Access, activation, and influence: How brokers mediate social capital among professional development providers

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Ambitious policies and professional development providers

- Common Core - ambitious policy, departs from current practices, especially in mathematics (Cobb & Jackson, 2011; Porter, McMaken, Hwang, & Yang, 2011; Schmidt & Houang, 2012)
- Ambitious reform: Schools/Districts $\rightarrow$ Professional development providers (Little, 1993)
- Ideas matter in the implementation process (Coburn, 2004, 2005; Spillane et al., 2002)

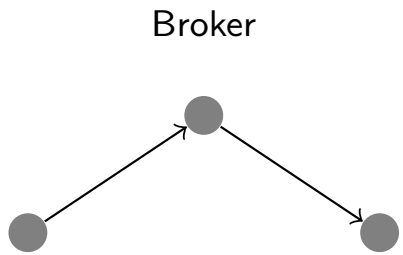
PD providers can influence implementation & are uniquely positioned in educational ecosystem

1. PD providers in a position of mediation between policy and practice
   - Can influence how teachers understand policy (Coburn, 2005)
   - Promoting certain ideas
   - Framing policy messages
2. PD providers span a variety of organizational sectors (both "system" and "non-system" [Coburn, 2005; Rowan, 2002])
   - Potential source of a diverse resources and expertise

- Yet: Little sustained attention to PD providers themselves
  - Little sense of how PD providers develop the ideas about policy they promote to educators

Social capital and brokerage theory

- Social capital (Coleman, 1988; Lin, 2002; Portes, 1998)
  - Information and resources available through social ties
- Three reasons:
  1. Access to social capital supports complex collective work (Reagans & McEvily, 2003)
  2. Social interactions (the sharing of information and ideas) shape how policies are generally understood (Beckert, 2010; Burt, 1999; Kellogg, 2014)
  3. Certain actors ("brokers") have greater influence on the content and flow of information (Burt, 1992)



Brokers provide access to, but also control activation of, social capital

- Two key social capital advantages (Burt, 1992; Burt et al, 2013)
  - *Access advantages* = ability to get unique information
    - Brokers span organizational/departmental boundaries to access outside expertise (Obstfeld, 2005; Reagans & McEvily,2003)
  - *Control advantages* = ability to control the flow of information
    - Brokers can selectively share, translate, filter, or hoard information (Burt, 1999; Fernandez & Gould, 1994; Kellogg, 2014; Stovel & Shaw, 2012)
    - Discretion over social capital activation
- **Local** influence on organizational access to information
- **Global** influence on the flow and content of information

Current study

- Mixed methods approach to capture network position, social capital access & activation
  - SNA: Identify actors in brokerage positions
  - Qualitative: Analyze how brokers interact with others

