

CULTIVATING CONNECTIONS AMONG RESEARCH, POLICY AND PRACTICE  
FOR STATE EDUCATION AGENCIES: SOCIAL NETWORKS AND KNOWLEDGE  
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Rationale and Conceptual Frame

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Improving student performance in low-performing schools has long been an intractable social problem in America with strong implications for equitable opportunities among America's youth. In the past few years under state and federal law, state education agencies (SEAs) have become important actors in designing or implementing supports and strategies for improving these schools, and in education reform more generally. Standards based reforms, the No Child Left behind Act of 2001 (NCLB), and more recently the Race to the Top competition, and the School Improvement Grant (SIG) program have not only given SEAs more responsibilities directly related to school and local district improvement, but have also pressed them to use research and evidence to ground their improvement efforts. Indeed, the current policy environment provides novel incentives for the use of RBK in state education policy.

But, the formal organizational structure of most SEAs has long been criticized for its hierarchical and segmented or "siloeed" nature, and its focus on federal compliance instead of on guidance and support for schools or districts. In her research comparing two state education agencies, Lusi (1997) argued that non-hierarchical, less segmented management structures could help build internal and external connections among SEA actors with varied expertise and produce more effective, adaptive organizations. Supporting complex school reform, she argued, was a newly added and very different role for SEAs that would require flatter, more integrative organizational structures.

More recent organizational research and theory, though not conducted or applied in the same setting, confirm and elaborate these arguments (Dutton & Heaphy, 2003; Feldman & Rafaeli, 2002). Adaptive organizations are able to bring to bear more varied,

but relevant expertise and knowledge on common problems through “high quality” internal and external connections (Wenger, McDermott, & Snyder, 2002). These connections can form “communities of practice” that enable actors to more flexibly manage the frequently changing, social dimensions of research knowledge as well as to contextualize it using the working knowledge of local actors (Barnes, Vanover, Salloum, Perrault, Massell & Rowan, 2010; Hood, 2002; Rowan, Barnes, Massell, & Vanover, 2008; Wenger, McDermott, & Snyder, 2002).

Sociologists have studied these kinds of connections, known as “social networks” to help understand the diffusion of innovation and knowledge since the end of the 19<sup>th</sup> century. More recent research and theory on the social networks, communities of practice and knowledge utilization perspectives, all argue that individuals are embedded in formal or informal relational systems that can shape norms, generate social capital, and promote the exchange and use of resources or knowledge. Newer models of knowledge diffusion for example, cast research use, not as a process in which the “users” receive a one-way transmission of information, but instead, as a “social process” (Honig & Coburn, 2008; Hood, 2002) involving social sense-making or interpretation of varied types of knowledge (Spillane, Reiser, & Reimer, 2002; Weick, 1995). The process can even be generative, as learning, working and innovating can interact such that communities of practice or professional knowledge networks actually construct new forms of “useable” knowledge for guiding action (Barnes, Camburn, Sanders, & Sebastian, 2010; Brown & Duguid, 1991). This research use or “incorporation process” helps individuals and organizations integrate often de-contextualized research findings into their policies and practices (Argyris & Schon, 1996; Coburn & Russell, 2008. Coburn & Talbert, 2006; Honig & Coburn, 2008; Honig & Hatch, 2004; Kennedy, 1982).

While scholars have examined the socially constructed and determined nature of knowledge acquisition, diffusion and use in organizations such as schools and districts, they have not applied these same lenses to state education agencies (SEAs). In fact, current studies have offered little information about how SEAs search for and use the research knowledge or advice that they employ in school improvement strategies. Our study has aimed to fill this gap in the literature. This study was designed to understand whether and how research-based and other types of knowledge are used by SEAs to improve low-performing schools, as well as how SEAs are organized to find, manage, and use such knowledge.

As SEAs are pushed to take on an increasing burden for improving low-achieving schools and districts, this paper seeks to answer the questions: How are SEAs organized to find and use research based knowledge, and why? More specifically how do the structure and qualities of social networks influence their use of research or evidence in SEA school improvement strategies? How do these characteristics of networks interact with other factors such as different knowledge types, or the political and institutional context in which SEAs operate?

## Data and Methods

This paper is part of a larger exploratory study of three SEAs being conducted by the Consortium for Policy Research in Education (CPRE). We focus here on qualitative and quantitative data from two SEAs. The identities of the three states are being kept confidential and will be referred to as State B and State C. The two states in this study were selected because of their contrast in terms of the resources available in their intermediary environments and the extent of hierarchical or collaborative formal structures within the SEA.

