of the 5 middle-school teachers, 3 taught English/Language Arts, one taught Spanish, and one taught Social Studies. All 5 elementary school teachers were generalists.

Data Collection

Study 1. Interviews with 49 staff members focused mainly on their advice-seeking practices around mathematics instruction. Using a semi-structured protocol, researchers asked interviewees about their advice or knowledge seeking related to mathematics instruction (see Appendix A for the interview questions related to math advice). Other questions focused on interviewees' views of leadership and change efforts currently

³ Neither of the charter schools had an assistant principal; only the public schools had math specialists and a literacy specialists.

⁴ This notion that the informal leaders are those who have many people go to them for advice was based on our assumption that the person who is sought after for advice is cast as the leader in these interactions. As we discuss later in this paper, our findings indicate that some caution should be applied in making this assumption.

underway at the schools. Each interview took approximately 45 minutes and all interviews were tape recorded and transcribed.

Study 2. We conducted cognitive interviews with 10 elementary and middle-school teachers. These interviews were not focused on just math; rather, they covered math, RWLA, and teachers' primary subject (if it was something other than math or RWLA). Following Desimone and colleagues' work on improving the reliability and validity of surveys in educational research (Desimone and LeFloch, 2004), we had teachers "think aloud" as they completed the online survey, and then asked follow-up questions where appropriate to further explore their thinking (see Appendix B). For example, after teachers listed the names in response to the advice prompts, we followed up with questions such as "Was there anyone who popped into your head that you disregarded? Why did you disregard them?" Each interview took approximately 45 minutes and all were tape recorded and transcribed.

Data Analysis

Study 1. We analyzed interviews to examine the nature of the interactions teachers and principals reported when asked about their advice-seeking behavior and to determine the extent to which these interactions were instances of leadership for mathematics instruction. We imported the interview transcripts into HyperResearch and applied a code to identify all instances where interviewees responded to the question of who they went to for advice. Forty-seven of the 49 study participants were asked the question, "Do you go to anyone for advice or information about mathematics instruction?"⁵ Of these 47 interviewees, 44 mentioned at least one name/position (e.g., "the math coach") or group (e.g., "the other primary teachers"), while three said they did

⁵ Though we interviewed 49 people in total, two of them were not asked about math; rather, one of these was asked about instruction in general, and one was asked about literacy instruction. Therefore, we did not include them in this part of the analysis.

not go to anyone for advice. These 47 interviewees identified a total of 92 advice-seeking instances.⁶

Importing all data coded under advice-seeking into Excel, we used open coding to identify emerging patterns in content and purpose. Next, we examined responses in each of the coded categories to determine the extent to which we might categorize these as instances of leadership for instruction (that is, instances where interviewees indicated that the purpose of the interaction was to influence instruction). Table 1 lists the codes and their definitions, a count of the number of advice-seeking instances that fell into each coding category, and our assessment of whether the instances in each coding category were examples of leadership. As some of the advice-seeking instances were double-coded because some interviewees gave multiple reasons for having sought out someone for advice or information, the numbers exceed the total number of influential interactions. We discuss these results in more detail in the next section.

[Insert Table 1]

We also compared the names interviewees mentioned in response to the interview question of who they go to for advice to the names they mentioned in response to similar questions on the SSSNQ survey (recall that interviewees had been administered Version 1 of this survey prior to participating in the interviews). The intent of this analysis was to determine whether asking the advice question in the surveys led interviewees to respond in the same way as they had in the interviews; the results of this analysis indicated that 80% of the time that a person mentioned a name in the interview in response to the math advice question, they mentioned that same name in the survey for math or teaching in general.

Study 2. We analyzed the cognitive interviews to examine whether survey respondents' interpretations of the survey questions were aligned with our interpretations as designers of the instrument, and to determine whether there were there aspects of

⁶ The number of advice-seeking instances per interviewee ranged from 1 to 6, and the average number of instances per interviewee was 2.09.

leadership for instruction that might not be picked up by the survey. To conduct this analysis, we examined interviewees' utterances as they filled in names in response to the survey prompts, and also examined any descriptions interviewees gave of their interactions with the people they listed. This allowed us to examine whether interviewees understood the questions to be about interactions in which they received information or advice intended influence their teaching of a specific subject. In addition, we examined interviewees' responses to questions about who they chose *not* to list in order to determine whether there were aspects of leadership that the survey missed.

School Staff Social Network Questionnaire in Practice: Promises and Problems

A primary goal of the work reported in this paper was to determine the validity of the inferences we can make about leadership for instruction based on the data generated by the SSSNQ. In the SSSNQ, we attempt to access leadership through asking about people's advice-seeking behavior. Our assumption is that asking respondents about advice-seeking will prompt people to recollect interactions in which leadership, operationalized as social influence interactions, occurred. In the first study, we examined this assumption by analyzing interviewees' descriptions of their advice seeking behavior. In the second study, we examined this assumption in more depth, and also explored the question of what aspects of leadership we may miss with our version the SSSNQ.

