Chapter 3
The Critical Role of Brokers in the Access and Use of Evidence at the School and District Level

Alan J. Daly, Kara S. Finnigan, Nienke M. Moolenaar, and Jing Che

3.1 Context

The No Child Left Behind (NCLB) Act enacted a series of large-scale reforms targeted at eliminating the persistent achievement gap in US public schools. This federal legislation contained clear-cut language that reoriented educators and policymakers toward alignment between federal dollars and the use of research-based evidence, or "scientifically based research." Despite the law's emphasis, scant empirical research exists regarding the systematic definition, use, access, and flow of research evidence in schools and across districts (Honig and Coburn 2008).

This research was supported by an award from the W. T. Grant Foundation (Grant #10174). All opinions and conclusions expressed in this article are those of the authors and do not necessarily reflect the views of the W. T. Grant Foundation.

Authors "Alan J. Daly" and "Kara S. Finnigan" contributed equally to this work.

A.J. Daly (✉)
Department of Education Studies, University of California,
San Diego, La Jolla, CA, USA
e-mail: ajdaly@ucsd.edu

K.S. Finnigan
Warner School of Education, University of Rochester,
414 LeChase Hall, Rochester, NY 14627, USA

N.M. Moolenaar
Department of Education Studies, University of California, San Diego, CA, USA

University of Twente, Enschede, Netherlands

J. Che
Rochester City School District and Center for Education Policy Research,
Rochester, NY, USA

K.S. Finnigan and A.J. Daly (eds.), *Using Research Evidence in Education: From the Schoolhouse Door to Capitol Hill*, Policy Implications of Research in Education 2,
DOI 10.1007/978-3-319-04690-7_3,

During the same time period, educators have experienced an increasing national and international push to systematically collect, interpret, and use data for instructional decision making (Finnigan et al. 2013). In this process of data use, district office staff mediate state and federal policies by playing a critical role in selecting evidence, developing knowledge, and supporting the use of data (Coburn et al. 2009b; Datnow et al. 2007; Hamilton et al. 2007; Ikemoto and Marsh 2007). In addition, school-level leaders play key roles in disseminating evidence, directing new learning efforts, and aligning new activities to existing efforts (Datnow and Park 2009; Kerr et al. 2006; Knapp et al. 2007). This suggests the importance of the social interaction between educational leaders in district offices and school sites for these educators to co-construct and make sense of evidence and its use (Coburn 2001, 2005; Datnow et al. 2002; Parise and Spillane 2010; Spillane et al. 2002).

In this exploratory case study, we describe and analyze the structure of a social system by examining the social interactions among district office and school site leaders. Specifically, we utilize social network theory and methods to examine how evidence is "brokered" by educational leaders across a large urban district, focusing particularly on whether evidence reaches leaders in low-performing schools. The term "broker" refers to those individuals who connect otherwise disconnected individuals or groups in the movement of a relational resource (e.g., advice). Social network theory provides insight into how evidence moves across individuals and levels of the educational system. Examining the social network of these district leaders allows us to better understand the more dynamic supports and constraints of the larger social infrastructure (Borgatti and Foster 2003; Cross et al. 2002; Daly 2010; Wellman and Berkowitz 1998).

The evidence "users" in our study are central office leaders and school site leaders. While all leaders comprise the structure of relationships of district leaders, our study specifically focuses on leaders of the low-performing schools given the policy pressures in the United States to improve these schools through increased sanctions and evidence-based reform. Although a growing number of research evidence and data use studies imply the influence of social processes on evidence use, with brokers playing particularly important roles (e.g., Daly 2012), the empirical work and theory building on this topic have not kept pace. In response to this gap, we examine the social network of a large US school district and the role of brokers in the use of data. Our exploratory study is guided by two overarching questions: (1) To what extent do educational leaders in the district broker advice/information regarding research evidence between and among central office administrators and principals? (2) To what extent are low-performing school leaders connected to other district leaders around evidence?

3.2 Frameworks

In recent years, a renewed interest in understanding the extent to which research-based practices are central to practitioners' work and district and school improvement has emerged from inside and outside of the field of education. Several strands

of research indicate the need for additional research to better understand the extent to which decisions are affected by research, the ways in which research evidence is shaped or adapted at the local level, and the factors that support or constrain the use of research. "Evidence-into-practice" (Nutley et al. 2003), "evidence-based decision making" (Coburn et al. 2009a; Honig and Coburn 2008), and "research-based evidence" (Tseng 2012) all refer to the use of research in local decision making and follow from increased attempts to disseminate research information with limited success (Nutley et al. 2003). In addition, all seem to imply that the use of evidence is in some ways stretched over people in a web of relationships (Daly 2012; Tseng 2012). Therefore, rather than trying to understand the use of evidence based on the attributes of an individual (e.g., gender or years of experience), in this chapter, we focus on the influence and outcome of an actor's "position" vis-à-vis social ties with others, as well as the overall social structure of a network (Borgatti and Ofem 2010). In more carefully unpacking this idea, we draw on social network theory.

In understanding the use of evidence through social network theory, it is useful to examine its underlying assumptions. First, social network theory assumes actors in a social network are interdependent rather than independent (Daly 2010; Degenne and Forsé 1999; Wasserman and Faust 1994). Second, relationships are regarded as conduits for the exchange or flow of resources (Burt 1982, 1997; Kilduff and Tsai 2003; Powell et al. 1996). Third, the structure of a network has influence on the resources that flow to and from an actor (Borgatti and Foster 2003). Fourth, patterns of relationships, captured by social networks, may present dynamic tensions as these patterns can act as both opportunities and constraints for individual and collective action (Brass and Burkhardt 1993; Burt 1982; Gulati 1995). It is this constellation of relationships that surround an actor and form a social network across a district and school that can both support or constrain the use of research evidence. Our work suggests that this network structure is consequential to the movement of research evidence (Daly and Finnigan 2011; Finnigan and Daly 2012).