Research questions

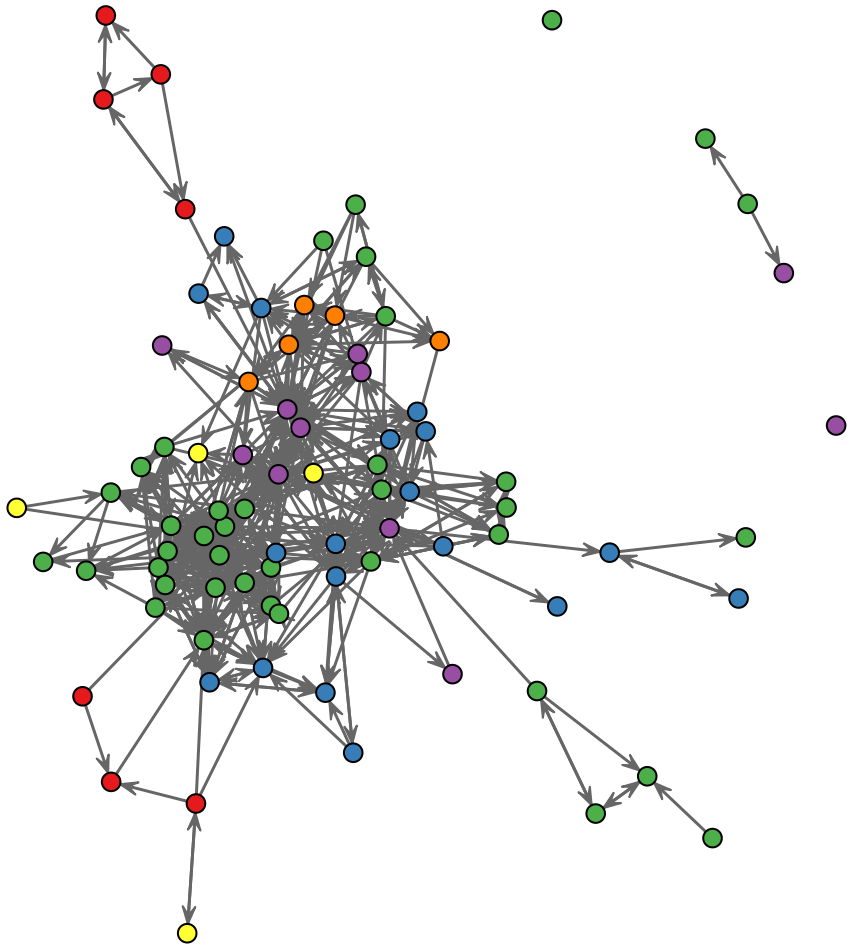
1. Where are brokers in a professional development network locate?
2. How do these brokers enact their network position?

Data

- From a larger study of social networks of mathematics and science professional development providers in a metropolitian region in the western US
- Three-wave snowball sampling design
  - Wave 0: Exploratory interviews with PD providers to develop seed list
  - Waves 1: Interviews with providers from seed list
    - Asked who they went to for advice or for collaboration and why
    - Asked to provide additional names if not on list
  - Wave 2: Interviews with providers from updated list
    - Same as above
  - Wave 3: Survey of providers with updated list
    - Sent fully appended list to all participants (including Wave 1 and 2)
    - Asked to identify people they went to for advice or collaboration from fully appended list

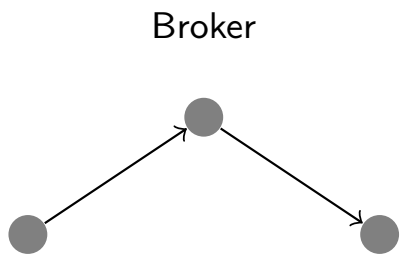
Sample and Network

- Mathematics Advice Network
- Providers = 84
- Organizational sectors
  - University (18)
  - District (39)
  - Charter School (7)
  - Non-profit (11)
  - County educational agency (5)
  - Other (for-profit, consultant) (4)



Methods 1: Identifying brokers

- Developed a novel statistical test to evaluate incidence of brokerage using a baseline model derived from the exponential family of random graph models (ERGMs)
- Gould & Fernandez's (1989) method for identifying brokers
- Compares observed brokerage scores per actor per role to a simulated conditional distribution
  - Conditioned on organizational sector to account for differences in the number of providers in each sector in the network
  - If a provider's brokerage score fell in the 95th percentile or greater, we considered them a broker



Methods 2: Analysis of interviews

- Gathered interviews with each broker (n = 14) and the providers they had connections to (their "alters"; n = 37)
- Iteratively developed codebook:

Accessing / Sharing	Connecting
Substantive information on a topic	Making connections
Logistical information	Sharing contacts
Material resources	Accessing contacts
Someone's perspective on a topic	
Information about activities of others	

For this study

Accessing / Sharing	Connecting
Substantive information on a topic	Making connections
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- Accessing: Brokers described going to another for information or advice
- Sharing: An alter described going to a broker for information or advice
  - Sharing == activation