Study 1 Findings

Our findings indicate that asking people who they go to for advice or knowledge about mathematics instruction enabled us to identify instances of leadership for mathematics instruction. In fact, while some of the interactions described by interviewees were instances of what we consider instructional *management* (rather than instructional *leadership*), our evidence indicates that the majority (83%) of the advice-seeking interactions we identified were indeed leadership for instruction – that is, interactions that were intended to influence knowledge, practice, and/or motivation related to instruction. Most of these leadership interactions were informal interactions;

very few interviewees mentioned interactions that occurred as part of formal organizational routines (e.g., grade level meetings, school improvement planning process). This may indicate that the social network survey is particularly suited for tapping into informal leadership, whereas it may miss some aspects of formal leadership. Our analysis also suggests that both advice-givers and advice-seekers assumed the leadership role depending on the particular interaction. Hence, while the social network survey is particularly useful for picking up on leadership *activity*, some caution is necessary in assigning participants to the *leader* and *follower* roles. We discuss each of these findings in more detail in the following paragraphs.

Advice-Seeking Interactions as Leadership. Of the 92 instances of advice-seeking identified in the interviews, seventy-six were leadership interactions – that is, interactions that were intended to influence knowledge, practice, and/or motivation related to instruction. These social influence interactions covered a wide array of those organizational functions thought critical for a school to run well, including human development (e.g., enhancing teachers’ knowledge) and organizational development (e.g., resource distribution; vertical and horizontal curriculum alignment).⁷

As an example of leadership related to human development, consider the response of Ms. Ryan⁸, a 2nd-grade teacher, when asked if she consults anyone for advice about mathematics instruction:

“There's a girl in here that is really...she seems to me like she's really got it together, so I always think about this wonderful person ... actually it's weird because...last year she was a first year teacher. ... She was fresh out of college and I told you that I've been teaching now eight years. But this girl's methods are so fresh that you know, I can't help it. I just want to... I like to talk to her about it

⁷ Interestingly, the interviews contained no instances of vision-setting - another important organizational function; this may be an aspect of leadership that is less likely to be *sought* than *offered*, and therefore less likely to come up when people are asked about who they go to for advice; we discuss this further later in the paper.

⁸ All interviewee names are pseudonyms.

... and she knows how to make it interesting and that I need ...when something has worked well, it's usually been her idea.”

Here, Ms. Ryan indicates that she perceives her interactions with Ms. Smith as enhancing her knowledge about how to teach even though Ms. Smith had no formal leadership position and was a novice teacher. Still, Ms. Ryan explained that Ms. Smith influenced her knowledge about pedagogy and her actual teaching practice. Ms. Ryan’s response suggests that the SSSNQ taps into leadership for instruction that is not tied to formal leadership positions, even when the source is a novice teacher.

As example of leadership related to curricular alignment, consider this response of Ms. Allan, a 4th and 5th-grade science teacher, who, when asked if she seeks advice from anyone about mathematics instruction, explained:

“Yes I do. Because ... we have to do measurements in science. And I did work with the math teacher, Ms. Osmond, to say ok, ‘what's the best way to do this?’ ‘Have you covered this yet?’ And they (students) really struggled with measurements ... so I ended up just having them count the tiles rather than get out the ruler and everything because they didn't, they didn't' really know how to do that. ... I did sit with her (Ms. Osmond) when I taught math in summer school... but I asked her the way that she explains it because I know the way that I learned it or how to get the answer, but the process that she uses like she has some pneumonic devices for division ... so since that's the way they learn it then that's the way you know I have to teach it again.”

Ms. Allan indicated that her interactions with Ms. Osmond influenced how she teaches measurement in her science lessons so it is aligned with how her students learn measurement in their mathematics classes. Further, Ms. Allan’s remarks suggest that through her interactions with Ms. Osmond she also acquires content knowledge about the process of calculating measurement.

The response of Ms. Martin, a second grade teacher, is representative of interactions related to resource distribution. Explaining that she goes to Ms. Newman, a fellow primary grade teacher, she noted:

“... basically if I am teaching a lesson in math, like currently we are doing money, coins, counting, I want something that's not in the book, something different, something out of the ordinary. Like I would need an idea or some sort of concept [so] that I can approach it differently so that the students see the lesson in a different angle. So I kind of go to her like for either books, or manipulatives or just a basic idea.”

Ms. Martin’s response indicates that her interactions with Ms. Newman influence her knowledge of *how* to teach and provide her with the necessary manipulatives and books to teach in this way.

The interactions described in each of these examples align with our definition of leadership as social influence interactions – that is, interactions intended to influence, or understood as intended to influence, instruction. The majority of the interactions we analyzed (83%) were consistent with this definition of leadership for instruction.