The data for this paper include documents related to states' school improvement strategies, interviews, and surveys administered in 2011. Interview data are drawn from nearly 40 in-depth interviews conducted in two states. We conducted interviews in 2010-2011 with a purposive sample of SEA staff and leaders involved in elementary school improvement efforts. The sample of respondents also included staff and leadership in curriculum and instruction, data and assessment, accountability, special programs, and teacher policy. Interview domains included: the state's strategy for improving low performing schools; the structure of formal and informal networks related to school improvement within and external to the SEAs; the qualities of those networks (including respondents' trust or collective efficacy); the knowledge sources and types of knowledge that network members used to develop, implement or revise state school improvement strategies; and the institutional or political context within which networks existed. A more in-depth, cognitive, component of the interview focused on key actors' accounts of the process through which they sought out and used different kinds of knowledge and evidence in their decision-making or improvement strategies (for similar strategies used in other studies, see Barnes, Camburn, Sanders, & Sebastian, 2010; Klein, Calderwood & Macgregor, 1989; Spillane et al., 2007). This section of the interviews included network questions such as who respondents turn to for different kinds of information and why, as well as who are most influential sources in their work and why.

Our quantitative data are from surveys to over 100 individuals in each of the two states. Response rates for the survey were 73% in State B and 81% in State C. One focus of the survey was to uncover the "organic" networks related to elementary school improvement efforts that may exist among SEA staff. In order to limit respondents to those who were involved in elementary school improvement efforts, a sorting question was asked of all respondents and those who answered, "Yes" were asked a series of social network questions related specifically to the sources and type of knowledge they used in their work with school improvement strategies. The survey questions built on earlier work (see Weinbaum, Cole, Weiss & Supovitz, 2008) that asks respondent to whom they turn for a variety of informational resources.

In particular, the survey asked with whom respondents interacted to acquire three types of knowledge based on our framing ideas: practitioner advice, research evidence, and data such as test scores or teachers' credentials. For each of these three networks, the survey also asked questions about the *strength* of respondents' connections to the people

they named as resources as well as questions about the *qualities* of those networks. Strength of network connections was measured through a combination of the frequency of communication and the influence that respondents perceived the resulting advice or information had on their work. The quality of network connections was measured through a set of questions related to the level of trust and sense of collective efficacy respondents felt existed among each group of individuals who they named as resources for a particular network (and in the case of trust, the information those individuals provided). Trust and collective efficacy measures were adapted from work in schools by Bryk & Schneider; Goddard, 2001; Goddard, Hoy, & Woolfolk Hoy, 2000; Goddard & LoGerfo, 2007.

In order to examine the configuration of relationships in the two SEAs, two network matrices were created that allowed a connection between individuals to be identified through the presence of a value (which could represent the presence or absence of a tie or a measure of the strength of that tie). The matrix was entered into UCInet, a widely used, general-purpose network analysis program that allowed us to identify highly connected or “influential” actors, and to view social networks visually, using NetDraw (Borgatti, 2002a; Borgatti, 2002b), a program that produces sociograms, or maps of relationships. In addition, coding network members by department/division, office, or type of external organization allowed us to visually examine those aspects of the network as well. We created socio-grams for SEAs’ knowledge and advice networks in the two focal states.

To address our research questions, we are using a complementary, mixed method, comparative case study design that focuses on two of the social networks at the SEA organization level within the two states—research networks and practitioner advice networks. We also use a subset of individual network cases of the more “influential” actors, with strong ties to others, within those organization level networks (Tashakkori and Teddlie, 1998; Newman and Benz, 1998).<sup>1</sup> We linked network data from the survey for the more influential actors (with strong ties) to their interview data, to create a more holistic view of the networks at the level of individuals: not only who respondents turn to for knowledge, but why. Likewise, we probed not only who are the most influential in their work, but also why. In addition to using descriptive statistics, and qualitative theme analyses, we also used network analyses to describe and compare the networks’ structures (defined as size or the number of individual ties named in each network, strength of connections, and configuration of connections--either segmented within office/division, or more lateral, cross office/division). Using qualitative data, we explored what might account for our survey findings as well as how network characteristics interacted with factors such as the **types of knowledge** that SEA staff seek or use in their school improvement activities, and the **political** and **institutional** context in which SEAs operate.

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<sup>1</sup> All cases are anonymous. We disguise gender and other identifying characteristics. We identified influential actors from a rank ordered list of respondents’ in-ties. For this paper, we also identified influential actors who had strong ties to others.

Our findings are preliminary. We are conducting additional analyses of the interview data and the SEA surveys. In addition, in order to assure ourselves of the quality of survey data, we are in the process of conducting a second survey in State B. Finally, we will conduct a second round of interviews with a more targeted set of SEA staff in late spring 2012 in order to better understand the network dynamics uncovered in this paper

## Preliminary Findings

### *Cross-Office and External Research Networks In SEAs*

We began our examination of the data by reviewing sociograms in which individuals are color-coded to depict different offices or divisions. Sociograms are an intuitive method for looking at the structure of the knowledge networks in part because the most well connected, influential, actors or units are located in the center while the less well connected are located on the periphery. We found that school improvement research networks included staff and leaders from multiple core divisions and offices in all three SEAs. However, different divisions/offices were included in the research networks in each state. Together the sociograms in Figures 1- 4 show that we did find internal cross-office conversation in the SEA research and practitioner networks (though not as much in State B's practitioner advice networks).