Key Finding 1: Organizations had similar access to social capital through brokers

	Broker	Non-broker
Sector*		
CMO	1	6
district	7	32
non-profit	3	8
other	0	4
state and county	2	3
university	2	16
Position‡		
Direct PD provider	3	26
Middle management	8	21
Academic researcher	2	16
Leadership	2	5
Other	0	1

Table 3: *Fisher's Exact = 0.601; ‡Fisher's Exact = 0.354

Key Finding 2: District-based brokers less involved in substantive interactions

- District-based brokers more often interacted around logistical issues
- Brokers outside of school districts interacted around substantive topics in math PD

Figure 1: District broker interactions: n = 97; non-district brokers interactions: n = 144. Not all categories represented in chart.

Logistical issues dominated district brokers' interactions

Accessing logistical information

I went to her quite a bit this year for institutional advice, not so much about how to do a workshop or what needed to be done, but more like, who do we have to contact? What paperwork do we have to fill out? How do we make this clean and legitimate?

— Harry Copper, a district broker and direct PD provider

Logistical issues dominated district brokers' interactions

Sharing logistical information

A lot of what I would ask [Jason] about is advice about navigating the different parts of the organization, making sure there's alignment. Right now, for example, there has been an iPad initiative in middle schools as well as teacher leaders in middle school and we're working to stitch those things together, so that it's not a subset of teachers who have six release days with one and six with another. That's a good example of where I'm getting his advice to think about that.

— A provider describes going to Jason Watson, a district broker in charge of STEM learning

Substantive issues dominated the interactions of non-district brokers

Accessing substantive information

One of the shifts in the Common Core at the secondary level is the relationship between expressions, equations, and functions. It's always been a big mess and a big time waste. We try to sort it out and clean it up, but people aren't noticing. 'Cause when you say equation, they assume they know what it means. It's three things.... I brought that problem to Peter. You need a mathematician's confidence in their understanding to play with stuff like that. We came up with something that actually works pretty well.

— Stephan Martell, a broker and executive director based in PD nonprofit

Substantive issues dominated the interactions of non-district brokers

Sharing substantive information

Because in Valley County we have quite a range of languages, and one of the concerns that's coming up often as we continue to work with teachers around Common Core is language. César has done some wonderful work with that and his colleagues in his network. That's one of the reasons why I reached out to César.

— A provider describes going to César, a broker based in a local nonprofit

Key Finding 3: Disconnect between access and activation among district brokers

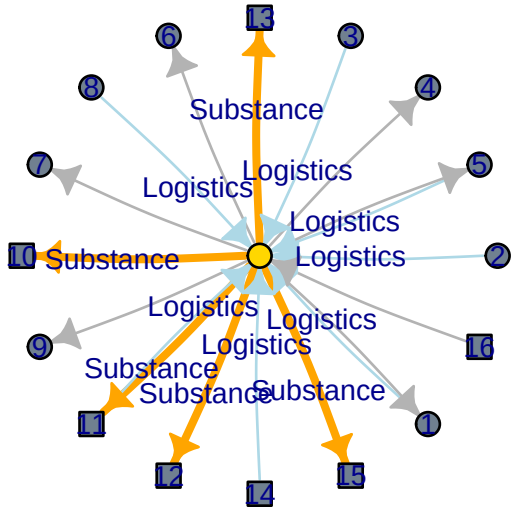
- In addition, district brokers demonstrated a *disconnect* between the information access and the information they shared

Figure 2: District broker interactions: n = 97; non-district brokers interactions: n = 144.