Of the 92 instances of advice-seeking, there was only one instance in which the interviewee alluded to the advice-giver influencing motivation. An eighth-grade math teacher Mr. Monk explained that his principal “encourages us to join the organizations, go to workshops ... she’s very supportive in that area, you know, to better help us become better teachers.” Our analysis suggests that the SSSNQ questions may predispose participants to report interactions related to their *knowledge and practice rather than to their motivation*. This may be in part a function of using the words ‘advice’ and ‘information’ in the prompt as these words may be more closely tied to knowledge and practice than to motivation.

Leadership vs. Management. Our analysis uncovered some instruction-related interactions (6 out of 92) that were not closely aligned with our definition of leadership,

in that it appeared these interactions were not intended to *change* instruction, but rather were intended to maintain the status quo. For example, third-grade teacher Mr. Riggins mentioned that he goes to his mentor and the 2nd grade cohort to “exchange things like I need your timer or do you have a ruler or ... I need some containers.” In contrast with some of the other resource exchanges described in the interviews (where teachers indicated that they went to others for resources or activity ideas that might *change* their practice in some way), we assume that in these cases Mr. Riggins already had a particular classroom activity planned, and simply saw the purpose of these interactions as that of procuring resources he had already elected to use, rather than actually modifying his practice. Therefore, we do not see this instance as an example of *leadership* for instruction, in that the interaction was not intended or perceived to *change practice* related to the core work of the organization. We do, however, see this as an instance of *managing instruction*, the distinction being that management refers to efforts at *maintaining*, as opposed to changing, current arrangements (Cuban, 1988). We should acknowledge here that drawing distinctions between leadership and management can be difficult in practice and the two often go hand in hand in the same interaction (Spillane & Diamond, 2007).

The other five interactions that were not aligned with our definition of leadership involved getting help with technology. For example, 2nd-grade teacher Ms. Martin mentioned Mr. Zink as one of the people she goes to for advice, and explained, “What happens in Accelerated Math is you get yourself locked out of it and he has the administrative password so he can go in and unlock you. Really that’s all I ask him for and that’s maybe every other week or so.” Again this instance is not aligned with our definition of leadership because this interaction *enables* Ms. Martin to deliver instruction she had already planned, rather than changing the way she delivers it. This was the case with 5 out of the 6 interactions in the interviews that involved getting help with technology.

There was one instance of getting help with technology that was aligned with our definition of leadership for instruction. Seventh-grade math teacher Mr. Maxwell explained of his interactions with technology specialist Ms. Ian, “She shows me how to use technology to better understand how to teach my classes.” In contrast with the previous technology example (where technology help simply enabled Ms. Martin to deliver instruction as she had already planned), here it seems that Mr. Maxwell sees the purpose of his interactions with Ms. Ian as that of providing him with knowledge that will potentially change the way he delivers instruction. We argue, then, that this is an example of leadership, whereas the other examples were management.

These examples highlight that distinguishing management and leadership, while helpful analytically, can be challenging in practice. As evident in Table 1, for several of the categories, we were unable to determine whether the interaction involved leading or managing instruction. In some instances, this was a result of interviewees failing to adequately probe interviewees contributing to vague responses. This was the case with 15 of the 92 advice-seeking instances, where interviewees indicated that they went to others for general advice, discussion, or problem-solving. In such cases, because we do not know the issues or problems under discussion, we cannot determine whether these instances were aligned with our definition of leadership. In other cases the difficulty in determining whether the interaction involved leadership stemmed from our inability to determine the purpose or intent of the participants. Specifically, in 6 of the 92 instances, interviewees indicated that they were discussing or getting help with their interpretation of test scores. Catholic School Principal Sister Elizabeth explained that “I have consulted downtown, uh, like on the Terra Nova (standardized test) when I wanna say these scores don’t make sense or they’re not in correlation the way I think they should be ... I’ve asked for help from the um, testing coordinator down there.” In this instance, the purpose of Sister Elizabeth’s advice seeking is unclear. If she was seeking help with understanding the test scores in order to determine what instructional changes should be

made in her school, then this interaction would be aligned with our definition of leadership for instruction. On the other hand, if the purpose of this interaction was simply to gain information that would help her explain the test scores to teachers or parents, then this is perhaps more about school management and administration.

Similarly, for 4 of the 92 instances, interviewees indicated that they were checking up on progress. Public school principal Ms. Emory, for example, explained that she goes to her school math and science lead Ms. Pointer when “I’m concerned about are we hitting everything we need to hit in order for the students to do well on assessment and that they’re actually understanding. And she’s been real good about telling me where she thinks the students are at this point and we talked a lot about the extended response and she was real good about reviewing extended response in the computer lab for math. So talking about how is it looking? How ... what ... what feel are you getting about what’s happening with the math teachers in the building?” The extent to which this interaction is leadership for instruction depends upon whether the intent of Ms. Emory in initiating this interaction was to gain information that would help her determine what changes to make in the curriculum or instructional approach, or whether she was simply wanting to stay informed of progress (such that she could, for example, keep her stakeholders informed of how things are going). It seems likely that she perceived the purpose of this interaction as that of determining whether any instructional interventions were necessary, which would be aligned with our definition of leadership. However, we cannot tell based on her response in the interview.