In both states, staff or leadership from the school improvement offices (including the curriculum and instruction functions) are located at the center of the networks (green nodes)<sup>2</sup> and are connected to several other key offices/divisions. In State B, (Fig. 1) several influential actors from the OSI, some prominent staff or leadership from the accountability and assessment office (grey nodes), the superintendent's office (yellow), one person from the early childhood office (purple), and a few individuals from ESEA program monitoring (aqua) are in the center of the school improvement network.<sup>3</sup> In State C, (Fig. 2) assessment is not prominent with only one individual from that office near the center of the network. In addition, the superintendent's office (yellow), ESEA program monitoring, a member of the teacher certification office (brown), to some extent special education (pink) and a few technology, career or adult education (blue) members are in and around the center (made up of only two or three influential people representing school improvement and instruction/curriculum units). Finding at least some cross office ties in the research networks stands in contrast to previous research depicting SEAs as fragmented or "siloes" organizations (Lusi, 1997).

The sociograms likewise show ties to external intermediaries or organizations in both states (see black nodes in Figures 1 and 2), though only a few of these externals appear to be influential or central in either the research networks or the practitioner

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<sup>2</sup> In State C, the lighter green nodes represent the Office of School Improvement (OSI) while the darker green nodes represent instruction.

<sup>3</sup> To identify "influential" actors also used a rank ordered list with number of "in-ties". Once we identified influential actors, we also looked for those with strong ties to other offices or externals. We displayed our cases at the individual level with strength scores juxtaposed to number of ties.

networks. Most are on the periphery of the core networks, in part because we did not survey the externals and thus have only “in-ties” not “out-ties”. Still, in the State C research network three external intermediaries are quite central in the research network, while two are more central than most in State B.

Generally, in terms of the conversations related to searches and use of research, or practitioner advice, the SEAs in our study appear to be open to ideas and information from outside their organizational units, and from individuals or organizations external to the SEA. While not as “transformed” (in structure or focus) as Lusi described would be necessary for SEAs to manage their new improvement responsibilities, we did find (in interviews and from our surveys) more lateral, “flatter” organizational research networks (formal and informal) and more “boundary spanning” connections to external intermediaries than we expected given previous studies.<sup>4</sup>

### *Why Cross Office and External Networks? Case Studies and Qualitative Data*

Our qualitative data suggest some factors that may account for these findings including the size and leadership of the SEA’s we studied, as well as the influence of state and federal initiatives.

*Smaller size.* First, multiple respondents in interviews across State B and State C discussed the smaller size of their respective organizations as one factor that fostered trust, cross office collaborations and connections to external intermediaries. One state (B) has shrunk from close to 2000 employees in the early 1990s to a current staff of approximately 300 people. The other state (C) is also a relatively small organization. Though the size of these two states varied and we expected their structures to vary, it appears that declining, or simply fewer resources in both states has meant that staff are taking advantage of expertise and knowledge across offices, as well as in external organizations. A respondent with the advantage of institutional history in State B (she had been in, out and back in the SEA since the late 1980’s and early 1990s) described how the smaller organization there had encouraged more cross-office collaboration and trust:

So it’s a much smaller department. . . . Under (new superintendent) to me it’s a flatter organization so you have greater access to the decision makers. . . I think because we’re a smaller department or maybe the culture [the superintendent] has put in place. . . [there are] greater opportunities to collaborate and work together. . . I think that was a very significant change here. . . . I think size is a factor because if you’re smaller you don’t have to worry so much. . . . You can relax a little. . . people trust more.

A respondent in State C also illustrates this point about “smallness” as she discusses cross-office teams:

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<sup>4</sup> This too was surprising as we sought states that differed on these dimensions in our sampling.

I'm a member of all those taskforces. We've been doing governors projects for charter schools, virtual schools, lab schools, all at the same time. **So that same core group is involved in all of this because there just aren't that many of us, you know? . . .** The leadership for each of those groups is different, but the core group that works on this is pretty much the same people because there's nobody else to do it.