In this study we focus on the use of data, which is often conflated with research evidence in the current policy context (see Finnigan et al. 2013). Recent studies of data use invoke a number of themes related to network theory to explain key evidence/data use processes such as the role of district and site leaders in supporting a data-oriented culture (Honig 2006; Wayman and Stringfield 2006), the use of intermediaries in developing capacity and brokering skills (Atteberry and Bryk 2010; Honig and Coburn 2008; Marsh et al. 2010), the nested and interdependent nature of evidence and data in a coherent system (Datnow et al. 2007; Finnigan et al. 2013; Halverson et al. 2007; Kerr et al. 2006; Levin 2008; Marsh et al. 2006; O'Day 2002, 2004; Supovitz and Klein 2003; Young 2006), and the presence of organizational structures and opportunities to collaborate in a high trust environment (Confrey and Makar 2005; Copland 2003; Daly and Finnigan 2012; Datnow et al. 2007; Halverson et al. 2007; Hammerman and Rubin 2002; Ikemoto and Marsh 2007; Wayman and Stringfield 2006).

In addition, a growing number of scholars aim to increase knowledge on evidence and data use by examining central office-school relationships in school improvement processes (e.g., Daly and Finnigan 2011; Honig and Copland 2008).

Fig. 3.1 Visual representation of broker

Their insights underscore the importance of social relationships among educational administrators, both horizontally (within district and school) and vertically (across district and school). These vertical and horizontal ties can be conceptualized as a social network between and among leaders that may support and constrain the flow of evidence across a system (Daly and Finnigan 2010; Finnigan and Daly 2010, 2012; Finnigan et al. 2013; Finnigan, Daly and Stewart 2012). This social network comprised of horizontal (within group) and vertical (cross group) ties also represents an opportunity for leaders to exploit existing information (within their primary group) and explore new information (beyond their immediate group). As such, depending on the network position of leaders within the overall social network, these leaders may be in the position to act as resource boundary spanners or "brokers" as discussed further below.

3.2.1 Brokers

From a social network perspective, an individual is considered a broker when that actor "bridges" a structural hole (Scott 2000; Stovel and Shaw 2012) (see Fig. 3.1). A broker occupies a position that may provide benefits for the overall system in terms of connecting otherwise disconnected others and that may benefit the actor personally in terms of access to resource diversity (Burt 2000, 2005; Obstfeld 2005). The idea of brokers is often examined through an actor's "betweenness," or how often an actor is positioned "in between" two people in the network who themselves are disconnected (Wasserman and Faust 1994). Betweenness has been argued to support the flow of resources in a social network by creating bridging ties between disconnected actors (Burt 1992). These individuals have increased influence and power within a system due to the social control over resources as they "determine" who receives what particular resource and in what form (Ahuja 2000). In this sense, brokers may filter, distort, or hoard resources, which may provide benefit in the form of control or power to the broker, but which may simultaneously inhibit overall individual and organizational performance (Baker and Iyer 1992; Burt 1992).

Studies of evidence and data use have often identified the key position of boundary spanners in brokering access to data (Finnigan and Daly 2012; Honig and Coburn 2008). These studies highlight the role of a range of different actors (e.g., the district office, intermediary agencies, leaders, and coaches) in bringing evidence, information, and support for evidence use to schools. For instance, district office leaders can play a key boundary spanning role by clearly articulating and supporting the development of shared understanding and alignment with respect to goals and practices, enabling a more coherent system around evidence and data collaboration (Finnigan and Daly 2012; Kerr et al. 2006; Supovitz and Klein 2003;

Wayman et al. 2007; Wohlstetter et al. 2008; Young 2006). Case studies of data use suggest that in creating a more coherent system, district office culture and knowledge related to the use of evidence may also have a substantial influence on the practices of principals in the interpretation and use of data (Firestone and González 2007; Louis et al. 2005, 2010). For example, as standardized data do not usually come in manageable formats, district leaders may "repackage" the data for school consumption. However, in repackaging the data, studies suggest that leaders often do so in "simple" terms that align with their previous knowledge and beliefs as to what is important and valued (Coburn et al. 2009a; Honig 2003; Spillane 2000). In this sense, the movement of resources from the district office to the sites goes through a filtering process at the district office before it is brokered out to the schools (Weick 1985).

3.3 Methods

We used exploratory case study methods to allow us to understand and open up the phenomena of brokering for investigation and theory development (Yin 2003). In examining the diffusion of evidence, we used a social network survey to explore both the general pattern of relationships between leaders around "advice for the use of data" and the presence of brokering relationships in the La Urbana Unified School District (LUUSD). An exploratory case study approach is most appropriate when there is a level of complexity that requires an in-depth understanding of the phenomenon of interest and when attempting to add to theory (Yin 2003).

3.3.1 Context

This study takes place within a large district in the Western United States, named La Urbana[1] Unified School District (LUUSD), which serves more than 130,000 students from 15 ethnic groups and well over 60 languages in preschool through grade 12. The district includes more than 140 schools including elementary, middle, high, K-8, and other schools. The approximate ethnic breakdown of LUUSD is 46 % Hispanic, 24 % White, 12 % African American, 5 % Indo-Chinese, 3 % Asian, Native American, Pacific Islander, and multiracial/ethnic students. The district employs 7,500 educators and nearly 900 pupil services employees (such as bus drivers, grounds, facilities, etc.). LUUSD was identified by the State Board of Education (SBE) as requiring corrective actions due to failure to meet Adequate Yearly Performance (AYP) under No Child Left Behind. This designation required the

[1] Pseudonym.

