

Absorptive capacity: A conceptual framework for understanding district central office learning

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Abstract Globally, school systems are pressed to engage in large-scale school improvement. In the United States and other countries, school district central offices and other local governing agencies often engage with external organizations and individuals to support such educational change efforts. However, initiatives with external partners are not always productive. We draw on the idea of absorptive capacity to present a conceptual framework for understanding when and under what conditions partnerships are likely to foster district learning and support change efforts. We contend that prior knowledge, communication pathways, strategic knowledge leadership, and resources to partner are preconditions for a district central office's absorptive capacity, and we identify the features of the external partner that likely matter for productive partnering. We argue that the relationship between district absorptive capacity and features of the partner is mediated by the nature of the interactions between district and partner, with likely consequences for organizational learning outcomes. For researchers, this framework serves as a tool for understanding how a district central office can learn from an external partner for educational improvement efforts. For school district leaders and external partners, this framework provides a structure for thinking strategically about when and under what conditions a partnership is likely to be productive.

Keywords Absorptive capacity · District central office · District capacity · External partner · Partnership · Organizational theory · School system · Organizational learning

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Introduction

Across the globe, there is growing pressure on school systems to improve teaching and learning. In the United States, school districts are critical players in systemic educational change (Burch and Spillane 2005; Datnow and Honig 2008; Hightower et al. 2003; Rorrer et al. 2008; Spillane 1996). They are responsible for local educational decision-making while also implementing state and federal initiatives (Hightower et al. 2002; Meyer et al. 1987). School district leaders design initiatives to improve teaching and learning, create structures and processes to implement these initiatives at scale, and provide management, oversight, and leadership system-wide (Rorrer et al. 2008).

Given limited resources and capacity, many school district central offices—like other local governance agencies in some countries—engage with external organizations and individuals for assistance in these reform efforts (Coburn et al. 2008; Datnow and Honig 2008; Honig 2004b). These external partners—educational vendors, consultants, foundation-based projects, and researchers—are eager to work with districts to share their materials and expertise and engender resources to support their work (Burch 2002, 2009; Rowan 2002; Russell et al. 2013). However, partnerships with external organizations are not always productive in helping district leaders meet their goals (Firestone and Fisler 2002; Freedman and Salmon 2001). They can fail to take into account the district central office's capacity to learn from its partners (McMillen et al. 2009) or insufficiently invest in fostering a district infrastructure that can support learning (Coburn et al. 2009; Donovan and Pellegrino 2003). The question is: When and under what conditions can school district central offices learn from external organizations to support their ambitious plans for educational change?¹

Research in organizational theory suggests that an organization's ability to learn from others is essential if it is to leverage work with external individuals or groups for productive change. Scholars refer to this capacity as *absorptive capacity*, defined as the ability to recognize the value of new information, assimilate it, and apply it in novel ways as part of organizational routines, policies, and practices (Cohen and Levinthal 1989, 1990; Zahra and George 2002). Here, we draw on theories of absorptive capacity to develop a conceptual framework for understanding districts' capacity to productively learn from external sources of knowledge. We argue that several organizational features are preconditions for absorptive capacity: prior related knowledge, pathways for communication, strategic knowledge leadership, and resources to coordinate and integrate efforts (Cohen and Levinthal 1990; Lane et al. 2006; Volberda et al. 2010). We identify the features of the external partner that likely matter for productive partnering. Finally, we suggest that the relationship between district absorptive capacity and features of the partner is mediated by the nature of the interactions between district and partner, with likely consequences for organizational learning outcomes.

¹ A companion question could also be one that considers how external partners can learn from their work with district leaders. This question is important but beyond the scope of this manuscript.

This conceptual framework contributes to research on district and other forms of local governance for schooling by providing a theoretically-grounded and multi-dimensional way to conceptualize capacity to learn from outside partners. It extends current conceptualizations of absorptive capacity by exploring the qualities of the external partners and the role of the interactions between district and external partner. It provides guidance for educational leaders—in school districts and other government units—to think strategically about when and under what conditions a partnership is likely to be productive. The framework can also be a useful tool for external partners when considering when and how they partner with a school district. Finally, it provides a number of testable propositions that can guide future research on the development of district capacity and the role of external organizations therein.

Districts and their capacity to learn from external partners

There is growing enthusiasm for partnering as a strategy for district and school improvement. Starting in the 1990s, governmental and philanthropic efforts raised the profile of external third party involvement in schools and districts (Supovitz 2008). Many intermediary organizations rose to prominence as part of the \$500 million Annenberg Challenge (Kronley and Handley 2003) and the comprehensive school reform movement (Borman et al. 2005; Desimone 2000). External partners have been heavily involved in school improvement and turnaround efforts at the state and federal level (Hassel and Steiner 2012; Le Floch et al. 2008). The U.S. Institute of Education Sciences, the National Science Foundation, and other grant-making organizations have new funding streams to promote partnerships between researchers and districts as part of continuous improvement efforts (Coburn and Penuel 2016). A recent national survey of state officials suggests that collaboration among the K-12, business, and higher education communities is a growing strategy for planning and implementation of the Common Core State Standards (Rentner 2013). External partners can include for-profit and non-profit individuals and organizations, including vendors, consultants, foundation-based projects, or researchers (Bulkley and Burch 2011).

External partners can provide tools, expertise, and other resources to support change and improvement in school systems (Honig and Ikemoto 2008; Corcoran and Lawrence 2003; Kerr et al. 2006; Smith and Wohlstetter 2006). For instance, in a study of a partnership between an external partner and three school district central offices, Marsh et al. (2005) noted that the collaboration contributed to changes in districts' organizational culture, norms, and beliefs about instruction and helped develop the knowledge and skills of administrators. Similarly, Fullan et al. (2004) found that work with external partners was critical to improvement efforts in districts in Canada, the United States, and England.

However, creating and maintaining productive partnerships can be fraught with difficulties. Partnerships may complicate a district's decision-making autonomy; there are structural and cultural barriers to working together; and they can require a large investment in time and money (Burch 2009; Hatch 2001; Kronley and

Handley 2003; Supovitz 2008). Further, external partners can alter or complicate district leaders' work (Firestone and Fisler 2002; Freedman and Salmon 2001). In his study of a district with many partners, Supovitz (2008) noted that the introduction of expertise led to a fundamental shift in the power dynamics in the district, requiring district leadership to readjust the traditional lines of authority and support between schools, the district central office, and the external provider. These challenges can multiply with each additional external partner (Hatch 2001).