*Less hierarchy.* The first comment above also shows a second theme in the qualitative data suggesting why the SEA's we studied may have developed more informal or formal cross-office connections than previous studies have shown: Across both States B and C, key leaders have tended to cultivate flatter organizations with more access to high level leadership, as well as collaboration and communication across divisions or offices to explore problems more holistically. An SEA respondent in state B discusses just one instance of this broader theme across both states:

About four months ago, [a Deputy Superintendent and his Senior Policy Advisor) got-- again, cross agency people, Teacher Prep[aration], Special Education, Title I, our office (Office of School Improvement)--all of the different offices together to look at statewide data that we collect and how we're going to use it. We have another meeting coming up next week and we're going to do those quarterly where it is cross agency . . . we're getting together -- and we're looking at our data saying, "All right, what's working, what's not working?"

*Response to federal incentives.* A third theme in the qualitative data shows that state and federal initiatives have indeed mobilized some cross-office and external research and advice networks. In State B, for example, nearly all respondents discussed development work and implementation of school improvement strategies within the context of state and federal initiatives and changing policy priorities, while several did the same in State C. Two different respondents from different offices illustrate this prominent pattern in state B:

When we decided to go for Race to the Top, the demands of what they wanted in that application required **that the department work collectively to get that work done.** So teams were created for each of the core reform areas. . . . That was the first time I've ever seen like the whole department kind of come together to craft a strategy.

I will have to say that doing the two Race to the Top applications was another impetus for that [cross office collaboration]. Because as we did the Race to the Top applications, we had to communicate. We couldn't submit the Race to the Top application only from the [school support unit] or the Office of School Improvement.

Some of these teams have continued collaborating after initiating the federal efforts with which they were tasked.<sup>5</sup> When asked about the ARRA state fiscal

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<sup>5</sup> Some have not. We will elaborate in the next section.

stabilization funds one respondent in State C reported for example, “I know that part of the push [to develop a data tool for schools] was to meet the requirement to receive the SFSF funds.” This initiative brought together staff from OSI and the assessment office and had continued as a project at the time of data collection. Another State C respondent described new cross-office and external links between the Special Education office, the OSI and the Regional Comprehensive Center (RCC). This network crossed internal and external SEA boundaries and focused in part on school turnaround or transformation models required by School Improvement Grants (SIG), funded by Section 1003 (g) of Title I of the ESEA. An office director noted:

With the inauguration of Obama and the new focus coming out with Duncan, [the superintendent . . . made the decision early in the summer of 2010 to start that evaluation work . . . So the interface on that project began immediately and we brought [the OSI director] on, [staff] from Title II, all of our instructional people. . . . And then OSI director suggested very early on that we bring the [Regional Comprehensive Center (RCC)] in . . . so they've been at every meeting as well. So that interface really began in earnest seven, eight months ago.

Staff and leadership in both states not only described their respective responses to federal or state policy, but also the influence of the Federal Comprehensive Assistance Centers (CAC) and other external organizations in developing new lateral and external knowledge networks. The centers “pushed in” research to SEAs, and federal policies or programs provided incentives for SEAs to seek out and “pull-in” research. Our interviewees in both states described internal and external networks that began to emerge around various issues related to school improvement.

*Research Networks are Larger, but Practitioner Networks have Stronger Ties. Many of the Strong Connections Appear to be Within SEA Offices and With Key External Intermediaries*

A second finding in our survey data shows that while the research networks are the largest of the 3 networks across the 3 SEAs (suggesting broad searches and generally openness to new ideas), the smaller practitioner networks have the strongest connections (see Table 1). Moreover, from sociograms (Figures 1-4) and from our more qualitative examination of the networks of influential actors with strong ties to others, it appears that many of the strong connections--represented by the darker, thicker lines connecting nodes--in the practitioner networks (especially in State B) are within division or office and with a very few, key externals, rather than across divisions or offices. In fact, this holds to some extent for research networks, and especially for influential actors within them (Figures 1 and 2).<sup>6</sup> Though the most influential OSI member in State B has reciprocal ties to federal program monitoring and the superintendents’ office; still many strong ties are within offices. These findings suggest that network structures made up of colleagues within SEA offices or divisions and a few key sources external to SEAs have

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<sup>6</sup> In the analysis of influential individuals’ networks we found a few cross-office ties, but most were within office or division.



more influence and cohesive interaction with SEA members as they develop and implement school improvement strategies than the wider array of members in the research network (or the cross office connections).

*Strong Relationships Within Networks: What Works in Practice?*

While we have looked at the research and practitioner networks for school improvement from the view of the SEA organizations, as noted earlier, we also examined a smaller sample of influential individuals' networks more qualitatively by linking a subset of survey data to interview data.<sup>7</sup> Thus we were able to explore the stronger connections of key internal individuals or external organizations that are influential in the sociograms. We found: First, many of the strongest relationships were in relatively small networks made up of at least some members who drew from the practitioner and research networks (as well as data networks). **The networks at the organization level included a wide range of diverse sources for research allowing for the flow of innovation and ideas. Here, even weak ties could be a strength as they opened up SEAs to broader searches and potential use of information (see e.g., Granovetter, 1973). But, importantly, some influential members working on school improvement brought information from these different sources back into smaller "working groups" with whom they interacted more frequently and who were influential in one another's work.**

Second, as we will show further below, while many respondents valued research, it was highly sought after in forms that are practical and provide some guidance for action. At the same time practitioner advice or expertise was highly prized and thus strong ties developed with individuals and organizations that could provide, assist in generating or adapting this kind of trusted information to state contexts. Below we discuss some of the most influential external and internal network members across the two states to illustrate this set of findings about the role of smaller working groups with strong ties making up some individuals' networks.