Key Finding 3: Disconnect between access and activation among district brokers

- When district brokers did access substantive information, they rarely shared it
  - Failed to fulfill a critical brokerage role as a relay of information

Panel A. Patricia's interaction map



Panel B. Jason's interaction map

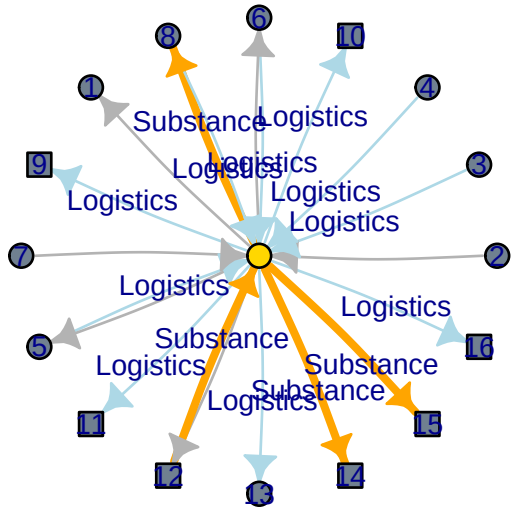
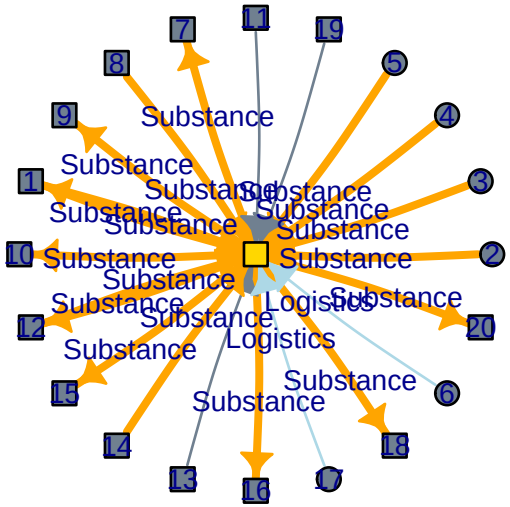


Figure 3: Out-directed arrows = information accessed. In-directed arrows information shared

Key Finding 3: Disconnect between access and activation among district brokers

- Brokers outside of school districts showed parity in access and activation
  - Acted as a relay, giving others access to information

Panel A. Stephen's interaction map



Panel B. Javier's interaction map

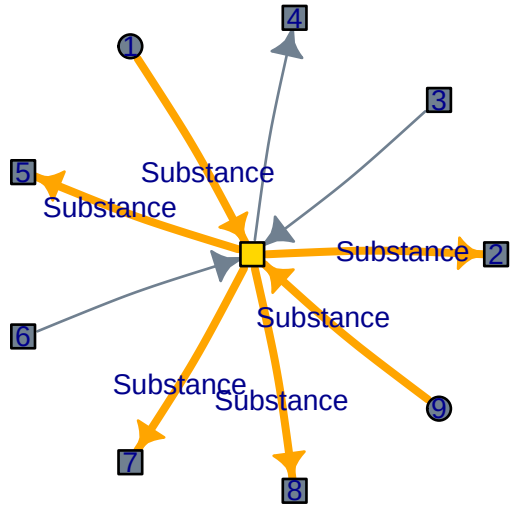


Figure 4: Out-directed arrows = information accessed. In-directed arrows information shared

Conclusions

- Organizational setting influenced the type and content of interactions
- District brokers less involved in substantive conversations about mathematics $\rightarrow$ less likely to shape ideas about the CCSS-M
- Disconnect between access and activation $\rightarrow$ less likely to provide social capital resources for home district
- Diminished global and local influence compared to non-district brokers

Implications

1. Policy implementation - Extends previous research on the influence of "non-system" in the implementation process (Coburn, 2005)
2. Social networks - Provides further evidence on the "embeddedness" of social network (Granovetter, 1985; Small, 2010)
   - Social context influence content of interaction, in addition to tie formation
3. Brokerage theory - Evidence that brokerage position may mask brokerage processes (Obstfeld et al, 2014)
   - Brokers *looked* the same, but behaved differently