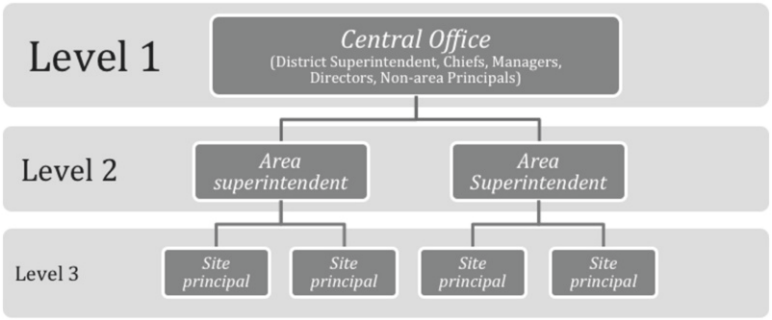


Fig. 3.2 Formal hierarchical levels in the La Urbana District

district to undergo a needs assessment by a national research, development, and service agency. The report noted the need for the district to more directly focus on data-driven decision making and support communication, particularly *within* areas as principals identified inconsistent interactions in their clusters.

In 2012, the district was organized into eight "areas," with each area comprising up to three high school clusters (including elementary and middle schools that feed the high school). These areas were loosely organized by geography and were served by an area superintendent who was responsible for approximately 20–25 schools. La Urbana's website describes the role of the area superintendent as:

> Serving as the ultimate point of contact for the schools in their areas. An Area Superintendent is responsible for all schools and issues in his/her area. Academic, discipline and other issues can be handled by the Area Superintendent's office.

Through this formal role, the area superintendent is the primary point of contact for principals in their cluster, and, as such, also responsible for connecting the central office to the school sites and coordinating action within their cluster. In other words, area superintendents are in the position to broker resources to low-performing schools by way of the relationship between central office leaders and the area principals.

In exploring the idea of brokerage in LUUSD, we examine three distinct levels in our dataset, namely, the central office (Level 1), the area superintendents[2] (Level 2), and the site principals (Level 3) (see Fig. 3.2). In essence, the area superintendents (as the focal actors in our study) are intentionally positioned as brokers mediating the flow of information and resources from the central office to the site administrators in each of their areas.

[2] It is important to note that the area superintendents are central office administrators, but given the unique role they serve as a connection point to the schools and oversee the principals, and as such we have separated them out into their own administrative "level" for these analyses.

Table 3.1 Sample demographics

	Min	Max	M	Sd
Experience as educator	1	40	23.5	8.8
Experience in district	1	39	18.3	9.8
Experience in administration	1	36	11.5	6.4
Experience in current position	1	22	5.2	3.9
Experience in current site	1	30	5.4	5.3
Female	62.9 %			

Table 3.2 Distribution of respondents over positions ($n = 256$)

	N
Central office	*94*
Area superintendents	*8*
Site principals	*(154)*
From Area 2	24
From Area 3	20
From Area 4	15
From Area 5	13
From Area 6	28
From Area 7	14
From Area 8	14
From Area 9	26

3.3.2 Sample

We collected data from educational leaders in LUUSD regarding the frequency of social interactions around the use of data in improving student outcomes. For this analysis, we included educators who served in formal leadership positions in the district, such as the superintendent, deputy superintendents, area superintendents, directors, assistant directors, and managers from the central office and principals at the school sites. We administered an online survey during the spring of 2012, and 256 respondents completed the survey (98 % response rate). Tables 3.1 and 3.2 provide details regarding the respondents including the high proportion of female leaders (63 %) and the average years of experience as an educator (23.5 years), in LUUSD (18 years), in administration (11.5 years), and at the current site (5 years). Our study included 94 central office administrators, 8 area superintendents, and 154 site principals located in 8 areas (see Table 3.2).

3.3.3 Data Collection

In order to assess the social network structure of advice around evidence use in La Urbana, we developed an online survey that included social network and

demographic questions. Our instrument is grounded in the literature on district improvement processes and practices (see, e.g., Coburn and Russell 2008; Chrispeels 2004; Honig 2006; Supovitz 2006; Spillane 2000; Togneri and Anderson 2003), data use (Daly 2012), and network studies (Cross and Parker 2004; Cross et al. 2002; Daly and Finnigan 2009, 2011, 2012; Finnigan and Daly 2010, 2012; Hite et al. 2005; Penuel et al. 2009). We piloted our questions with practicing administrators before collecting these data. Although we asked about a number of relationships, in this study we focus on the exchange of "advice regarding data (evidence) use." Specifically, respondents were asked to quantitatively assess their relationships with other administrators (school and central office) on a 4-point interaction scale ranging from 1 (within the past 2 months) to 4 (1–2 times a week). The evidence/data use network data was taken from the prompt, "Please select the administrators in La Urbana to whom you turn to for assistance in using data for student achievement … and at what frequency?" Our study involves a bounded/saturated approach (Lin 1999; Scott 2000), which includes all members of the LUUSD leadership team (central office and site administrators). We utilized this strategy because it, coupled with high response rates, provides a more complete picture and more valid results according to Lin (1999) and Scott (2000).

3.3.4 Data Analysis

We analyzed network measures using the UCINET software (Borgatti et al. 2002) to better understand the structure of the "Data Use" network. First, we examined the "Data Use" network to reflect advice seeking that occurred at least once within the past 2 months. This network can be regarded as reflecting infrequent, occasional advice seeking among the leaders in La Urbana. Second, we analyzed the same network to reflect advice seeking that occurred at least once a week. This network can be regarded as reflecting more stable, ongoing, and frequent advice seeking among the leaders in the district. Given the extensive literature on the importance of tie intensity in networks (Carley and Krackhardt 1999; Krackhardt 2001; Wasserman and Faust 1994), this approach provides a rich description and understanding of the depth and breadth of the exchange of advice among leaders in La Urbana.

We ran graphic representations of the evidence use network using Netdraw (Borgatti et al. 2002), which provides a visual image of the network and which illuminates overall structural patterns. We also ran a *density* measure, which is the number of social ties between actors divided by the number of total possible connections and can be thought of as how tightly knit a network is. A dense network, meaning one with a high percentage of relationships, is thought to be able to move resources more quickly than a network with more sparse ties (Scott 2000). We also conducted analyses of the amount of brokerage that took place in the district by calculating the *betweenness* score for all leaders in our sample. Betweenness is a measure of how often an actor is positioned "in between" two people in the network who themselves are disconnected (Wasserman and Faust 1998).