One set of influential external groups with strong ties to SEA members in the research network were those that could vet and collate research around specific SEA needs, current policy issues and SEAs' problems of practice. These influential intermediaries such as the federal comprehensive assistance centers (CACs) and some professional associations could also broker knowledge and facilitate discussions with practitioners from different states that were using applied research in their SI strategies (in part because they were in larger professional networks of states focused on current policy issues incentivized by federal initiatives noted earlier).

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<sup>7</sup> Recall we identified the most influential actors, with strong ties to others using sociograms, and rank ordered lists. We arrayed these influential actors with the names of their in-ties and out-ties, along with the strength scores for those ties. We linked that survey network data to their interview network data to create a more holistic view of the networks at the level of individuals. In several instances we found additional ties to external organizations, beyond what the sociogram showed and factored these findings into a final view of influentials—internal and external.

An office director in State B, for example, valued research, but also external sources who helped his team make sense of that research with “how to” information, through materials and work with colleagues in other states. When asked to whom he turned for research he said:

A [regional comprehensive assistance center (RCC), national content center] and the technical assistance agencies, those folks. Policy organizations. That's where you go. They spend a lot of time, . . . compiling it, analyzing it and so that's the first place I go [for] research and best practices. . . .And then for strategies, for how to do it, first place I go is to . . . see what other states are doing and see what we can learn from other states. What's nice about [RCC] is that they pull the states [in a region] together on a regular basis so you can learn what the states are doing. . . . If they figured out a way to get it done.

Strong network connections with these federal centers allowed states to stay current on a changing policy environment while still accessing research that could respond to specific state problems. This is one characteristic of a community of practice (COP) as it helps knowledge users manage the sometimes contradictory and frequently changing aspects of social policy and social research. A high level official in State C also turned to the federal comprehensive center system (CACs) and reported: “I know we rely quite a bit on CII [National Center for Innovation and Improvement]. And also [an RCC]. The RCC not only assists us, but they help to broker other organizations if we need assistance.” An influential member of a smaller work group in State C said her group would ask very specific questions of the CII, “We’re getting ready to implement the lead turnaround partner model with this group of schools, what kind of research do you have?” Two influential members of smaller work groups in State B reported:

The [RCC] has worked with us a bunch of times and I would regularly turn to them and say, “Get me what other states are doing. Help me know what else is going on.” And they were really good at quickly rounding up the information we needed on whatever the subject was.

The [RCC] is the entry point for [State] into a big network of stuff. So it's all the comprehensive centers. Our [liaison] says: “I need to connect you with a guy in Alabama, or I need to connect you with a guy in California or Wisconsin or whatever.” So it's just a door into a set of resources.

One characteristic of COPs is that a community of people care about common problems or have common goals. Through these strong ties with brokers or weaker ties with some key states,<sup>8</sup> early state implementers of policies, or developers of models and promising practices, could network with strong working groups in states who were puzzling over similar problems. Here, external intermediaries with strong ties to core SEA groups<sup>9</sup> are able to quickly respond to a particular policy or program need the SEAs faced, and then facilitate opportunities to see it in action through other practitioners in

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<sup>8</sup> Outside of this study.

<sup>9</sup> The smaller groups with strong ties who interact more frequently and are influential in the work.

SEAs who were “doing it”. Another strong external group—professional associations—and a few universities also offered similar kinds of action research and/or worked closely with states to apply research in their context.

Yet another characteristic of COPs is that they share a “practice”, meaning they work together to develop, refine and use a set of ideas, tools, frameworks and so on. These more influential external intermediaries in SEAs’ strong, smaller, core networks also brokered, jointly developed with states, or helped states adapt research-based, but useable tools that translated research into more specified guides for action. In these instances, the blueprints or models were adapted-- through a smaller core group of within office SEA colleagues, and a few external intermediaries-- for use in the context of a particular state. Again, both states’ core group members reported the teams worked with the Center for Innovation and Instruction (CII), part of the federal CAC system. One office director reported:

When I saw the book, I just looked at it and said, “Good God, this is exactly what we need. Here are the research-based indicators. Here's a blueprint for our school that's in improvement to look at.” I think it’s a little unwieldy because there were so many. So now how do we get it down to a few? And really, that was [the CII directors’] role. He sat at those meetings where we discussed taking those indicators down to a narrower group.