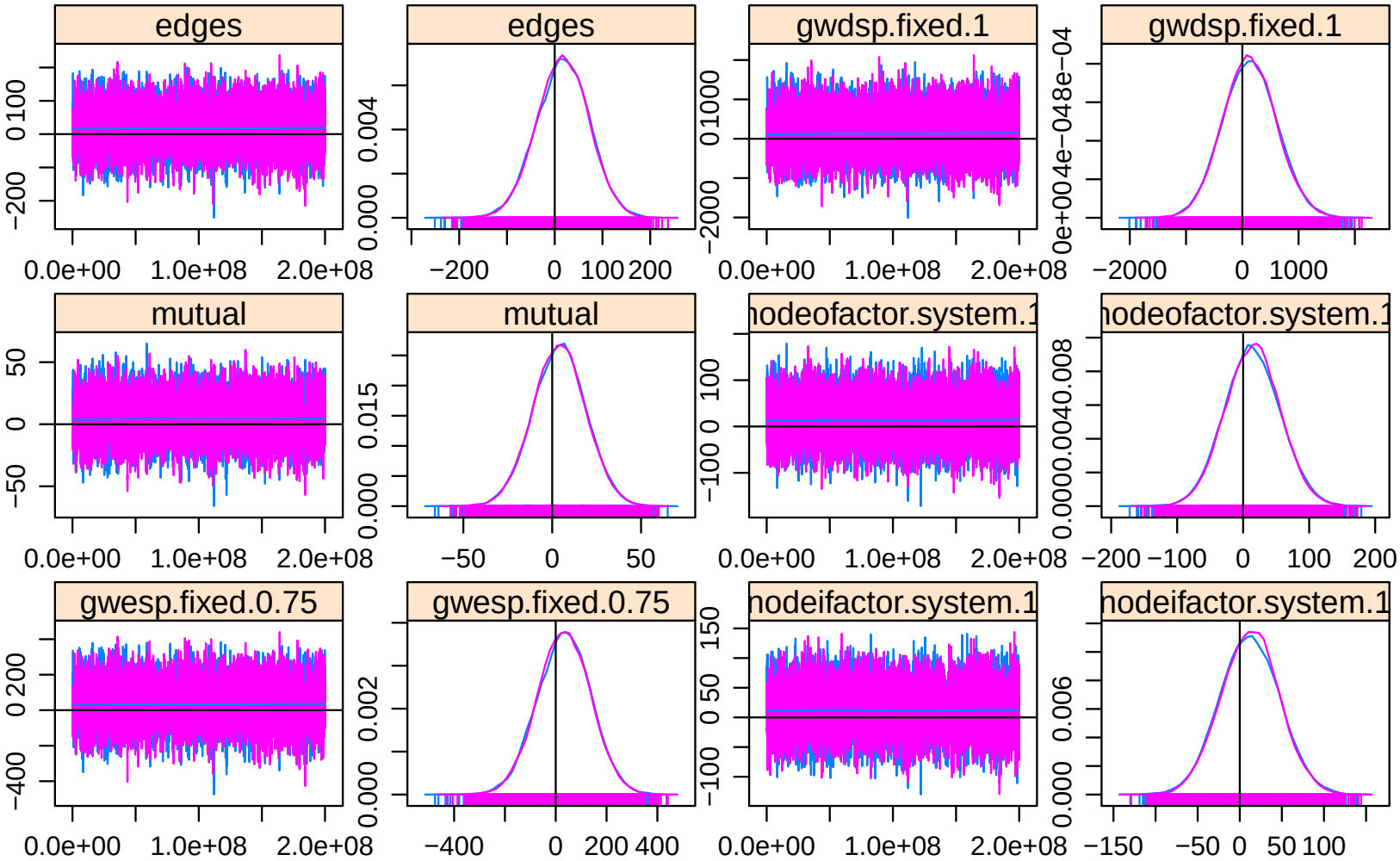
Limitations

- Interactions not directly observed
- Inferring the influence on the ideas available in the network
  - Do not have observations of what PD providers promoted in sessions
- Data from a single region – unclear how representative it is