Despite the popularity and promise of these efforts, the mechanisms by which external partners support organizational change and learning are not well understood. Many studies argue that school districts need some level of existing internal capacity to work productively with external organizations (Burch and Spillane 2004; Hightower et al. 2003; Honig 2003, 2009; Honig et al. 2010; Kerr et al. 2006; Massell and Goertz 2002; McLaughlin and Talbert 2003; Rorrer et al. 2008; Supovitz 2006). However, few of these studies provide robust theorizations of this concept (Stoll 2009). Some define district capacity solely in terms of human capital (i.e., the knowledge, skills, or personnel in the central office), neglecting other elements that may contribute to capacity (e.g., Firestone 1989). Others use the term "capacity" loosely, without a clear definition (e.g., Corcoran et al. 2001).

There are a few scholars in education that offer more robust conceptualizations of district capacity. From Spillane and Thompson (1997), we learn that one district's success in implementing ambitious instructional reforms was largely due to its ability "to learn new ideas from external policy and professional sources and help others within the district learn these ideas" (p. 187). They called this ability "capacity," which they conceptualize as consisting of three interrelated dimensions: human capital, social capital, and financial resources. Human capital includes individuals' knowledge, skills, and will to carry out reforms, as well as the level of staffing dedicated to these efforts. Social capital involves norms of trust and collaboration within the organization, as well as links to knowledge sources from the environment. Financial resources are the resources dedicated to staffing, time, and materials (Spillane and Thompson 1997). More recently, Honig and her colleagues focused specifically on districts' capacity to learn from the organizations in the environment (Honig 2003, 2004a, b, 2008; Honig and Ikemoto 2008; Ikemoto and Honig 2010). They argued that a district central office's capacity to search for and use information from the environment requires site and system knowledge, ties with sites and within policy systems, and administrative tools (e.g., the structure of the workday) (Honig 2003).

We build on the work of Spillane, Honig, and colleagues to extend our understanding of a district's capacity to productively learn from external sources of knowledge. To do so, we turn to the theory of absorptive capacity from organizational learning theory. Research outside of education has identified absorptive capacity as key to an organization's ability to learn from outside sources of knowledge. In their seminal work, Cohen and Levinthal (1990) defined "absorptive capacity" as an organization's "ability to recognize the value of new information, assimilate it, and apply it to commercial ends" (p. 128). An organization with substantial absorptive capacity, they argued, is able to locate new ideas from the environment and incorporate them into organizational practices,

policies, and routines. As part of this process, organizational leaders identify available and needed knowledge (acquisition), create processes and routines to incorporate it into current practice (assimilation) or develop new solutions (transformation), and apply it to new problems (exploitation) (Cohen and Levinthal 1990; Zahra and George 2002). More recent work has conceptualized absorptive capacity as a learning process in which organizations make sense of information and construct new knowledge through activity and social interaction (Zahra and George 2002).

Absorptive capacity can foster a range of organizational outcomes. It can contribute to increased performance and innovation, often measured by the number of patents a company holds, a proxy for investment in research and development (Cohen and Levinthal 1990; Stock et al. 2001; Rosenkopf and Almeida 2003; Tsai 2001). Tsai (2001) found in his survey of multinational corporations that more absorptive capacity produced a greater number of new products with better profitability rates. Absorptive capacity can result in less tangible benefits, such as the spread of knowledge within an organization (e.g., Gupta and Govindarajan 2000), interorganizational learning (e.g., Lane et al. 2001), and improved ability to search for new knowledge in the environment (e.g., Shenkar and Li 1999). Szulanski (1996) found that the absence of absorptive capacity was a major impediment to the spread of best practice within organizations. In the long term, absorptive capacity is cumulative and path dependent; the more an organization invests in its absorptive capacity, the more it will be able to benefit from new external information in the future (Cohen and Levinthal 1990). In education, a number of scholars recognize the utility of this concept, referencing absorptive capacity in studies of district learning (e.g., Daly and Finnigan 2010; Honig 2003). However, these scholars have not explored the concept in depth or operationalized it in systematic ways.

While research on absorptive capacity has the potential to offer insight into district central office capacity to benefit from engagement with external partners, it has limitations as well. First, most empirical research on absorptive capacity has been conducted in the for-profit sector (Lane et al. 2006). It is not clear how these concepts might be operationalized in a non-profit education setting. For instance, narrowly measuring learning outcomes using measures such as patent production is not likely an appropriate way to understand organizational learning outcomes for district central offices. Second, to date, scholars have paid limited attention to how features of the external sources of knowledge—the outside organization or individual with whom organizations engage—may matter for organizational learning (Volberda et al. 2010). Those studies that do consider the external source tend to treat all sources of knowledge as equal, failing to consider different qualities that may matter for an organization's ability to learn from and with them. Further, most research on absorptive capacity does not attend to the interactions between an organization and an external source of knowledge, and how these engagements may matter for an organization's ability to learn from and with them. Yet, it is likely that the nature of interaction—for instance, how it is structured or the routines in place—might matter for the organization's ability to draw on and use external knowledge in productive ways. These gaps in the literature make it difficult to predict when

partnerships with school districts may or may not promote organizational learning and change.

We address these limitations by developing a conceptual framework that brings together the concept of absorptive capacity with existing scholarship on educational change to understand when and under what conditions district central offices can learn from external organizations, and with what consequences for organizational learning. We begin by outlining the organizational features that support a district's absorptive capacity. We then elaborate the features of external partners that likely matter for their work with district administrators. Finally, we explore how the interactions with external organizations shape opportunities for learning and knowledge exchange. Together, the framework helps us understand an organization's ability to make use of external knowledge as a function of its internal organizational conditions, features of the external partner, and the nature of its relationship with external sources of knowledge.

Conceptual framework

School districts often enter into relationships with external organizations or individuals with the hope that these efforts will provide needed advice and guidance for educational change. Yet, we know little about when and under what conditions partnerships with a district are likely to enable districts to learn from external partners in ways that support this change. Below, we put forth a conceptual framework to guide future inquiry to shed light on these important issues (see