Informal vs. Formal Leadership. Interviewees mentioned seeking interactions with both formal and informal leaders. Twenty-four of the 92 advice-seeking interactions (26%) involved individuals in formally designated leadership positions, such as principal and math coach. However, even where interviewees mentioned going to formal leaders, most of the *interactions* described by the interviewees were informal in that they did not occur as part of a formal organizational routine (e.g., school improvement planning) or

meeting (e.g., grade level meeting). In fact, only three of the interviewees mentioned going to someone for advice as part of a professional development session, and only one interviewee explicitly mentioned getting advice in a formal departmental meeting. Still, there were several instances where interviewees noted that their advice seeking was tied to colleagues they had relationships with and that these relationships often came about as a result of participating in the same formal organizational routine.

The prevalence of ‘informal’ interactions over formal interactions is somewhat surprising and it is difficult to figure out whether it is a function of the SSSQ design or the actual interactions that school staff engage in. With respect to instrument design, one possibility is that the wording of the question may prompt respondents to focus on informal exchanges and to ignore interactions that occurred as part of formal routines and meetings. Specifically, getting advice or information from people in a meeting may be construed by respondents as not intentionally or actively *seeking out* advice or information from someone. Further, asking “To *whom* have you turned ...” may predispose respondents to focus on interactions with one other person (dyadic interactions) rather than interactions that involve multiple people. Hence, the current SSSNQ may be better designed to picking up informal leadership and may underreport on formal leadership. In some respects this may be less problematic than it first appears because it is considerably easier to identify formally designated leaders from organizational charts and rosters and through survey items that ask about leadership responsibilities. In contrast, informal leadership is difficult to tap into. Still, our data might be capturing what school staff actually experience in their day to day work. For example, informal interactions are likely much more prevalent than interactions in formal organizational routines and meetings that happen only weekly or monthly. Further, there is some evidence to suggest that organizational routines in schools are often more about managing rather than leading instruction (Cuban, 1988).

Who is the leader? While the primary emphasis of our work is on leadership *practice*, we are also interested in the identification of those who occupy the leadership role some or most of the time; that is, those persons in a school who take responsibility for a major chunk of the social influence interactions related to instruction. In particular, while the SSSNQ enables us to identify those organizational members who are advice-givers in the bulk of these social influence interactions, we are interested in whether it is valid to claim that those persons who are most sought after for advice are indeed instructional *leaders*. Certainly, in the representative interactions we have described above, the person who is sought after for advice is cast as a leader by the advice seeker, in that the advice seeker sees the advice giver as influencing the advice-seeker's practice. However, we offer some cautionary notes in making inferences from these data about leaders for instruction.

To begin with, in some social influence interactions, interviewees' accounts suggested that influence was bi-directional – a two way street. For example, Ms. Sharp, a 3rd-grade teacher, said of her relationship with Ms. Maple (another 3rd grade teacher in the same school) “we share information and activities.” Ms. Pointer, a math teacher and coordinator, explained of her relationship with fellow 8th-grade math teacher Ms. McClain, “We gave the same tests and quizzes, so that once we gave a quiz, we could sit down and say, ‘How come yours are better than mine? What did you do that I didn’t that I could change or vice versa?’ (Ms. McClain) comes to me every time she gives a test or a quiz and says, ‘Look at these. What can we do?’” Fifteen of the 47 participants (32%) in the study made similar remarks, suggesting that the direction of influence in their interactions were sometimes bi-directional. These accounts underscore that distinctions between leadership and followership are sometimes fuzzy in practice and that people can move in and out of these roles, even formally designated leaders. Fortunately, the SSSNQ picks up on these two-way interactions and reciprocated ties can be easily identified.

At times *advice-seeking* itself may be a leadership interaction. Principal Gant explained that, in deciding whether or not to adopt a new curriculum, she would go to her teachers and ask “Are we missing something? Are there gaps in the curriculum? Can you look at that for me please?” She went on to say “And then I ask teachers do they wanna go to a workshop or do they know if it would be any good or would it be helpful to skip it?” Certainly, asking teachers for input might be construed as providing them an opportunity to participate in leading instruction at the school. However, while we assume the teachers from whom Principal Gant sought advice intended to influence instruction with their input, the original intention to influence instruction (through requesting the teachers’ input) lay with Principal Gant. In fact, one could argue that whenever one takes the initiative to seek out advice in order to change the way instruction is delivered, the advice-seeker is as much a leader as the advice-giver.