3.4 Findings

Our findings suggest that overall interactions regarding the use of data are quite sparse across the district with high variability within specific areas of the district, despite a district-wide push for the use of evidence for improvement. We also find important differences between the underlying informal ties and the structures one would expect based on district's formal lines of authority and communication in regard to the use of data, with area superintendents engaging in differing brokerage roles. Moreover, and perhaps most troubling, our data suggests that principals of underperforming schools, who are arguably in most need of evidence for improvement, are often disconnected from the overall data use structure. General findings suggest that the lack of connections between and among district leaders overall, and out to principals of underperforming schools in particular, may significantly inhibit the coherent flow of evidence. In the remaining paragraphs, we provide the evidence to support these findings.

3.4.1 Sparse Relationships and Varied Brokering Across the District

When we focus on interactions around evidence use that occurred within the past 2 months (Fig. 3.3a), we find that this network (while appearing densely connected) is actually quite sparse with an overall density of 4.4 %, meaning that only 4.4 out of 100 potential advice relationships actually occurred within the past 2 months. On average, leaders in LUUSD sought or were sought for advice around data use by about 11.1 other leaders within the past 2 months. The network that reflects more frequent advice seeking around evidence use as exhibited by data use (Fig. 3.3b) is even more sparse with an overall density of only 0.7 % and on average 1.7 advice relationships for each leader on a bi-weekly basis.

In Fig. 3.4a, b, we graphically display the most frequent relationships around data (at least every 2 weeks), with graphs colored and organized by area. Figure 3.4a

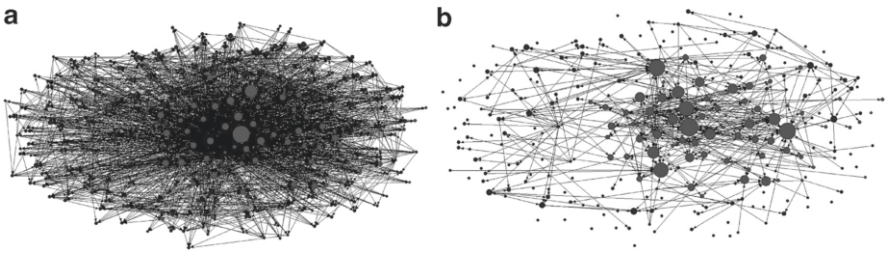
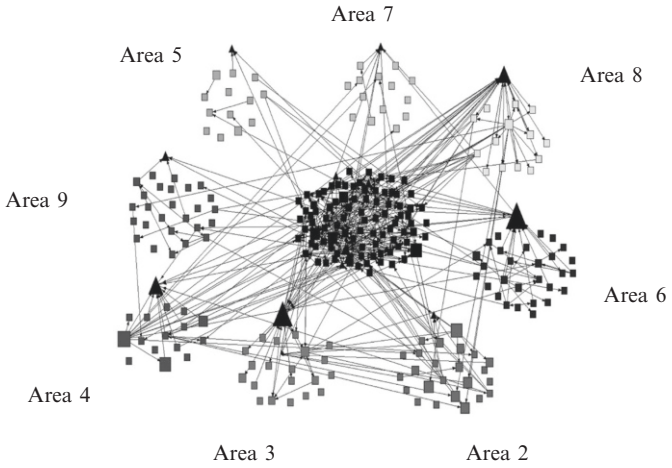


Fig. 3.3 District network of "asking advice around data use," reflecting (**a**) all advice interactions within the past 2 months and (**b**) at least every 2 weeks, sized by indegree

a With Central Office (in black)



b Without Central Office

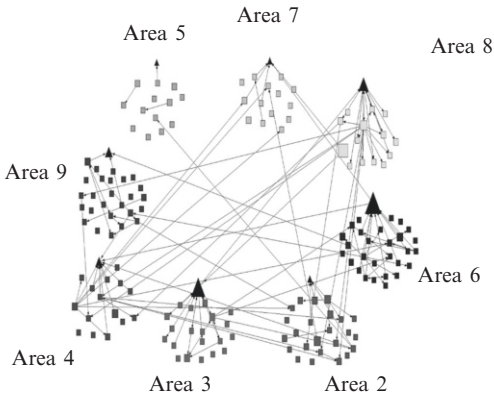


Fig. 3.4 District evidence/data use network, frequency at least every 2 weeks, nodes sized by betweenness, area superintendents in *black triangles*, separated by the eight areas, (**a**) With central office (in *black*) and (**b**) without the central office administrators (in *black*)

includes all areas and the central office, and Fig. 3.4b shows the same network without the central office administrators. The nodes are sized by betweenness brokerage, meaning that larger nodes are more often "between" others who are themselves disconnected, thus reflecting their brokerage role.

These network maps reveal, again, that bi-weekly advice seeking around data is limited. Figure 3.4a shows that advice about data appears to be sought both within and across the central office and the areas, with many ties to and from the central office. Central office leaders tend to be more sought for advice around data,

with area superintendents engaging in more betweenness brokerage, which aligns with their formal position in the district in terms of brokering resources to schools.

When we examine the areas without the central office (Fig. 3.4b), we find variation between the areas in terms of their density, the extent to which they are predominantly externally and internally focused, and the betweenness brokerage played by each area superintendent. For instance, the network of Area 6 seems to be more densely connected than other areas, has both internal ties within the area as well as external ties to others outside the area, and has an area superintendent who is strongly connected to both the central office and two other areas and who is a major broker in terms of betweenness (as displayed by the large node). In contrast, the network of Area 4 appears to be much less densely connected, has fewer internal ties compared to external ties (mainly to the central office), has an area superintendent who is connected to the central office but not to other areas, and who does not occupy a major brokerage position in the district (as displayed by the small triangle).

As the bi-weekly exchange of advice among district leaders on evidence use is rather sparse, meaning there are few opportunities to broker relationships, we shift our analysis to those relationships that occur within the past 2 months to a daily basis. In this way we are effectively "capturing" all of the reported advice relationships between and among leaders in LUUSD.