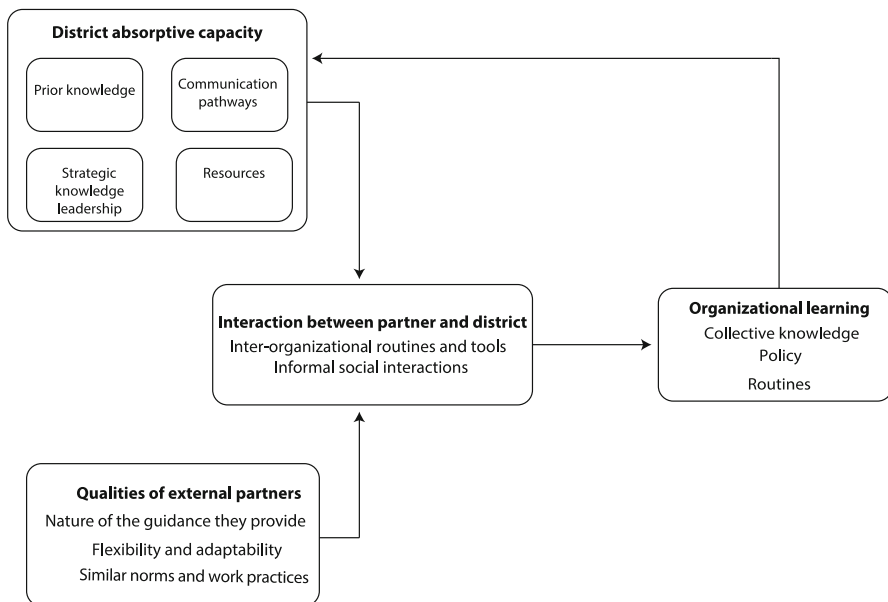


Fig. 1 Conceptual framework

Fig. 1). We posit that the degree to which school district leaders learn from external partners depends upon the district central office's absorptive capacity as well as features of the external partner. The nature and structure of the interactions between the district and external partner then mediate the district's learning outcomes.

Organizational dimensions that support absorptive capacity

A district's absorptive capacity is its ability to recognize the value of new information, assimilate it, and apply it in novel ways (Cohen and Levinthal 1990). Theorists have identified three organizational features that contribute to an organization's ability to make use of new knowledge from an external partner: prior knowledge and expertise, communication pathways, and strategic knowledge leadership. To that, we add a fourth from empirical literature in education: resources for partnering.

Prior knowledge

Scholars argue that prior knowledge and expertise is a critical organizational feature that enables absorptive capacity because people within an organization need relevant, domain-specific knowledge to be able to recognize and make use of external knowledge (Cohen and Levinthal 1990). For today's districts, prior knowledge is an important part of district capacity generally (Honig et al. 2014; Spillane and Thompson 1997). With regards to work with an external partner, the relevant prior knowledge likely depends upon the nature of the work that an external partner is brought into do. For example, if an external partner is engaged to help the district improve teaching in middle school mathematics, relevant prior knowledge may include an understanding of different instructional approaches in mathematics and knowledge of effective teacher professional development. In contrast, work with an external partner to support a district-wide technology initiative may require prior district knowledge about how to integrate technology into the classroom in productive ways or how to scale up innovation system-wide. Honig et al. (2014) provide evidence that district staff with high levels of prior knowledge of district redesign efforts were more likely to be able to engage with new practices promoted by outside support partners who brought ideas on district reform to the table than staff without this prior knowledge who were working with the same support partners.

While it takes some degree of relevant prior knowledge to be able to recognize and make use of new guidance from external partners, not everyone in the district central office needs to have all of the relevant knowledge as long as it is distributed among the individuals who are involved in a given initiative. But, having the relevant knowledge is not helpful if people in the organizations are not aware of where the expertise is located in the system (Cohen and Levinthal 1990; Honig 2003; Levitt and March 1988; Walsh and Ungson 1991). Given that most large school districts have highly complex, departmentalized, and multi-level organizational structures (Hannaway 1989, 1993; Meyer et al. 1987; Spillane 1998), this can

be a challenging task. Thus, relevant prior knowledge must be accompanied by knowledge of where the expertise is located in the system.

Communication pathways

Formal and informal communication structures are important for knowledge sharing and joint problem solving in a district central office.² Central office staff will be more likely to learn from external sources if there are ways to share this understanding and engage in joint problem solving with one another. With well-developed communication pathways, there is regular, ongoing communication that enables knowledge sharing related to a given initiative. Indeed, scholarship on social sensemaking suggests that individuals can develop shared understandings through social interaction and joint negotiation (Vaughan 1996; Weick 1995).

Communication pathways can be either formal or informal (Spillane and Thompson 1997). Formal pathways include official meetings, task forces, and working groups that bring people together to engage in joint work. District central offices frequently create these opportunities as a way to increase coordination and bring individuals into decision-making processes (Chrispeels 2004; Daly and Finnigan 2010; Hannaway 1989; Honig 2004b; Leithwood et al. 2007; Togneri and Anderson 2003). Knowledge sharing may also occur in informal social interaction via social networks. Depending upon how they are configured, social networks may create opportunities to learn more about where knowledge is located in the system and create opportunities for within and cross-department knowledge sharing (Coburn et al. 2012). Using social network analysis, scholars have found that the configuration of social interaction matters for the flow of knowledge and the ability to engage in joint problem solving (Burt 2001; Hansen 1999; Hargadon 2003; Powell and Grodal 2006). For example, networks that access diverse knowledge pools, such as those that stretch across departments, enable greater innovation (Burt 2001; Reagans and McEvily 2003). Knowledge flow and joint problem solving are also facilitated by strong ties and trust, particularly when knowledge is complex or tacit (Hansen 1999; Reagans and McEvily 2003; Uzzi 1997). In contrast, sparse ties between administrators in a district central office may constrain the exchange of complex information and ultimately inhibit change efforts (Daly and Finnigan 2010).

Strategic knowledge leadership

Managers can play an important role in creating, extending, or modifying an organization's accumulated knowledge base (Fullan 1980, 2006; Volberda et al. 2010). Here, we are interested in a particular type of leadership related to engagement with external partners, a concept we call strategic knowledge leadership. Strategic knowledge leadership is the ability to identify and assess

² Here, we focus on the communication pathways within the central office as part of a framework for understanding how district central office staff learn in partnership with external partners. The communication pathways between district central office and schools are important to many district initiatives and should be considered in future projects.

current sources of knowledge within the organization, scan the broader field for available sources of knowledge, and synthesize acquired knowledge by linking it with current knowledge and routines within the organizational setting (Volberda et al. 2010). It is especially important in situations where there are multiple sources of new knowledge available (Van den Bosch et al. 1999; Volberda et al. 2010). Applied to a school district, strategic knowledge leadership is the ability of district leaders to offer important big picture thinking about synthesizing and applying new knowledge while leveraging existing knowledge.

Strategic knowledge leadership likely has multiple components. For instance, district leaders may vary in their willingness to engage with external partners in the first place depending on how much they value the insight or support of outside partners, making this a crucial component of strategic knowledge leadership. It can involve intentional efforts to link knowledge and approaches from external partners to existing mechanisms that support instructional improvement (e.g., district coaching models or existing teacher networks) as a way of building it into existing district practice and knowledge resources. It may also involve helping those in different areas of the district understand how new ideas, approaches, and knowledge link together or to their ongoing work. The ability to coordinate the work of multiple partners may be a dimension of strategic knowledge leadership, as well.