Another influential member of a core team in that state similarly reported:

We got a lot of information from CII, for example. . . . We used the transformation tool kit that CII has developed to assist with working with those schools that were required to use a late turnaround partner. So, CII assisted us with taking the transformation tool kit indicators and putting those into the web-based system that we’re already using with our divisions and schools.

These comments illustrate how an external intermediary, itself part of a larger national network of states, worked with a small core internal team of SEA staff, to address several specific problems of practice, and used practical, adaptable tools for embedding research into an existing school improvement state strategy. In doing so they saved a valued resource that most respondents said hindered their use of research: time.

Networks of colleagues in similar roles and professional associations within a state or across other states also had some strong ties to the influential SEA respondents for a similar reason—they could relate to how research might be used in practice, or what they were actually “doing” to solve similar problems and to address similar needs. The SEA members in our interview sample respected their counterparts “practice”. In State B and State C respondents reported for example:

If I had to pick one thing that's been the most helpful for me in terms of my thinking it's what research are my peers around the country drawing from, that

I could also utilize. What decisions they're making, how are they handling various policy challenges in their states?

We have a very strong relationship with our national group for teacher education, the credentialing group, we work very well together. I trust their practice.

A final reason for the strength of practitioner networks and respondents' desire for practical advice even in the research networks we studied, was the range of different expert advice these networks could provide from technical know-how or knowledge of education law, to research that is most relevant for specific problems and salient feedback on strategies. Core groups in both states presented here had strong ties to networks of practitioners "on the ground" for example, who provided feedback on how research based improvement strategies were working in the field, what needed clarifying, or what could be changed.

When asked why he turned to a group of practitioners for his most useful information, a core group member in State B charged with implementing a school improvement strategy said, "It's getting that feedback on what will work and what won't." An influential in State C said of a group of field based practitioners with very strong ties in his network: "They're the ones that see it in action and they know where our course correction should be. They're the ones that can say, '[Name] this isn't working. This is working great, this is not working.'" Later he continued, "They have a lot of practical stories, anecdotes, and so forth, about how things were going in the field that we may not necessarily hear at our level."

A core group member in state B describes how these strong network ties to a few key individuals could work to help SEA members make sense of their strategies once they were "rolled out" or even before, through network structures spanning the SEA's boundaries:

And we regularly met, and the [OSI Director's] office meets with this group. We have a group of [regional] school district school improvement people and a lot of times we use them as a sounding board because they're in the schools doing school improvement with the local districts. And a lot of times we can say, "Okay, here's what we're thinking." ... We would discuss our ideas with them. "We're thinking that this is how you could help us with the schools. Is that too much? Is it not enough?" . . . So, that was our regular structure.

Based on our framing perspectives, COPs can vary a lot in how members communicate, but the important element is that they do so frequently enough to address problems together, share an area of common concern, and a similar practice. Another State B member of the core school improvement group (with strong ties) commented on the nature of her network that used research, but also shared goals, tasks and a set of ideas as they interacted frequently:

I think what helps us is the regular communication that we have and through email, through meetings, these same people come to the high priority [regional field] meetings, they also go to school improvement facilitators network. . . So we get professional development there, we can network there and talk there. So I think that those conversations and sharing of research. . . has really helped.

*SEA Influential Network Members: Overlapping Networks, Boundary Spanners*

The influential individuals' networks in the two SEAs that we have discussed to this point, spanned unit boundaries internally and SEA boundaries externally. Further, nearly all interview respondents perceived these influential actors to be "idea people" "visionary" or institutional historians based on their years of experience in the agency or around particular issue areas. These SEA members who were central in the research and practitioner networks would pull in multiple kinds of information from across offices and/or from the key external members of their network. They were frequently consulted for knowledge and advice themselves.

They also tended to be in different, but still a few overlapping networks thus in part "distributing" the search for expertise or different kinds of information. For example, the respondent who commented above worked closely with a core group of people with strong connections and an understanding of common ideas, tools and program implementation. She named individuals who were influential in her work, and who were in the same practitioner networks that she was ("these same people come to the high priority [regional field] meetings, they also go to school improvement facilitators network"). But she in turn, was also part of internal cross office group known as the "brain trust" and would take feedback from her network connections into the "brain trust" consisting of cross office and external members who understood different perspectives on the problems they encountered. They thought through and attempted to solve them together. Similarly, a respondent in State C reported, "We don't know everything, but there are some big initiatives that we're all at the table on." In State B an influential school improvement actor reported:

We [her offices and another reform office] work very closely together. She [the director of the other office] has two of her consultants in our area. . . I go to the school improvement grant meetings, they go to the high priority meetings so that we know what everybody's doing, that we're on the same page. So that's where the mentor piece came in.