Findings indicate that LUUSD leaders differ considerably in terms of their brokerage roles as measured by betweenness ($M = 0.6$ %, $sd = 2.2$ % with a range of 0–27 %). This means that of the maximum possible betweenness that a district leader could have, only 6 out of 1,000 times this relationship actually is a brokerage relationship where an individual connects two other administrators *who are themselves disconnected* (Hanneman and Riddle 2005). At first glance, we see that central office leaders broker slightly more than the overall sample average ($M = 1.1$ %, $sd = 3.4$ %) whereas the site principals broker less ($M = 0.2$ %, $sd = 0.4$ %). Site principals also broker more within their own areas than within the whole district (1.7 % and 0.2 % respectively). This is not surprising, as the density of advice seeking within areas is higher than the overall district density, which increases opportunities for brokerage within areas compared to the whole district.

Results also indicate that area superintendents, in line with their position, have the highest number of brokerage relationships within the overall district in general. Perhaps not surprising, area superintendents generally exhibit brokerage (betweenness) roles in connecting educators *within* their own areas ($M = 24.2$ %, $sd = 26.5$ %). In effect, out of all the theoretically possible brokerage opportunities, our data indicate that area superintendents broker in nearly 1 out of every 4 potential "betweenness" situations.

3.4.2 Diffusion of Evidence and Low-Performing Schools

Beyond the sparse connections around data district-wide, we found that principals at the lowest-performing schools were least likely to ask advice of others (or be

Fig. 3.5 Advice on data and program improvement schools (sized by indegree)

asked for advice) regarding the use of data. Moreover, it also appears that the lowest-performing schools were not evenly distributed throughout the district and, instead, concentrated in a few areas.

In Fig. 3.5 above, we provide a visual display of the groupings of principals and area superintendents by area and illustrate the density of ties within and across areas. In this figure, the squares are principals, and lighter color squares are the principals of program improvement (PI—underperforming) schools under accountability policy sanctions. The black triangles at the top of each area represent area superintendents, and black triangles in the center cluster are other central office staff. The nodes are sized by indegree, meaning that larger nodes were more regularly sought for advice about data. As this graph indicates, while some principals are connected to other district leaders, those in low-performing schools have fewer ties in most of these areas (both to one another and to the area superintendents and other central office leaders), despite the fact that the leaders of underperforming schools are likely to need advice around the use of data for student achievement. Furthermore, this is particularly evident in the area at the very bottom middle of the graph. As can be seen in this area, there is the greatest concentration of principals of underperforming schools, but this area has the least amount of interaction around the use of data for student achievement.

While we might not expect the same amount of ties within each area, certainly the formal structure and emphasis of the district would lead one to believe that there should be a significant amount of exchanges regarding data in schools that are the most underperforming. This can be contrasted with the area at the top middle of the graph that has no underperforming schools, but is the most densely connected. In some ways, this indicates that the "rich get richer" in a data exchange sense, while those in most need have fewer exchanges and as such may reinforce existing performance levels.

While area superintendents were formally tasked with being the "source" of advice for data, it is important to note that they were not always the most sought leaders within their areas (meaning that some of the area superintendents, represented by triangles within an area in the graph, were relatively small in

Fig. 3.6 Advice on data and program improvement schools (sized by betweenness)

comparison to others). As is evident in Fig. 3.5, a number of principals were viewed as sources of advice regarding data far more than the formally designated area superintendents who were serving in this "brokering" role. This suggests that while the district may be attempting to set up exchanges with those with formal positional authority to diffuse evidence, it may well be the case that those "outside" the formal exchange system are much more active. This may result in less coherent and consistent messages being sent across the system.

The previous analysis was about actors who were the "source" of advice. In this section we turn our attention to those who "broker" evidence across a system. In Fig. 3.6 we graphically display the most frequent interaction network regarding data. In this graph the nodes are sized by betweenness brokerage, meaning that larger nodes are more often "between" disconnected others on a shortest path. As can be seen in the graph, most connections regarding data were between central office leaders, and yet the data initiative was meant to be engaged at the school level and, in particular, within the underperforming schools. In addition, while some area superintendents engage in comparatively high levels of brokers (bigger size nodes), others enact significantly less brokerage (smaller nodes). The result is a very uneven distribution of brokerage within areas with some area superintendents connecting disconnected principals and others doing significantly less brokerage.

If we again examine the area with the most underperforming schools, discussed above, we see that, in fact, the area superintendent of that zone is engaging in relatively less brokerage activity than, for example, the one in the area on the top of the graph that does not have any underperforming schools. Therefore, not only are there limited "sources" of data available in the area with the most underperforming schools, the area superintendent is providing less brokerage into those underperforming schools. The combined effect may be limited sharing of knowledge within the area, as well as a lack of advice around data from outside the area being moved in to support principals of underperforming schools. This suggests a misalignment between the formal and informal organization within LUUSD that may, in fact, reinforce low performance rather than help these most challenging schools in their improvement efforts.

3.5 Conclusion and Implications

LUUSD, like many educational systems across the globe, initiated a district-wide effort on data use that was meant to be diffused to the schools primarily through the area superintendents. Our results suggest that overall there were very sparse data use ties across the entire district. Although the limited number of ties may be expected in the early stages of an effort, one might expect much more brokerage as a way to get out information about the effort. Unfortunately, our results suggest very few brokerage ties taking place across the system. In fact, those who were formally tasked with brokering this initiative to the schools were not consistently the ones playing the top broker roles. We also found tremendous variation in terms of network structure and the types of brokerage roles that were enacted. In addition, those underperforming schools also seemed to be even more adversely affected by the lack of advice around data exchanges as well as limited brokering. We unpack the main findings and implications from our overall study below.