Resources for partnering

Spillane and Thompson (1997) recognized that financial resources are an important part of district capacity generally. Here, we add a specific kind of resource to support the ability to learn from outside sources of knowledge: resources to partner. Coordinating with external partners can involve a great deal of invisible work (Hatch 2001; Honig 2008), and as such, it requires resources to support district leaders' ability to productively make use of what external partners have to offer. The work of developing and maintaining partnerships requires a budget that supports the time of key stakeholders dedicated to engaging with the partner; staffing dedicated to partnership coordination; and the purchase of services and materials integral to the work. One consistent finding across studies of partnerships was an underestimation of the time needed to engage in the collaboration, particularly if it served as an "add-on" to an educator's already full set of responsibilities (Earl and Cousins 1995; López-Turley and Stevens 2015). For long-term partnerships, it can also be difficult to sustain the infrastructure because sources of funding are often short-term and project focused (Donovan et al. 2003).

Together, these four organizational features—prior knowledge, communication pathways, strategic knowledge leadership, and resources to support collaboration—likely contribute to a district central office's overall ability to make use of new knowledge from an external partner. It is also possible that there may be some critical interrelationships between these dimensions. For example, communication pathways may be the vehicle through which district staff learn about and mobilize existing prior knowledge as they interact with new knowledge (Nahapiet and Ghoshal 1998). In an earlier longitudinal study of teachers' social networks, one of us found that communication channels among teachers that were characterized by

substantive and mathematics-focused discussion contributed to a stronger understanding of the social location of mathematics expertise in schools (Coburn et al. 2012). Strategic knowledge leadership may also interact with prior knowledge in important ways. Having relevant prior knowledge may not be sufficient to foster absorptive capacity absent the ability of leaders to involve those with prior knowledge in partnership work (Jansen et al. 2005). Finally, resources to partner may foster the development of communication channels. When there is more staff or time dedicated to partnership work, it likely makes it easier for partners and district staff to meet more frequently, both formally and informally (Wentworth et al. 2016).

Qualities of external partners

Districts' internal capacity is likely not the only thing that shapes the degree to which they learn from and make use of knowledge from external partners. Qualities of the external partner are potentially consequential as well. Studies in education suggest that a wide range of external partners exist in the larger educational system (Rowan 2002; Russell et al. 2013). Each partner varies in ways that may shape the degree to which a district central office can learn from them. We have identified three factors that may matter: the nature of the guidance external partners provide, their flexibility and adaptability, and the nature of their norms and work practices.

Nature of guidance they provide

The degree to which engagement with external partners fosters new learning depends, in part, on the nature of the guidance they provide (Cohen and Levinthal 1990; Lane et al. 2006; Szulanski 1996). The degree of shared knowledge between the external organization and district central office—or knowledge complementarity—plays a role in a central office's ability to engage productively with external guidance. The nature of the guidance from the external partner serves as a counterpart to the prior knowledge within the district. Guidance that is similar enough to enable communication and facilitate learning but dissimilar enough to add value to the central office is most likely to foster use (Cohen and Levinthal 1990). For example, Earl and Cousins (1995) found the most promise in partnerships where the research-based expertise of the outside partner complemented the local, contextualized knowledge of practitioners. A complementary, shared knowledge base likely enables district administrators to frame and interpret guidance from external partners more easily, making the “uptake” of advice more likely (Hubbard 2010).

External knowledge may be explicit, tacit, or embedded. Explicit knowledge (“know-what”) includes ideas formally shared in writing or explicit presentations (Brown and Duguid 1998). A partner's explicit knowledge could include a written set of instructional strategies that are shared with district staff. Tacit knowledge, sometimes referred to as “know-how,” is that which is embedded in day-to-day, informal understandings. Tacit knowledge could include understandings about how to orchestrate change (Nutley et al. 2003). Embedded knowledge is that which is

built into tools (Pea 1993), such as protocols for walkthroughs or data conversations. Tools function to structure social interaction as people engage with the tool and each other, providing opportunities for people to learn new approaches in the act of doing them (Ikemoto and Honig 2010; Norman 1988; Sherer and Spillane 2011).

We know that explicit knowledge is easier to communicate than tacit knowledge, which is more difficult to capture and express across organizational boundaries (Nonaka 1994; Polanyi 1966). However, tacit knowledge is often more contextual and specific and thus may be easier to integrate into ongoing routines. Tools may be an effective way to incorporate new approaches into everyday organizational practice. For instance, the Institute for Learning, a non-profit organization coordinated by the Learning Research and Development Center at the University of Pittsburgh that partners with school districts, created a set of tools for central office administrators to use when they visited schools. The IFL tools (e.g., a set of principles for rigorous teaching and learning, an observation protocol for “Learning Walks”) named key concepts and offered routines practitioners could integrate and implement in their day-to-day practice. By using these tools, district leaders forged new ways of observing and communicating with schools on matters of instruction (Honig and Ikemoto 2008; Ikemoto and Honig 2010). The nature of the knowledge that external partners promote—whether explicit, tacit, or embedded—likely matters for what and how district leaders learn from engagement with them.

Flexibility and adaptability

A district central office’s learning is likely improved when the external partner is able to be flexible and adaptable to the needs of the “learner” organization (Lane et al. 2001; Lane and Lubatkin 1998). In education, a flexible partner tailors its guidance and advice to fit the needs and realities of the particular district context. This quality may make it more likely for district leaders to see the applicability of the partner’s guidance in their particular setting, increasing the likelihood that district partners will attend to the advice. Flexibility is also required when working within a district context, as the work occurs in a very dynamic environment, where changes (e.g., new top leadership, evolving state or federal policies, shifting priorities) are the norm, rather than the exception (Honig 2003). An adaptable partner is one that can adjust course to accomplish common goals through other strategies than they had initially devised. Being flexible can present some challenges for an external partner. They are not likely to see impact if they are not flexible enough to take advantage of new opportunities or make accommodations to previous plans based on changes in local conditions. At the same time, a partner likely needs to maintain fidelity to the core principles and messages in order to achieve common desired outcomes (Cobb et al. 2013; Rosenquist et al. 2015).