So search and sense-making could occur across multiple individuals' networks with different foci, but each informing a piece of a state problem or strategy. Or, individuals could cross boundaries of work groups, taking part in many of the same groups, but with varying roles. Recall for example the respondent from State C who said, "The leadership for each of those groups is different, but the core group that works on this is pretty much the same people." As shown in multiple examples, influential SEA members frequently drew from sources in both the research or practitioner networks

(including from their own prior knowledge), which is consistent with the knowledge use literature (see for example, Cohen & Garet, 1975; Cohen & Weiss, 1993; Lindblom and Cohen, 1979). But this knowledge was also brought back to smaller core groups of people who more frequently interacted. Work groups with strong ties often included some combination of members internal to an office and a few key external organizations as we noted at the onset of this section.

### *Social Capital in Core SEA Work Networks*

Importantly, the interactions of a community of people who care about a domain can foster trust and efficacy when they are willing to “share ideas, expose ignorance, ask difficult questions and listen carefully. . .” (Wenger, McDermott & Snyder, 2002, p. X). A prominent theme in the qualitative data is that members of networks with strong connections, including both internal and external members working on problems they cared about, did report developing trust over time. This may account for why we did not find much variation across different kinds of networks on our trust measures (practitioner and research for example). Though causal arrows are difficult to discern, the qualitative data shows that social capital such as trust in the sources and information SEA’s were using, a sense of efficacy in their improvement strategies and decision-making; both were bound up in strong network relationships. Information, decisions, and ideas were perceived to be more trustworthy within the context of strong relationships and collective work. When asked if and why he trusted the research and other information provided within a core work network (that crossed offices and the SEAs boundaries) to be valid and reliable for example, one influential office director said: “Because we digest it together. And people challenge each other.” He went on to describe a collective practice in his own office as an example of what the developers of the state’s school improvement strategy did:

We have our issues, we pick a topic that we're going to dive into deeply. We do that once a week on a topic. And then we solve problems. What are we going to do about this? ...How are we going to handle this? And people bring in research and they'll come back and we'll table things and [then] come back to them with the research, and then we'll challenge the research.

An office director in the other state said:

I want to validate what they're [researchers' are] saying. But when you have those strong networks, you build upon that professional knowledge and practice. And I think we do that very, very well. We're not afraid to tell people we don't know something, either.

The first comment not only shows how members of some collaborative SEA work groups warranted research or other kinds of information as trustworthy, but also provides another example of research use as “social sense making” described in our framing section. The second shows an example of a strong network whose members share knowledge, a practice and who are trusting enough to “expose” what they don’t know.

Other respondents commented on how collective thinking and group work can increase a sense of efficacy when innovating, and generally develop collective capacity. The director of a school reform office in one state talked about the advantages of innovating or developing new strategies for improving schools within networks that included external members from key providers or other states, as well as central members internal to his SEA:

Well, one thing that it did was make me feel less alone in the process. . . . Where you're walking out on the edge, nobody has paved the road yet, and you're wondering, "Is this the right thing? Is this the wrong thing? . . . . So sometimes getting that level of information from other people, other ideas would spark, "This will work here." . . . And sometimes it would solve a problem. . . . What about bringing everybody together in a network and making them meet three or four times a year to share ideas?"

Here, even less frequent interactions could support a sense of efficacy and influence a state's work. In State C when asked if the people in his core work network have the expertise to find, and then use the information to successfully improve low-performing schools, an office director reported about his colleagues and others:

That is a great question. There is no one individual that holds all the information, which is why we have a group. . . . there isn't any one person but I think all of those different people hold enough pieces that we can have those conversations and share information across the table that can . . . push us along . . . to that ideal goal at the end.

This office director just above, was one of several respondents who also reported an enhanced sense of efficacy from collective thinking, again illustrating the social capital embedded in these networks. Resources such as "communal memory" support group members such that no one person has to know everything. His network brought different sources of knowledge and ways of warranting information into a group that could then make sense of how to use it or inform decisions about "what to do." He trusted practitioners in his network because:

You get to talk to the people who are actually involved in it [implementing the school improvement strategy]. So, I think that increases, in your mind, the validity because you are hearing it, as well as the actual reports. So I think it's a trust thing.

But he also trusted research in the context of his working group that would challenge the research. He provides an example:

This study, they did it with 30 people, okay. This is not enough, to me, to be able to transfer that to a larger setting, you know, can this be generalized to ours? Well, okay, they only did it with this one group of students. No, that's not what we are looking for.

Again, he and most of the SEA influentials whose individual networks we studied using our case data, reiterate that practitioners, in this case SEA program developers and implementers, managers, and staff—incorporate practitioner advice and a range of other kinds of evidence into their sense making about how to apply research. They often do so in COPs that have been designed or emerged around specific problems of practice.