3.5.1 Sparse Ties, Isolated Administrators, and Varied and Limited Brokerage

One of the first findings from this study is the sparse ties between and among educational leaders in La Urbana. Examining the most frequent ties between leaders in terms of data use suggests that there are limited exchanges, which may negatively influence the overall coherence in the district. Further, a number of principals are isolated and do not have individuals from whom they indicate they seek, or are sought, for advice. Given the limited number of relationships, it may be difficult for the larger system to engage with the use of evidence with consistency and coherence. In addition, we may have expected more brokering relationships to be in place in the district, but there was actually relatively limited brokering taking place across the district, and that brokerage was inconsistent and often fragmented and certainly was significantly different across areas.

3.5.2 Potential Influence of Indirect Connections

Brokers connect otherwise disconnected others in a network. In this case, it means that the advice that actor A received from broker B around data originated in part from the advice that broker B obtained from C. In this way, A was indirectly influenced by C through B. As such, individuals who are two steps away (meaning you have to go through another individual to reach them) potentially influence the advice one receives. Consequently, when seeking advice each person makes some assessment of the potential advice giver. However, at least part of the result

of the decision is out of a person's control, as one rarely knows from whom the broker gets his or her advice. Is that person reputable? Are they moving "useful" advice about data? Is their advice reflective of the larger system's goals and interpretation? To achieve coherence, central office leaders may find it necessary to reduce the game of telephone by ensuring that those in brokering positions are providing common understandings.

3.5.3 Advice Seeking Outside Areas

We found that within an area principals will seek out an area superintendent for advice and that area superintendent will go outside the area to a different area to obtain advice—as such the advice a principal receives from an area superintendent is influenced by another area. In contrast, the principals who also play important brokerage roles within their areas tend to seek advice from outside of their areas. In this way principals are actually engaging in advice from a "broader" section of the network. An area superintendent may be less likely to seek advice within his/her own area as that may be interpreted to be a sign of "lack of knowledge" to individuals within their own area. This may also be the case for the principals that do not want to necessarily "expose" their lack of knowledge.

3.5.4 Limited Advice Around Data for Low-Performing Schools

Current accountability policy mandates the use of research-based evidence in overall improvement efforts. Our work would suggest that in school systems evidence is often defined as "data." In fact, many systems across the country, including LUUSD, have taken up "data use" as a mantra for improvement particularly for those underperforming schools. However, despite the district's formal emphasis on this type of evidence, our study indicates very limited exchanges between and among principals of lower-performing schools and between those principals and either principals of better performing schools or district leaders who have the formal authority and mandate to support their work. Without the opportunity to engage with others around the use of data, it may be difficult for individual leaders to break free of existing patterns of use and as such performance may stagnate.

However, perhaps the most troubling part of the findings is that the "rich get richer" in this system. Our analysis suggests that low-performing schools are concentrated in a few areas. Interestingly, in the area that had the highest proportion of principals of underperforming schools, there were both the least amount of exchanges regarding the data and less brokerage activity of the area superintendent. This results in both a lack of exchange within the area and fewer exchanges happening outside the area as would be indicated by high amounts of brokering.

Consequently, although one might not expect principals of low-performing schools to seek other principals of low-performing schools for the use of data, one might expect that these principals could be connected to other principals outside their area for fresh strategies on the use of data. These "outside" connections need to be brokered by those who are in the formal position to do so, area superintendents, but our study suggests that was not happening. This may ultimately leave the principals of underperforming schools to either reach out to other principals of underperforming schools for advice around data, which may limit new successful approaches, or continue to do what they have been doing, which may hinder improvement. As such this situation portends a continued lack of improvement, as limited information makes its way into the hands of the educators who need it the most.

References

Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly, 45*(3), 425–455.

Atteberry, A., & Bryk, A. S. (2010). Analyzing the role of social networks in school-based professional development initiatives. In A. J. Daly (Ed.), *The ties of change: Social network theory and application in education* (pp. 51–76). Cambridge, MA: Harvard Press.

Baker, W. E., & Iyer, A. (1992). Information networks and market behavior. *Journal of Mathematical Sociology, 16*, 305–332.

Borgatti, S., & Foster, P. (2003). The network paradigm in organizational research: A review and typology. *Journal of Management, 29*(6), 991–1013.

Borgatti, S. P., & Ofem, B. (2010). Overview: Social network theory and analysis. In A. J. Daly (Ed.), *The ties of change: Social network theory and application in education* (pp. 17–30). Cambridge, MA: Harvard Press.

Borgatti, S., Everett, M., & Freeman, L. (2002). *UCINET for Windows: Software for social network analysis*. Harvard: Analytic Technologies.

Brass, D. J., & Burkhardt, M. E. (1993). Potential power and power use: An investigation of structure and behavior. *Academy of Management Journal, 36*(3), 441–470.

Burt, R. S. (1982). *Toward a structural theory of action*. New York: Academic.

Burt, R. S. (1992). *Structural holes: The structure of competition*. Cambridge, MA: Harvard University Press.

Burt, R. S. (1997). A note on social capital and network content. *Social Networks, 19*(4), 355–373.

Burt, R. S. (2000). The network structure of social capital. In R. I. Sutton & B. M. Staw (Eds.), *Research in organizational behavior* (pp. 1–83). Greenwich: JAI Press.

Burt, R. S. (2005). *Brokerage and closure: An introduction to social capital*. Oxford: Oxford University Press.

Carley, K., & Krackhardt, D. (1999). Cognitive inconsistencies and non-symmetric friendship. *Social Networks, 18*(1), 1–27.

Chrispeels, J. (2004). *Learning to lead together: The promise and challenge of sharing leadership*. Thousand Oaks: Sage.

Coburn, C. (2001). Collective sensemaking about reading: How teachers mediate reading policy in their professional communities. *Educational Evaluation and Policy Analysis, 23*(2), 145–170.

Coburn, C. E. (2005). Shaping teacher sensemaking: School leaders and the enactment of reading policy. *Educational Policy, 19*, 476–509.

Coburn, C. E., & Russell, J. L. (2008). District policy and teachers' social networks. *Education Evaluation and Policy Analysis, 30*(3), 203–235.