Similar norms and work practices

There is some evidence that organizations are more likely to learn from others if the others have similar norms and work practices. When norms and practices are shared,

districts and their partners are more likely to productively coordinate their work together and share understandings about goals. This may be difficult to enact in the context of school districts and their external partners, as many external partners are from vastly different kinds of organizations than districts, including for-profit vendors, technical assistance agencies, universities, or non-profits. Indeed, the challenges of collaborating across kinds of organizations are well documented in education. When the external organization is a university, for instance, practitioners and their partners may work in different cultural worlds, with contrasting practices and norms (Bickel and Hattrup 1995; Brookhart and Loadman 1992; Gifford 1986; Keating and Clark 1988; Palinkas et al. 2009; Schlechy and Whitford 1988). These differences can shape the dynamics of partnership in profound ways, leading to confusion, uncertainty, and even conflict (Coburn et al. 2008), all of which constrain learning opportunities. In their longitudinal case study of one urban district's partnership with a local university, Coburn et al. (2008) described the difficulties that university partners and district leaders had when the norms of the two groups conflicted. Differences in work norms—in this case, approaches to professional development—led to tension and frayed trust. However, when expectations for work norms, roles, and relationships were established and shared, district leaders and their partners were able to more successfully engage with and learn from each other. Beyond university partners, other types of partners are likely to bring their own distinct work practices and norms, like differing incentives, sanctions, or authority and decision making rules, that can shape a district's ability to work with, and learn from, an external partner (Supovitz 2008; Volberda et al. 2010).

Interactions between external partner and district

Thus far, we have focused on the internal organizational conditions of the district central office and the characteristics of external partners that, at least theoretically, enable school districts to learn from external sources of expertise. Next, we argue that central office's absorptive capacity and the features of the external partner are mediated by the nature of the interactions between the central office and the external organization. An external organization may be flexible and adaptable and have complementary expertise, but it may not foster district learning if its interactions with the district are not conducive to learning. Similarly, some interactions may be more productive than others given a district's level of absorptive capacity and the features of external partners. We focus on two dimensions of a partnership's interactions: inter-organizational routines and tools and informal social interaction.

Inter-organizational routines and tools

When and how guidance from external partners enters into the flow of district work is likely influenced by inter-organizational routines and tools that may shape those routines. Routines are “repetitive, recognizable pattern[s] of interdependent actions, involving multiple actors” (Feldman and Pentland 2003, p. 95). Inter-organizational routine are those that include participants from both the central office and external partner, are repeated over time, and are recognizable to those involved. Many

districts and their partners develop structures for interacting with one another on a semi-regular basis. For example, the Strategic Education Research Partnership (SERP), a place-based research partnership, has developed an intentional structure it calls the core team meeting (Donovan et al. 2013). The core team meeting consists of district leaders and SERP staff meeting together monthly to discuss their joint work, reflect on what is being learned, and identify possible new lines of investigation. Other external partners have regular or semi-regular meetings where they provide updates or engage in design work with one another (Coburn and Penuel 2016).

Routines can be designed or emergent. Designed routines are formal mechanisms for coordinating collective work, like the structure developed by SERP. They can involve such things as meeting structures, formalized standard operating procedures, or other practices that structure work (Pentland and Rueter 1994; Sherer and Spillane 2011). Emergent routines develop through ongoing interaction in the flow of interdependent work until they become “the way we do things here” (Cohen 1994). They emerge as district leaders and their partners improvise a new routine that was not planned in advance when faced with a novel challenge. Or, during ongoing engagement with a partner, unwritten traditions or informal procedures may emerge as a product of their work together.

The structure of routines is important because they can shape who is involved in the discussion, around what sources of knowledge, and in what ways (Coburn and Turner 2012; Horn et al. 2015; Little 2012). As such, they can create very different conditions for learning, influencing what and how district central administrators take away from their engagements with outside organizations (Dyer and Singh 1998; Lane et al. 2001). For example, an inter-organizational routine in which the external partner presents an update on their work is likely less conducive to district learning than those involving co-planning, coaching together, or co-design work, routines often a part of co-design or co-led partnerships (Coburn and Penuel 2016).

Sometimes, there are specific tools that are involved in the enactment of inter-organizational routines (Bray and Russell 2016). Tools function to structure social interaction, in this case between external partners and district staff, as they engage with the tool and each other. This is because tools provide opportunities for people to learn new approaches in the act of doing them (Ikemoto and Honig 2010; Norman 1988; Sherer and Spillane 2011). Some partners explicitly design tools to structure interaction between external partners and district leaders. For example, the Carnegie Foundation uses a tool called a fishbone diagram with its partner districts. The fishbone diagram is a template for identifying the root causes of a problem and the factors thought to contribute to that outcome. The tool guides conversations, focusing discussion on a problem, its root causes, and possible contributing factors, and it serves to capture the details that emerge from those conversations (Bryk et al. 2015). As with routines, the design of tools can create very different conditions for learning, directing people’s attention toward particular ideas, or ways of thinking and acting, and away from others (Ikemoto and Honig 2010).

Informal social interaction

Opportunities for knowledge exchange and sensemaking with an external partner may also happen outside of inter-organizational routines when districts receive guidance from partners informally (Eraut and Hirsh 2007). We know that the structure of informal interaction—or, district leaders’ informal social networks—matters for learning (Ghoshal et al. 1994; Spillane and Thompson 1997; Walter et al. 2007). In the case of school district central offices, it is likely that the more ties district leaders have with external sources of expertise, the more opportunities they have to access new and diverse knowledge resources (Powell et al. 1996). At the same time, strong ties—especially those that support a high level of trust between district leaders and external partners—are important for enabling collaboration that facilitates inter-organizational learning (Asen 2013; Daly and Finnigan 2012; McEvily et al. 2003). When informal interaction is characterized by trust, all parties are more willing to share and exchange information in situations that require them to be vulnerable and take risks (Lane et al. 2001). Strong ties and the resulting trust also foster sharing knowledge that is tacit or complex (Reagans and McEvily 2003; Uzzi 1997).

Organizational learning outcomes

When district central offices engage with external partners in the service of educational change, district leaders can, under some conditions, learn in ways that support their improvement efforts.³ We argue that districts’ absorptive capacity and the features of external organizations, as mediated by the structure of their formal and informal interaction with districts, influence the likelihood that districts experience organizational learning and leverage this learning for educational change.

The existing literature on absorptive capacity often uses narrow measures of learning outcomes, including such things as the number of patents (e.g., Ahuja and Katila 2001) or new products (e.g., Tsai 2001). We draw on organizational learning theory, particularly the work of James G. March and collaborators, to more broadly conceptualize the learning that may result from engagement with outside partners.⁴ Drawing on March and colleagues, we define organizational learning at the district central office level as the degree to which the district integrates explicit and tacit guidance and tools from the external partner into collective knowledge, routines, and policies that guide behavior (Feldman and March 1981; Levinthal and March 1981; Levitt and March 1988; March 1991). We focus on two elements of organizational learning: collective knowledge and shifts in policies and routines.