In analyzing social network data, the “directionality” of an advice-seeking interaction may not be as important as the existence of the interaction in the first place. Specifically, the SSSNQ may be a more accurate in identifying the *participants* in social influence interactions than in nominating the advice-givers as the *leaders*. At the same time, if multiple individuals identify the same person then we might conclude that this person is very likely a leader for instruction or has considerable opportunity to lead instruction.

Interviews vs. Surveys. Our analysis indicates that asking people who they go to for advice or knowledge about instruction can illicit instances of leadership defined as social influence interactions. A related concern, however, is the responses of school staff to these questions on a survey rather than an interview. Comparing the names generated by school staff in interviews to the names they generated in surveys, we found high agreement. Specifically, 80% of the time a person mentioned a name in the interview, they mentioned that same name in response to the survey questions. While this high level of agreement between the two methods might be interpreted as validating the SSSNQ, we

again urge caution here. Specifically, while it is tempting to consider the face-to-face interviews as generating more valid data (high internal validity) due to opportunities for probing and follow-up with participants, internet survey and face to face interviews are two distinct methods and one would not expect a perfect match. Still, the levels of agreement do suggest some cause for optimism with respect to the validity of the inferences we can draw from the data generated by the SSSNQ.

Study 2 Findings

In this section, based on an analysis of our cognitive interviews with 10 teachers, we discuss the extent to which the interviewees interpreted the survey questions in ways that were consistent with our intent in designing the survey. In doing so we also consider whether our questions may have missed aspects of leadership related to instruction. Our analysis suggests that, for the most part, teachers interpreted our survey questions in ways that were consistent with our intent. At the same time, there were some inconsistencies in how teachers interpreted the survey questions, specifically in regards to whether “advice and information seeking” included observations and the informal “bouncing around” of ideas. Furthermore, our analysis suggests that the survey may underreport interactions that involved *unsolicited* advice-giving, as well as interactions around discipline/behavior management issues and aspects of teaching that cross subjects. Finally, our analysis suggests that the SSSNQ survey may under-report infrequent interactions that happened not-so-recently. We discuss each of these findings below.

What “Worked” with the Survey Questions. Our analysis indicates that teachers interpreted the question “To whom have you turned for advice or information about teaching (subject X)” as we had intended, describing interactions that were intended to influence their teaching of a particular subject. Several teachers explicitly distinguished advice-seeking that was intended to influence teaching from interactions that were not intended to influence teaching. For example, Ms. Harter, in explaining why she didn’t list one of her fellow teachers as a source of advice and knowledge said “You know,

maybe in passing she might've said, 'we're learning multiplication', but I don't consider that getting advice or information from her. I guess I got information but it *didn't help me with any of this.*" And Ms. Kipling, in response to the question about who she goes to for math advice, explains "I guess I would go to the math teacher but it's never really come up. I did have her help me study for the GRE math part though." So, though Ms. Kipling did go to the math teacher for math advice, she did not list the math teacher in response to the question because that advice was not instruction-related.

In all cases, as interviewees described the kinds of advice they received from the people they listed, they tied their descriptions back to the particular subject they had been asked about. Interviewees were able to easily categorize such advice as being about "deepening content knowledge", "planning or selecting course content and materials", "approaches for teaching content to students", "strategies specifically to assist low-performing students", or "assessing students' understanding of the subject."

Inconsistencies in Interpretation. There were some inconsistencies in what teachers included as "advice or information", particularly when it came to the inclusion of teacher observations and the informal "bouncing around" of ideas. Three teachers brought up observations in the interview; of these three, two *included* observations, and one *excluded* them. For example, Ms. Dalton included teachers she observed, explaining "Sometimes I go into other people's classrooms. I don't know if that's turning to them for advice or information. I go to see what they're doing and see the activities that they have planned for their classroom. *I will say I went to them for information.*" As designers, we would like for teachers to consider such observations as potential advice and information-seeking interactions. However, not all teachers interpreted the prompt to include observations. Ms. Harter explicitly excluded those she observed; when asked if there is anyone who she didn't list that influences her teaching practice, she said "Well ... there are certain teachers ... I see what they're doing in their classroom and that might influence (my teaching), like the 7th-grade teacher. And some of these teachers I feel

like I didn't even necessarily go to them to ask things; it was just like looking and observing things they do." In some respects then, the SSSNQ, because of its focus on verbal (or even written) exchanges, may under-report interactions that mostly or exclusively involve observation.