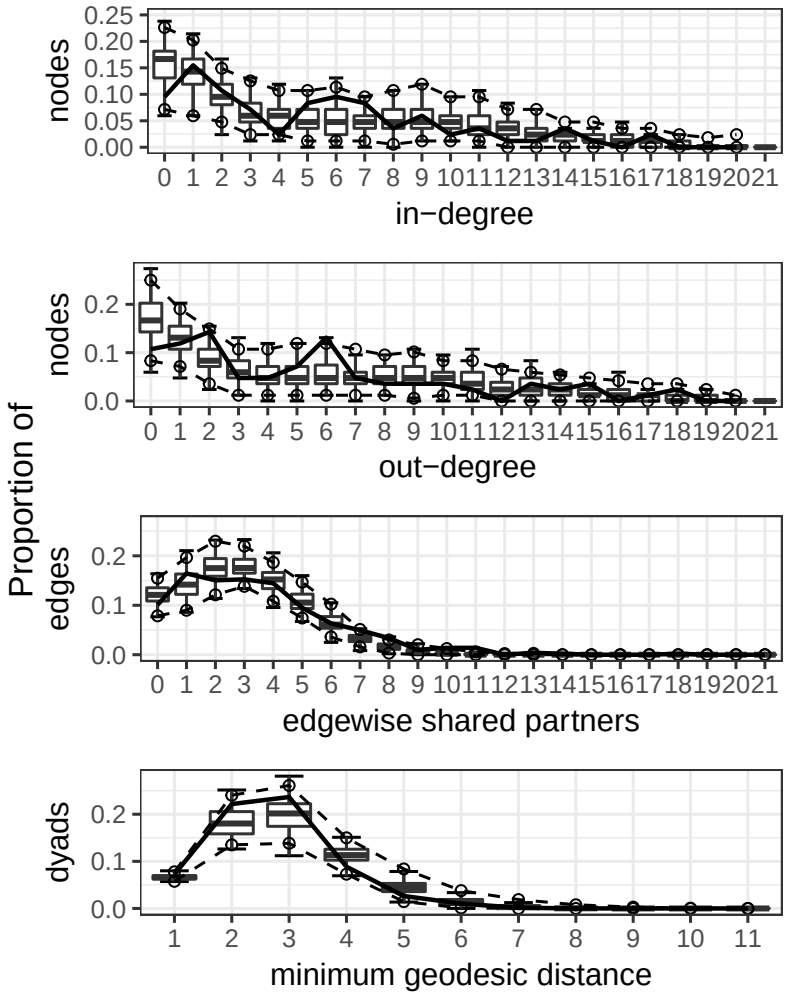
Thank you!

- Co-author, Cynthia Coburn
- Rebecca Buchanan, UCSC, data collection
- IES Doctoral Training Fellowshing, funding

MCMC Diagnostics



Goodness of fit



More Methods 1: A statistical test of brokerage

1. Define an exponential random graph baseline model
2. Estimate the parameters for the model (using ergm package in R)
3. Use parameters to simulated 10,000 networks
4. For each simulated network, derive G&F brokerage score for each actor
5. Create a conditional distribution for brokerage role for each sector
6. Compared the observed value for per actor per role to the conditional distribution
7. If observed value was in 95th percentile or higher, we considered them a broker

More Methods 1: A baseline model

$$log\left[\frac{Pr(Y_{ij}=1|Y_{-ij}=Y_{-ij},\theta)}{Pr(Y_{ij}=0|Y_{-ij}=Y_{-ij},\theta)}\right]=\sum_{\kappa=1}^{\kappa}\theta_k\delta^{+}_{ij,k}(y)$$

- 3 structural terms (reciprocity, triadic closure, and intrasitivity) and 1 exogenous terms (organizational setting - within a school district or outside)