³ Research suggests that external partners can also learn from their work with districts (e.g., Wentworth, Carranza, & Stipek, 2016). In this article, we focus solely on the organizational learning of the district central office. This important topic is a good subject for a future article.

⁴ We recognize that districts can and do learn from internal sources of knowledge. Here, we focus on organizational learning within the context of external partnerships.

Collective knowledge

District leaders' engagement with partners and with one another can influence the collective knowledge of district central office. For instance, ongoing engagement with external expertise or with colleagues can influence shared understandings about the nature of a problem or the solutions to be pursued (Coburn et al. 2008). Indeed, Levitt and March (1988) argued that one of the most powerful consequences of engagement with new ideas and experiences is the "transformation of the givens," or the "redefinition of events, alternatives, and concepts" (p. 324). Shifting understanding about the problems and solutions facing the district can be a key contributor to educational change. For example, Finnigan et al. (2012) documented how district central offices that largely depend upon existing ideas, practices, and understandings have limited organizational learning and stalled change efforts.

Shifts in shared understanding may be especially likely when district leaders engage with partners' guidance and tools through well-designed inter-organizational routines and/or generative informal interactions. For example, in their longitudinal study of district decision making, Coburn et al. (2008) described how ongoing engagement with an external consultant shifted district leaders' thinking around professional development for teachers. The consultant came to the district with expertise related to high quality professional development. He emphasized the importance of PD that was situated at the school site and in the day-to-day practices of teachers. In early interviews with district personnel about what they saw as high quality professional development, situated professional development did not emerge as an important factor. However, after a year of regular formal and informal engagement with the consultant, where he routinely shared research-based tools and resources, consensus grew among district leaders that it was problematic that professional development was not ongoing and situated at the school site. Here, the interactions with the consultant helped district leaders to reframe their understanding of high quality professional development in a new way, demonstrating new collective knowledge.

Policy and routines

Beyond new collective knowledge, engagement with external partners constitutes learning when it is incorporated into district policy and routines. We define policy broadly, including formal policies (e.g., a new policy on secondary course pathways) as well as rules, plans, and guidelines. In the case described above, the organizational learning went beyond new collective understandings about professional development (Coburn et al. 2008); the district also changed its policy regarding teacher professional learning. Instead of a series of workshops throughout the year intended to provide follow up for intensive institutes in the summer, the district leadership reconfigured the calendar so that students had a late arrival four times during the year to allow for time during the school day for ongoing, situated professional development.

Organizational learning also occurs when tools or guidance from external partners are integrated into a district's designed or emergent routines. For example,

Supovitz and colleagues discussed how Duvall County School District worked with the Consortium for Public Research in Education (CPRE) to develop the snapshot system to foster district-level data use (Supovitz 2006; Supovitz and Weathers 2004). In this designed routine, leaders articulated what different levels of implementation of its instructional initiatives looked like, embedded those ideas in rubrics and walk-through protocols, collected extensive data on implementation using those tools, and used those data to both spread best practices and make organizational adjustments. Since this routine became integrated into the ways that central office staff worked with the schools in an ongoing way, it constituted a form of organizational learning.

Feedback loop for increased conditions for absorptive capacity

Finally, there may be some conditions under which engagement with external partners not only contributes to organizational learning but also contributes to the development of organizational conditions that foster central office absorptive capacity (indicated with the arrow from organizational learning back to absorptive capacity in Fig. 1). That is, there can be a feedback loop between organizational conditions for absorptive capacity, organizational learning, and new conditions for absorptive capacity (Cohen and Levinthal 1990; Van den Bosch et al. 1999). For example, there is likely a positive relationship between new collective knowledge and the level of prior related knowledge in such a way that, all things being equal, the district's absorptive capacity increases. New district routines developed through work with a partner could bring individuals in different departments together for joint work, leading to the development of new patterns of informal ties or creating new structures for more regular and productive formal meetings. Resources to partner may increase if, through their work with external partners, district leaders create or amend policies to secure additional resources, or reallocate existing resources to support time and staffing to partner. Theoretically, a successful (or unsuccessful) partnership experience could contribute to a district leader's understanding of what it takes foster partnerships in ways that are more conducive to district learning, impacting how the leader thinks about future efforts to guide district learning through partnerships. It is entirely conceivable that, through such a partnership, the district leadership could increase their capacity to synthesize and apply new knowledge going forward.

However, not all organizational learning from engagement with partners will necessarily lead to increased absorptive capacity. A district could develop new collective knowledge, policies, or routines that do not create change in the organizational conditions for absorptive capacity. A district central office could adopt a new routine because of their work with a partner, but the new routine does little to reorganize the pathways for communication in the district central office. Or, engagement with external partners might lead to changes in policy but does little to foster district leaders' strategic knowledge leadership.

Discussion and implications

Internationally, school systems are confronting complex decisions on how to improve teaching and learning in schools. In the United States, school district central offices are charged with this responsibility, and they are increasingly reaching out to outside partners as they develop and implement change efforts in classrooms and schools. Yet relationships with external partners do not always lead to learning and change (Firestone and Fisler 2002; Freedman and Salmon 2001). In the absence of such learning, district administrators are more likely to draw on existing ideas and practices, which may limit the likelihood of educational change (March 1991). We have brought together research and theory on absorptive capacity with research on educational change to create a conceptual framework that identifies the key dimensions that may shape the likelihood that a district's work with an external partner actually fosters organizational learning. More specifically, we attend to districts' internal capacity to learn from external partners, the qualities of those partners, and how the nature of their engagement with one another influences organizational learning. Ultimately, we suggest that the degree to which a relationship between a district central office and external partner is likely to lead to organizational learning goals depends upon the central office's pre-existing organizational conditions for absorptive capacity, features of the external partner, and the nature of the interactions between district central office and external partner.

The framework contributes to theory on district capacity and organizational change in at least three ways. First, it provides a more theoretically-driven way to conceptualize district capacity. Many researchers talk about the importance of district capacity for learning, but few provide robust theorizations of the concept. Without a shared understanding of the idea, we are left with a hodgepodge of definitions and sets of measures, resulting in a research base that is fragmented. By drawing on and elaborating the concept of absorptive capacity, this framework brings a more robust conceptualization of what district capacity to learn from external partners entails—one that provides guidance for assessing existing capacity and taking steps to improve it.

Second, the framework extends theories of absorptive capacity. Despite its prominence in organizational literature, absorptive capacity as a concept has not been widely explored in the non-profit or public sector. Consequently, the theory has been developed and tested under a narrow set of conditions that limit our understanding of the concept. For instance, business literature often conceptualizes the outcome of absorptive capacity as increased levels of innovation as measured via patent production. Here, we have offered a broader set of learning outcomes and illustrate how they can be operationalized in education. These concepts are not only more appropriate for the public school setting, they offer an alternative to proxy measures of organizational learning outcomes typically used in studies in non-educational contexts as well.