Similarly, three teachers mentioned "bouncing ideas around"; of the three, one included, while two explicitly excluded, these interactions. Ms. Waller included a teacher with whom she bounced ideas around, explaining, "Now [she] is a new teacher to our district; she started last year. And uh, I bounce a lot of ideas off of her and she bounces a lot of ideas off of me. She is very creative and so I talk to her a lot," while another teacher explicitly excluded bouncing ideas around; as Ms. Miller explains, when asked if there is anyone else she talks to about literacy that she didn't mention, "I have some friends who are teachers who I guess I could've put down. But I don't know ... maybe it's the way the question was phrased or something, but it seems like, um, information about teaching so like how to teach it ... so, like, methods or ... assessment, not necessarily like a cool idea. You know like how do you get at like the content or the skills so I think maybe that's why I didn't." When prompted to elaborate, she says, "I think [what I do with my friends] is more like bouncing ideas, like, activity ideas, off each other. Or like, 'I'm thinking about doing this' or 'I know you've done this before, how did it work exactly or like can you give me your worksheet or you know something from that.'" On the one hand, Ms. Miller's response is evidence that teachers are careful and discriminating in how they answer the survey questions. On the other hand, while Ms. Miller chose to exclude this type of interaction, this casual "bouncing around of ideas" among friends is potentially leadership, if the interaction was intended or understood to influence instruction.

We are unable to gauge based on the current study what portion of teachers are likely to include or exclude persons they observe, or persons with whom they bounce ideas around. However, this does point to the ways in which our survey questions might

potentially be misinterpreted by study participants, and we are considering ways to revise the survey to reduce the likelihood of these types of misinterpretations. We discuss design changes later.

Aspects of Leadership the Survey May Miss. Our analysis indicates that there may be some types of leadership interactions that the SSSNQ prompts fail to illicit because of the focus on advice and information. Observations and “bouncing ideas around” are two such examples of this. Our analysis also indicates that the SSSNQ prompts may also fail to pick up on or at least under report *unsolicited advice-giving*. Ms. Harter, when asked if there was anyone else who she interacts with or talks to about reading, writing and language arts that she didn't list, said, “Yeah, I guess my assistant principal a little bit. But I feel like not enough to constitute...like some of these (other) people I didn't talk with very much (either) so I don't know why I'm not like including her. But I feel like you know *I would never really ask her anything I guess. She more just like gives us suggestions more than anything.*” Ms. Hatter’s omission of the assistant principal is problematic considering our working definition of leadership. Specifically, even though the assistant principal’s advice to Ms. Hatter was not solicited by her, it is an example of a social influence interaction that is either intended or understood to influence. Though we only uncovered one instance of this sort of omission, it may indicate that unsolicited advice-giving may be underreported by the SSSNQ.

We also identified other types of leadership activities that, by design, our instrument does not pick up on but that may be important for researchers to consider. These include advice-seeking interactions around discipline/behavior management issues, and interactions that have to do with aspects of teaching that cross subjects. Several teachers, when asked if there was anyone who influenced what they did in the classroom whom they did not list, mentioned people they turn to for help with discipline and behavior management issues. For example, Ms. Miller explained that “The 7th-grade (Spanish) teacher helps me a lot with behavior issues and discipline ... the principal also

... she'll occasionally give me ideas or more let me talk ideas out and definitely discipline and behavior ... some of the other teachers ... helped me with behaviors and discipline.” And Ms. Kipling explained that she did not list her Mom (a Special Ed teacher) as someone she goes to for advice related to teaching Social Studies because they talk more about parents and behavior. Ms. Sanders, a foreign language teacher, was also asked if anyone influenced her teaching whom she did not list. She replied that she sought advice from her mother and her boyfriend related to how to deal with the children in certain situations, but explained that she didn't list them “because neither of them would know how to go about teaching foreign language.” On the one hand, this demonstrates that teachers are discriminating in the way we had intended between subject-specific instruction and other kinds of advice. On the other hand, the ways in which teachers deal with discipline and classroom management do indeed affect instruction in particular curricular domains.

With respect to aspects of teaching that cut across school subjects, science teacher Ms. Waller, when asked if there was anyone who influenced her teaching that she didn't list (in response to the prompt about advice for teaching *science*) explained, “Yes, there are teachers in other subject areas that have influenced me. For example, Miss Quinton who's our drama teacher has influenced me to try to put more artistic things within my curriculum.” She also mentioned going to a couple of language arts and math teachers to ensure that, when she has students do writing- and math-related tasks in her science classes, she is consistent with what they are taught in their language arts and math classes. Later in the interview/survey, Miss Waller did list these language arts and math teachers in response to math and RWLA prompt; if we had asked Ms. Waller “To whom have you turned for advice or information about *art* as it relates to your classroom teaching” it is likely that she would have mentioned the art teacher as well. Once again, this shows that teachers are discriminating in responding to the questions. At the same time, what this points to is the trade-off in asking questions that

are school subject-specific. If we want to identify the full range of interactions that are intended to influence the way a particular subject is taught, we have to ask about multiple subjects.