Coburn, C. E., Honig, M. I., & Stein, M. K. (2009a). What's the evidence on district's use of evidence? In J. Bransford, D. J. Stipek, N. J. Vye, L. Gomez, & D. Lam (Eds.), *Educational improvement: What makes it happen and why?* (pp. 67–86). Cambridge, MA: Harvard Educational Press.

Coburn, C. E., Touré, J., & Yamashita, M. (2009b). Evidence, interpretation, and persuasion: Instructional decision making in the district central office. *Teachers College Record, 111*(4), 1115–1161.

Confrey, J., & Makar, K. (2005). Critiquing and improving the use of data from high-stakes tests with the aid of dynamic statistics software. In C. Dede, J. P. Honan, & L. C. Peters (Eds.), *Scaling up success: Lessons learned from technology-based educational improvement* (pp. 198–226). San Francisco: Jossey-Bass.

Copland, M. A. (2003). Leadership of inquiry: Building and sustaining capacity for school improvement. *Educational Evaluation and Policy Analysis, 25*, 375–395.

Cross, R., & Parker, A. (2004). *The hidden power of social networks: Understanding how work really gets done in organizations*. Cambridge, MA: Harvard Business School Press.

Cross, R., Borgatti, S., & Parker, A. (2002). Making invisible work visible: Using social network analysis to support strategic collaboration. *California Management Review, 44*(2), 25–46.

Daly, A. J., & Finnigan, K. (2010). A bridge between worlds: Understanding network structure to understand change strategy. *Journal of Educational Change, 111*, 111–138.

Daly, A. J. (Ed.). (2010). *Social network theory and educational change*. Cambridge, MA: Harvard Education Press.

Daly, A. J. (2012). Data, dyads, and dissemination: Exploring data use and social networks in educational improvement. *Teachers College Record, 114*(11), 1–38.

Daly, A. J., & Finnigan, K. (2009). A bridge between worlds: Understanding network structure to understand change strategy. *Journal of Educational Change, 11*(2), 111–138.

Daly, A. J., & Finnigan, K. (2010). A bridge between worlds: Understanding network structure to understand change strategy. *Journal of Educational Change, 111*, 111–138.

Daly, A. J., & Finnigan, K. (2011). The ebb and flow of social network ties between district leaders under high stakes accountability. *American Education Research Journal, 48*(1), 39–79.

Daly, A. J., & Finnigan, K. (2012). Exploring the space between: Social networks, trust, and urban school district leaders. *Journal of School Leadership, 22*(3), 493–530.

Datnow, A., & Park, V. (2009). Conceptualizing policy implementation: Large-scale reform in an era of complexity. In D. Plank, B. Schneider, & G. Sykes (Eds.), *Handbook of education policy research* (pp. 348–361). New York: Routledge.

Datnow, A., Hubbard, L., & Mehan, H. (2002). *Extending educational reform: From one school to many*. London: Routledge/Falmer.

Datnow, A., Park, V., & Wohlstetter, P. (2007). *Achieving with data: How high-performing school systems use data to improve instruction for elementary students*. Los Angeles: University of Southern California, Rossier School of Education, Center on Educational Governance.

Degenne, A., & Forsé, M. (1999). *Introducing social networks*. London: Sage.

Finnigan, K. S., & Daly, A. J. (2010). Learning at a system level: Ties between principals of low performing schools and central office leaders. In A. J. Daly (Ed.), *Social network theory and educational change* (pp. 179–195). Cambridge, MA: Harvard Education Press.

Finnigan, K. S., & Daly, A. J. (2012). Mind the gap: Organizational learning and improvement in an underperforming urban system. *American Journal of Education, 119*(1), 41–71.

Finnigan, K., Daly, A. J., & Stewart, T. (2012). Organizational learning in schools under sanction. *Education Research International, 2012*(16), 1–10.

Finnigan, K. S., Daly, A. J., & Che, J. (2013). Systemwide reform in districts under pressure: The role of social networks in defining, acquiring and diffusing research evidence. *Journal of Educational Administration, 51*(4), 476–497.

Firestone, W. A., & González, R. A. (2007). Culture and processes affecting data use in schools. In P. A. Moss (Ed.), *Evidence and decision making* (pp. 132–154). Malden: Blackwell.

Gulati, R. (1995). Does familiarity breed trust? The implications of repeated ties for contractual choices in alliances. *Academy of Management Journal, 35*, 85–112.

Halverson, R., Prichett, R. B., & Watson, J. G. (2007). *Formative feedback systems and the new instructional leadership*. Madison: University of Wisconsin.

Hamilton, L. S., Stecher, B. M., Marsh, J., McCombs, J. S., Robyn, A., & Russell, J. (2007). *Implementing standards-based accountability under no child left behind: Responses of superintendents, principals, and teachers in three states*. Santa Monica: RAND Corporation.

Hammerman, J. K., & Rubin, A. (2002). Visualizing a statistical world. *Hands On!*, *25*(2), 1–7.

Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. Riverside: University of California.

Hite, J., Williams, E., & Baugh, S. (2005). Multiple networks of public school administrators: An analysis of network content and structure. *International Journal on Leadership in Education, 8*(2), 91–122.

Honig, M. I. (2003). Building policy from practice: District central office administrators' roles and capacity for implementing collaborative education policy. *Educational Administration Quarterly, 39*, 292–338.

Honig, M. (2006). Street-level bureaucracy revisited: Frontline district central-office administrators as boundary spanners in education policy implementation. *Educational Evaluation and Policy Analysis, 28*(4), 357–383.

Honig, M. I., & Coburn, C. (2008). Evidence-based decision making in school district central offices: Toward a policy research agenda. *Educational Policy, 22*(4), 578–608.

Honig, M. I., & Copland, M. A. (2008). *Reinventing central offices to expand student learning. An issue brief of the center for comprehensive school reform and improvement*. Washington, DC: Learning Point Associates.