Third, few scholars of absorptive capacity attend to the relationship to external sources of knowledge at all (Jansen et al. 2005; Volberda et al. 2010). Those studies that do consider the external source tend to treat all sources of expertise as equal,

failing to investigate how the nature of interaction between districts and external partners might matter for districts' ability to learn from and with their partner. Consequently, there is limited insight into how the qualities of external partners, and the interactions between an organization and its partner, matter for an organization's ability to draw on and use external knowledge in productive ways. Our conceptual framework opens up this black box, providing guidance for investigating the nature of external partner–school district relationships by clarifying the dimensions of external organizations and their interactions with school districts that are likely to promote organizational learning and change.

The framework also has at least three implications for practice. First, in any midsized to large district, no single partner could possibly meet all of the district's needs. At the same time, having multiple partners can make it difficult for the district central office to benefit from the new knowledge and expertise the external organizations bring to the district (Hatch 2001). The conceptual framework can help district leaders think strategically about when and under what conditions work with an external partner is likely to be productive, given their existing capacity.

Second, by identifying specific organizational conditions in school districts that promote absorptive capacity, this framework highlights key points of leverage for practitioners and policy makers who seek to increase districts' ability to engage with external guidance in productive ways. For instance, it may cue district leaders to consider improving formal or informal communication pathways between departments that are implicated in work with an external partner before the partnership begins. A partner brought on board to support middle school mathematics may be more successful if there are well-developed communication structures between the mathematics department and the leadership department responsible for supervising middle schools. Similarly, a district leader may be prompted to think about what resources (i.e., staffing) they may need to dedicate to shepherding partnership efforts.

Finally, this framework may be useful for external partners as they consider possible relationships with school districts. Some districts may be better positioned to work productively with, and learn from, the external partner. The framework could provide an external partner insight into a district's readiness to partner. A district's absorptive capacity could shift with leadership or staffing turnover where existing expertise or strategic knowledge leadership is lost or gained. District reorganization may interrupt existing communication channels both within the district and between the district and external provider while budget cuts can threaten the resources available for partnering and make learning less likely. Assessing the conditions in the district that are likely to support or undermine its absorptive capacity may be a useful task for a partner when deciding whether to work with a new district. Further, the framework, with its attention to specific features of external organizations and inter-organizational routines, provides valuable insights to external organizations seeking to design new ways of working with district central offices. Knowing that the design of routines can create very different conditions for learning, external partners could think critically about how their routines shape what district central administrators take away from their engagements with partners.

Our framework can also provide important direction for future studies of the relationship between districts and their external partners. The framework identifies key dimensions that likely matter for districts' ability to learn from external partners and suggests some broad relationships between them. As such, it highlights a number of avenues for future empirical research. Future studies could investigate the relationships between different elements of the framework in greater detail. For example, do districts with few organizational supports for absorptive capacity benefit from external partners with different qualities than those that have ample prior knowledge, communication pathways, strategic knowledge leadership, and resources? Similarly, are there certain kinds of interactions that are more conducive to learning in districts with different organizational conditions for absorptive capacity, given the involvement of external partners with certain qualities? Are some kinds of interaction routines more beneficial when the knowledge an external partner offers is tacit rather than codified? Is knowledge incorporated into tools more likely to influence district policy than other forms of knowledge resources? Future research could use strategic sampling to systematically investigate these sets of relationships.

Researchers could also investigate whether some dimensions of the framework are more important than others. For example, are some organizational conditions that foster absorptive capacity "leading," that is, necessary for learning to occur? Honig and colleagues (2014), for instance, suggested that prior expertise is key, whereas Cohen and Levinthal (1990) pointed to the combination of prior knowledge and communication pathways as necessary. Future studies could address this question in the context of school districts. Similarly, it could be that regular interaction with well-designed routines is the dimension that is not only necessary but sufficient for learning to occur. Could it be that without well-designed interaction spaces that include supportive routines and times for informal interaction, learning outcomes are simply not likely to occur? Applying and testing the relationship between different dimensions of the conceptual framework empirically can provide clarity to these questions.

Finally, the framework could scaffold the development of further conceptual work in different settings. For example, it is likely the case that external partners learn from engagement with school districts. What are the internal conditions in external partners that enable them to better learn from their work with district leaders? How does the nature of informal networks and inter-organizational tools and routines matter for external partners' learning? Does learning for external partners depend upon how they monitor how their partnership impacts district learning and use that information to improve their services? It may also be possible to adapt this framework to study the relationship between district central offices and schools. In some respects, professional development providers housed in the central office are external sources of knowledge for schools they seek to support.⁵ Future research could investigate the ways in which this framework helps explain schools' ability to learn from external providers, including providers in the district central

⁵ We thank James Ryan, executive director of STEM in San Francisco Unified School District, for suggesting this use for our framework.

office. For example, are there additional dimensions that matter when the external providers have some degree of authority over the learners?

The conceptual framework lays out research-based propositions about when and under what conditions work with external organizations might be productive for school districts. Applying and testing this conceptual framework empirically can provide clarity to these and other questions and lead to a more robust understanding of organizational learning and educational change.