Current Networks vs. Past Networks. Our goal in asking about advice-seeking over the past year is to pick up not only recent and frequent leadership activities but also to trigger respondents to include infrequent leadership activities. Our analysis suggests that, despite our efforts, rather than thinking in historical terms, respondents may be focusing on the present and identifying people in their current support network. For example, in response to the name-generator prompt and while filling in the survey online, interviewees typically spoke in the present tense with phrases like “I go to ...” or “I talk to ...” or “I ask her about ...” (rather than saying “I have gone to ...” or “I have spoken to ...”). Even when interviewees did take an historical perspective, there were instances where people left off the names of those that they had not interacted with recently, or with whom they interact infrequently. Ms. Dalton, for example, when asked if there was anyone she thought of but decided not to include, responded "I was thinking (of another teacher), she's a third grade teacher, but she wasn't here for half the year ... and so I didn't really go to her for that much help this year". And Ms. Kipling, when asked if there was anyone she didn't list, remarked, “Yeah, there's some 7th and 8th grade teachers we kinda chit chat maybe here or there. But I don't have as frequent, you know we just have...like we have this meeting today with all the math teachers (she'd already listed). These are pretty much you know the core because we all teach the same thing and we're all you know in the same boat. So all this is where my frequent contact is with these three.” Based on this analysis, we suspect that the SSSNQ survey may under-report infrequent interactions that happened not-so-recently.

Discussion

Our analyses suggest that asking people who they go to for advice or information related to specific school subjects does indeed identify leadership operationalized as the

social influence interactions in an organization. At the same, there are aspects of leadership that the versions of the survey examined here may sometimes miss or underreport, but that are important influences on instruction. Social influence interactions tied to formal organizational routines (such as professional development activities, departmental meetings, etc.), unsolicited advice giving, teachers observing or “bouncing ideas around” with other teachers, leadership around discipline/behavior management issues, and leadership that crosses subjects may be underreported in the SSSNQ. Additionally, the survey may underreport interactions that occur infrequently or with people who are not part of teachers’ current advice networks. In the following paragraphs, we discuss redesigning the SSSNQ to address these issues.

Regarding our finding that there are aspects of formal leadership that the survey may under-report (including professional development sessions, departmental meetings, and instances of unsolicited advice-giving from formal leaders), we believe that tweaking the prompts may redress the problem. In particular, we hypothesize that asking people who they have *turned to* for advice or information caused them to focus on interactions they initiated, excluding interactions in which they *received* unsolicited advice or that were organizationally prescribed. Therefore, we propose modifying the survey to ask, “From whom have you *received* advice or information”, instead of the question “To whom have you *turned* for advice or information”.

Regarding the issue that there were some inconsistencies in whether teachers included observations of other teachers and “bouncing ideas around” with each other, we are considering providing some examples for teachers to consider when introduced to the social network section of the survey, explicitly mentioning activities such as observing other teachers and bouncing ideas around (we could also include formal routines such as professional development activities and meetings, further addressing the issue described in the previous paragraph). The trade-off is that in listing specific examples, there is a risk we will bias teachers toward only including interactions that are similar to the

examples. If we do choose to list such examples, then, it will be critical that we list a broad range of possibilities and word the question in a way that makes it clear this is not an all-encompassing list.

Regarding leadership around discipline/behavior management issues, and leadership that crosses subjects, we are considering two options. One is that we modify the survey so that, rather than starting with the subject-specific questions, we start with a general question about who people receive teaching-related advice from. Then, we would allow respondents to indicate whether the advice they receive is about their own subject, another subject related to teaching their own subject, or discipline/behavior management issues. Within each of those three categories, we could then ask more detailed questions as appropriate. Another option is that we ask about subject specific advice in the way we currently do, and then provide interviewees with a follow-up prompt that says, “Is there anyone else you didn’t list already who provides you with teaching-related advice or information?”. If participants answered yes, they would list the additional names, and then identify what dimension of teaching (e.g., discipline/classroom management, teaching strategies incorporating another subject into their teaching) the advice covers.

Finally, regarding the fact that some teachers seemed to answer in terms of their current network rather than in terms of their network throughout the year, we are considering changing the advice prompts such that, rather than asking about behavior over the past year, we simply ask about current teaching networks (i.e., “From whom do you currently receive advice or information about teaching”).

The SSSNQ allows us to move away from an exclusive focus on school principals and other formally designated leaders to include non-positional leaders. Further, by focusing on social influence interactions it allows us to tap into leadership practice as distinct from leaders. In this respect, the SSSNQ offers an important research instrument for examining school leadership. Like any research instrument or approach the SSSNQ

has limitations, many of them surfaced in this paper, and an awareness of these is key in generating valid inferences about leadership for instruction.

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Figure 1. Screen shot from SSSNQ Version 1 - Math Advice Questions

To whom have you turned for advice or information about MATH TEACHING STRATEGIES & CONTENT? More spaces available on next page.