Ikemoto, G. S., & Marsh, J. A. (2007). Cutting through the "data driven" mantra: Different conceptions of data-driven decision making. In P.A. Moss (Ed.), *Evidence and decision making* (National society for the study of education yearbook, Vol. 106, Issue 1, pp. 105–131). Chicago: National Society for the Study of Education.

Kerr, K. A., Marsh, J. A., Ikemoto, G. S., Darilek, H., & Barney, H. (2006). Strategies to promote data use for instructional improvement: Actions, outcomes, and lessons from three urban districts. *American Journal of Education, 112*(4), 496–520.

Kilduff, M., & Tsai, W. (2003). *Social networks and organizations*. London: Sage.

Knapp, M., Copland, M., & Swinerton, J. (2007). Understanding the promise and dynamics of data-informed leadership. In P. A. Moss (Ed.), *Evidence and decision making* (pp. 74–104). Malden: National Society for the Study of Education.

Krackhardt, D. (2001). *Network conditions of organizational change*. Paper presented at the Academy of Management Annual Meeting, Washington, DC.

Levin, B. (2008). *How to change 5000 schools: A practical and positive approach for leading change at every level*. Cambridge, MA: Harvard Education Press.

Lin, N. (1999). Building a network theory of social capital. *Connections, 22*(1), 28–51.

Louis, K. S., Febey, K., & Schroeder, R. (2005). State-mandated accountability in high schools: Teachers' interpretations of a new era. *Educational Evaluation and Policy Analysis, 27*(2), 177–204.

Louis, K. S., Leithwood, K., Wahlstrom, K. L., & Anderson, S. E. (2010). *Learning from leadership: Investigating the links to improved student learning*. Retrieved from The Wallace Foundation website: http://www.wallacefoundation.org/KnowledgeCenter/KnowledgeTopics/CurrentAreasofFocus/EducationLeadership/Documents/Learning-from-Leadership-Investigating-Links-Final-Report.pdf

Marsh, J. A., Pane, J. F., & Hamilton, L. S. (2006). *Making sense of data-driven decision making in education: Evidence from recent RAND research* (OP-170). Santa Monica: RAND Corporation.

Marsh, J. A., McCombs, J. S., & Martorell, F. (2010). How instructional coaches support data-driven decision making: Policy implementation and effects in Florida Middle Schools. *Educational Policy, 24*(6), 872–907.

Nutley, S., Walter, I., & Davies, H. T. O. (2003). From knowing to doing: A framework for understanding the evidence-into-practice agenda. *Evaluation, 9*(2), 125–148.

O'Day, J. (2002). Complexity, accountability, and school improvement. *Harvard Educational Review, 70*(3), 293–329.

O'Day, J. (2004). Complexity, accountability, and school improvement. In S. Fuhrman & R. Elmore (Eds.), *Redesigning accountability systems* (pp. 15–43). New York: Teachers College Press.

Obstfeld, D. (2005). Social networks, the Tertius Iungens orientation, and involvement in innovation. *Administrative Science Quarterly, 50*, 100–130.

Parise, L., & Spillane, J. (2010). Teacher learning and instructional change: How formal and on-the-job learning opportunities predict change in elementary school teachers' practice. *The Elementary School Journal, 110*(3), 347.

Penuel, W. R., Riel, M. R., Krause, A., & Frank, K. A. (2009). Analyzing teachers' professional interactions in a school as social capital: A social network approach. *Teachers College Record, 111*(1), 124–163.

Powell, W. W., Koput, K. I. V., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly, 41*, 116–145.

Scott, J. (2000). *Social network analysis* (2nd ed.). London: Sage.

Spillane, J. P. (2000). A fifth grade teacher's reconstruction of mathematics and literacy teaching: Exploring interactions among identity, learning, and subject matter. *Elementary School Journal, 100*(4), 273–307.

Spillane, J. P., Reiser, B. J., & Reimer, T. (2002). Policy implementation and cognition: Reframing and refocusing implementation research. *Review of Educational Research, 72*(3), 387–431.

Stovel, K., & Shaw, L. (2012). Brokerage. *Annual Review of Sociology, 38*, 139–158.

Supovitz, J. A. (2006). *The case for district-based reform: Leading, building, and sustaining school improvement*. Cambridge, MA: Harvard Education Press.

Supovitz, J., & Klein, V. (2003). *Mapping a course for improved student learning: How innovative schools use student performance data to guide improvement*. Philadelphia: Consortium for Policy Research in Education.

Togneri, W., & Anderson, S. E. (2003). *Beyond islands of excellence: What districts can do to improve instruction and achievement in all schools*. Washington, DC: The Learning First Alliance and the Association for Supervision and Curriculum Development.

Tseng, V. (2012). The use of research and evidence in policy and practice. *Social Policy Report, 26*(2), 1–16.

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. New York: Cambridge University Press.

Wasserman, S., & Faust, K. (1998). *Social network analysis: Methods and applications*. New York: Cambridge University Press.

Wayman, J. C., & Stringfield, S. (2006). Technology-supported involvement of entire faculties in examination of student data for instructional improvement. *American Journal of Education, 112*(4), 549–571.

Wayman, J. C., Cho, V., & Johnston, M. T. (2007). *The data-informed district: A district-wide evaluation of data use in the Natrona County School District*. Austin: The University of Texas.

Weick, K. E. (1985). Cosmos vs. chaos: Sense and nonsense in electronic contexts. *Organizational Dynamics, 14*(2), 50–64.

Wellman, B., & Berkowitz, S. D. (1998). *Social structures: A network approach*. Cambridge, MA: Cambridge University Press.

Wohlstetter, P., Datnow, A., & Park, V. (2008). Creating a system for data-driven decision making: Applying the principal-agent framework. *School Effectiveness and School Improvement Journal, 19*(3), 239–259.

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Newbury Park: Sage.

Young, V. M. (2006). Teachers' use of data: Loose coupling, agenda setting, and team norms. *American Journal of Education, 112*(4), 521–548.