### Conclusions and Discussion

Cultivating professional networks may be an important means to not only spread innovation and increase the influence of research in SEA's, but also to develop expertise, capacity and we found, to tailor research based solutions to different local contexts. While we found plenty of "isolated" SEA members who did not communicate with anyone, and some skepticism about how these organizations were using research, we also found more boundary spanning connections across offices and to key external intermediaries than we anticipated given previous studies (Lusi, 1997 for example). These networks did influence the use of research and other kinds of knowledge in SEA strategies, allowing for some flow of ideas, innovation, action-oriented tools and feedback on strategy implementation. Smaller SEA organizations, SEA leaders committed to more collaborative organizational cultures and importantly, state and federal initiatives have all mobilized some cross-office and external research and advice networks in the two states we focus on in this paper.

Interestingly, while the research networks were the largest, suggesting broad searches (across all 3 states),<sup>10</sup> the smaller practitioner networks had the strongest relationships or ties connecting group members. Moreover, in both the research and practitioner networks, many of the strong ties we found were within offices or divisions and with a few key external intermediaries (as opposed to across offices/divisions or with the wider range of research sources in these networks). Thus in part, formal roles and offices did influence communication (Weinbaum, Cole, Weiss, & Supovitz, 2008). But our more qualitative analyses of network data from a subsample of influential individuals or organizations in the survey, along with their interviews also allowed us to explore these stronger relationships through the lens of key individuals' networks.

Through our qualitative data we found the most influential SEA members who were charged with developing and implementing school improvement strategies had developed a knowledge network that included multiple connections (in-ties and out ties) to other offices, external sources of practitioner advice, and external sources of research knowledge. But they still formed smaller "core groups" of colleagues and external intermediaries with whom they interacted more frequently and whose members influenced one another's work. The influential people in school improvement work valued practical, action oriented advice, including research or implementation feedback in forms that could be applied. They interacted more frequently with external groups who could provide or assist them in generating and adapting this kind of knowledge to their

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<sup>10</sup> It is important to note that even weak ties to a larger network of sources can be a strength, in this case for the SEA organizations, as it allows access to a wider range of potential ideas or expertise (Granovetter, 1973).



state's needs; and, in turn used strong connections to smaller internal working groups to apply different kinds of information to quite specific, often practical problems.

Wenger, McDermott and Snyder (2002) in their seminal text “a Guide to Managing Knowledge” elaborated a wide range of empirical cases included in their theory of Communities of Practice (COPs). They showed that COPs could exist within and across organizational boundaries; they could vary in size, means of communication and other factors. But like the examples we have used from two of the SEAs in this study, strong, high quality social networks or “core work groups” all tended to be designed or to arise as “people address[ed] recurring sets of problems together” (Wenger, McDermott and Snyder, p. 26), and developed a shared “practice” (a set of ideas, tools, frameworks, information, stories, language and so on).<sup>11</sup> Frequent interactions of community members could and did foster social capital such as trust or a sense of collective efficacy—in the members of the community as well as the information they used, and the decisions they made.

While federal and state incentives played a strong role in creating SEA demand for research and the advice, products or services of external intermediaries, a few of these groups made themselves and the research they marshaled more influential within the networks of central SEA members, and thus in shaping potential solutions to states' school improvement problems. Based on a previous CPRE study of the federal CAC system, and on preliminary evidence from our current study, they did this first by being flexible and committed to meet the needs of states; second by being knowledgeable about research related to the federal school improvement reform agendas; third by being timely; and forth by brokering, and collectively (with SEAs) generating or adapting products that translate research into useable knowledge for practitioners.

Similar to what Cecil Miskel and his colleagues found in a study of influential actors in state reading policy networks (Miskel & Song, 2004 and Song & Miskel, 2002), we found that the most influential actors in the networks we studied were those with access to timely information who could in turn provide that information to others in the network. In our cases such information included feedback about how a strategy was working “in action” as implemented, how practitioners' in similar roles might be adapting research to SEA problems, or potential research based solutions to specific problems that challenged states as they attempted to respond to policy pressures.

The role of “community organizer” that some influential actors external or internal to the SEA assumed, tended to go beyond more traditional roles of “knowledge disseminator” or technical assistance provider. Instead, community organizing brought together expertise and knowledge in a relational arrangement for developing system capacity and “useable knowledge” (for some SEA members).

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<sup>11</sup> See Massell & Goertz, 2012 AERA paper for more examples of these “problems of practice”. See also Fink & Weinbaum, 2012 AERA for more details on external intermediaries.

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## Appendix A

See Power Point attachment Appendix A, Barnes, Weinbaum & Francis.