How much did this influence you?
1=not at all
5=very influential

Name:	How often?	Influence
Faculty 7	Yearly	5
Faculty 5	Quarterly	4
Faculty 2	Monthly	3
Faculty 9	Weekly	2
Faculty 2	Daily	1

Progress

math 1

Figure 2. Screen Shot from SSSNQ Version 2 – Math Advice Questions Page 1

School Staff Survey

NORTHWESTERN UNIVERSITY

During THIS SCHOOL YEAR, to whom have you turned for advice or information about teaching Mathematics? Please write full first and last names, and give a brief description of that person's role or position. You do not need to fill all the spaces.

I have not sought advice from anyone.

Name	Role
Jim Spillene	principal
James Pustejovsky	6th grade teacher
Virginia Pitts	math coordinator
Cindy Sigal	roommate - also a teacher

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Figure 3. Screen Shot from SSSNQ Version 2 – Math Advice Questions Page 2

School Staff Survey

Please check the boxes that accurately describe the type of advice or information you sought from each person.
(Select all that apply.)

	<i>Deepening your content knowledge</i>	<i>Planning or selecting course content and materials</i>	<i>Approaches for teaching content to students</i>	<i>Strategies specifically to assist low-performing students</i>	<i>Assessing students' understanding of the subject</i>	<i>Other</i>
Jim Spillane	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
James Pustejovsky	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Pitts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Cindy Sigal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please describe the other advice or information you sought from each person.

Virginia Pitts

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Figure 4. Screen Shot from SSSNQ Version 2 – Math Advice Questions Page 3

School Staff Survey

For each person listed below, please describe how often you interact with him or her, and how influential his or her advice is on your work.

	Frequency	Influence
Jim Spillane	<input type="text" value="A few times per year"/>	<input type="text" value="1 (Not at all influential)"/>
James Pustejovsky	<input type="text" value="Once or twice per month"/>	<input type="text" value="3 (Somewhat influential)"/>
Virginia Pitts	<input type="text" value="Once or twice per week"/>	<input type="text" value="5 (Very influential)"/>
Cindy Sigal	<input type="text" value="Daily or almost daily"/>	<input type="text" value="-Click Here-"/>

← Back Next →

Table 1. Coding Results for Nature of Advice-Seeking Interactions in Interviews

Code	Code Description	Count	Is This Leadership for Instruction?
Tch	Seeking help with how to teach/present something	26	Yes
Cov	Ensure coverage/consistency between grades or teachers	11	Yes
TrbS	Getting help with students who are having trouble	9	Yes
Mth	Discussing math; help with math	5	Yes
Coord	Coordinating/co-planning	4	Yes
CD	Getting input on curricular decisions	3	Yes
WI	Help with what to include	2	Yes
Fac	Help with how to help faculty / help faculty teach	2	Yes
MS	Getting help with managing students, grading, homework	2	Yes
Motiv	Encouraging/motivating	1	Yes
RA	Getting/sharing resources, materials, activities	11	Yes (w/one exception)
Tech	Help with technology	5	No (w/one exception)
GAD	General advice, discussion, or problem-solving	15	Unclear
Test	Discussing, or help with interpreting, test scores	6	Unclear
StsChk	Checking up on/clarifying school progress	4	Unclear

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Appendix A - Leadership Interview Protocol (Advice Questions Only)

Do you consult anyone or anything for advice or knowledge about mathematics instruction?

If answer is yes:

What sources do you consult?

With reference to each person mentioned:

How often do you connect with _____?

Why do you go to _____?

What do you usually go to _____ for?

If no person mentioned:

You didn't mention going to anyone for advice or knowledge about math instruction; why not?

Appendix B – Cognitive Interview Protocol (Abridged Version)

- 1) After introduction and before starting, remind interviewees to:
 - Read the question out loud
 - “Think out loud” as you come up with the answer
 - Make sure you share any thoughts about what you decide *not* to include or *not* to take into account.
 - Share any impressions or reactions to the question itself
- 2) Have interviewees talk aloud through advice questions for different subjects.
- 3) After they complete each set of advice questions, ask (if it wasn’t clear from think-aloud):
 - How did you decide which names to fill in?
 - Was there anyone who popped into your head that you disregarded?
 - Why did you disregard them?
 - Is there anyone else you interact with or talk to about anything that is at all related to mathematics teaching?
 - Why did you not include them here?
 - How did you decide how influential each person was? Can you think of any examples of ways they have influenced you?
 - How did you decide how satisfied you were with the advice that’s available? What might make you more satisfied?
 - Were there any advice categories that were confusing? Any advice categories that seems to be left off?
- 4) After completing last advice network question (the one about school-related matters), review/show list of teachers that have come up for each network, and ask:
 - Is there anyone else who influences what you do in the classroom that is not listed here?
 - Why did he/she not come up here?
 - Is there anyone you interact with frequently that wasn’t listed here?
 - Why did he/she not come up here?
 - Which of these people (if any) would you see as “leaders” in your school? Why?