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References

- Ahuja, G., & Katila, R. (2001). Technological acquisitions and the innovation performance of acquiring firms: A longitudinal study. *Strategic Management Journal*, *22*, 197–220.
- Asen, R. (2013). Deliberation and trust. *Argumentation and Advocacy*, *50*, 2–17.
- Bickel, W. E., & Hattrup, R. A. (1995). Teachers and researchers in collaboration: Reflections on the process. *American Educational Research Journal*, *32*(1), 35–62.
- Borman, G., Slavin, R. E., Cheung, A., Chamberlain, A., Madden, N. A., & Chambers, B. (2005). The national randomized field trial of Success for All: Second-year outcomes. *American Educational Research Journal*, *42*(4), 673–696.
- Bray, L. E., & Russell, J. L. (2016). Going off script: Structure and agency in individualized education program meeting. *American Journal of Education*, *122*(3), 367–398.
- Brookhart, S. M., & Loadman, W. E. (1992). School-university collaboration and perceived professional rewards. *Journal of Research in Education*, *2*(1), 68–76.
- Brown, J. S., & Duguid, P. (1998). Organizing knowledge. *California Management Review*, *40*(3), 90–111.
- Bryk, A. S., Gomez, L. M., Grunow, A., & LeMahieu, P. G. (2015). *Learning to improve: How America's schools can get better at getting better*. Cambridge, MA: Harvard Education Press.
- Bulkley, K. E., & Burch, P. (2011). The changing nature of private engagement in public education: For-profit and nonprofit organizations and educational reform. *Peabody Journal of Education*, *86*(3), 236–251.
- Burch, P. E. (2002). Constraints and opportunities in changing policy environments: Intermediary organizations' response to complex district context. In A. M. Hightower, M. S. Knapp, J. A. Marsh, & M. W. McLaughlin (Eds.), *School districts and instructional renewal* (pp. 111–126). New York: Teachers College Press.
- Burch, P. E. (2009). *Hidden markets*. New York, NY: Routledge, Taylor & Francis.
- Burch, P. E., & Spillane, J. P. (2004). *Leading from the middle: Mid-level district staff and instructional improvement*. Chicago: Cross City Campaign for Urban School Reform.
- Burch, P. E., & Spillane, J. P. (2005). How subjects matter in district office practice: Instructionally relevant policy in urban school district redesign. *Journal of Educational Change*, *6*, 51–76.
- Burt, R. S. (2001). Attachment, decay, and social network. *Journal of Organizational Behavior*, *22*, 619–643.
- Chrispeels, J. (2004). *Learning to lead together: The promise and challenge of sharing leadership*. Thousand Oaks, CA: Sage Publication.
- Cobb, P. A., Jackson, K., Smith, T., Sorum, M., & Henrick, E. (2013). Design research with educational systems: Investigating and supporting improvements in the quality of mathematics teaching and learning at scale. In W. R. Penuel, B. J. Fishman, A. R. Allen, & B. H. Cheng (Eds.), *Design-based implementation research: Theories, methods, and exemplars* (Vol. 112, pp. 320–349). New York, NY: National Society of the Study of Education Yearbook.
- Coburn, C. E., & Penuel, W. R. (2016). Research-practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher*, *45*(1), 48–54.

- Coburn, C. E., & Turner, E. O. (2012). The practice of data use: An introduction. *American Journal of Education*, 118(2), 99–111.
- Coburn, C. E., Bae, S., & Turner, E. O. (2008). Authority, status, and the dynamics of insider-outsider partnerships at the district level. *Peabody Journal of Education*, 83(3), 364–399.
- Coburn, C. E., Honig, M. I., & Stein, M. K. (2009). What is the evidence on districts' use of evidence? In J. D. Bransford, D. J. Stipek, N. J. Vye, L. M. Gomez, & D. Lam (Eds.), *The role of research in educational improvement* (pp. 67–86). Cambridge: Harvard Education Press.
- Coburn, C. E., Russell, J. L., Kaufman, J. H., & Stein, M. K. (2012). Supporting sustainability: Teachers' advice networks and ambitious instructional reform. *American Journal of Education*, 119(1), 137–182.
- Cohen, M. D. (1994). Organizational routines are stored in procedural memory: Evidence from a laboratory study. *Organization Science*, 5(4), 554–568.
- Cohen, W. M., & Levinthal, D. A. (1989). Innovation and learning: The two faces of R&D. *The Economic Journal*, 99(1), 569–596.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128–152.
- Corcoran, T. B., Fuhrman, S. H., & Belcher, C. L. (2001). The district role in instructional improvement. *Phi Delta Kappan*, 83(1), 78–84.
- Corcoran, T., & Lawrence, N. (2003). *Changing district culture and capacity: The impact of the Merck Institute for Science Education Partnership*. Philadelphia, PA: Consortium for Policy Research in Education, University of Pennsylvania.
- Daly, A. J., & Finnigan, K. S. (2010). A bridge between worlds: Understanding network structure to understand change strategy. *Journal of Educational Change*, 11, 111–138.
- Daly, A. J., & Finnigan, K. S. (2012). Exploring the space between: Social networks, trust, and urban school district leaders. *Journal of School Leadership*, 22(3), 493–530.
- Datnow, A., & Honig, M. I. (2008). Introduction to the special issue, Scaling up teaching and learning improvement in urban districts: The promises and pitfalls of external assistance providers. *Peabody Journal of Education*, 83(3), 323–327.
- Desimone, L. (2000). *Making comprehensive school reform work*. New York: ERIC Clearinghouse on Urban Education.
- Donovan, M. S., & Pellegrino, J. W. (2003). *Learning and instruction: A SERP research agenda*. Washington, DC: National Research Council.
- Donovan, M. S., Snow, C. E., & Daro, P. (2013). The SERP approach to problem-solving research, development, and implementation. In B. Fishman, W. R. Penuel, A.-R. Allen, & B. Cheng (Eds.), *Design-based implementation research: Theories, methods, and exemplars* (Vol. 112, pp. 400–425). New York, NY: National Society of the Study of Education Yearbook.
- Donovan, M. S., Wigdor, A. K., & Snow, C. E. (2003). *Strategic education research partnership*. Washington, DC: National Research Council.
- Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23(4), 660–679.
- Earl, L. M., & Cousins, J. B. (1995). *Participatory evaluation in education: Studies of evaluation use and organizational learning*. London: Taylor & Francis.
- Erat, M., & Hirsh, W. (2007). *The significance of workplace learning for individuals, groups, and organizations*. SKOPE monograph 9. Oxford: SKOPE Research Centre.
- Feldman, M. S., & March, J. G. (1981). Information in organizations as signal and symbol. *Administrative Science Quarterly*, 26(2), 171–186.
- Feldman, M. S., & Pentland, B. T. (2003). Reconceptualizing organizational routines as a source of flexibility and change. *Administrative Science Quarterly*, 48, 94–118.
- Finnigan, K. S., Daly, A. J., & Stewart, T. J. (2012). Organizational learning in schools under sanction. *Education Research International*, 2012, 1–10.
- Firestone, W. A. (1989). Using reform: Conceptualizing district initiative. *Educational Evaluation Policy and Analysis*, 11(2), 151–164.
- Firestone, W. A., & Fisler, J. L. (2002). Politics, community, and leadership in a school-university partnership. *Educational Administration Quarterly*, 38(4), 449–493.
- Freedman, R., & Salmon, D. (2001). The dialectic nature of research collaborations: The relational literacy curriculum. In T. Ravid & M. G. Handler (Eds.), *The many faces of school-university collaboration: Characteristics of successful partnerships*. Englewood, CO: Teachers Ideas Press.

- Fullan, M. (1980). *The role of human agents internal to school districts in knowledge utilization*. Ontario: The Ontario Institute for Studies in Education.
- Fullan, M. (2006). The future of educational change: System thinkers in action. *Journal of Educational Change*, 7, 113–122.
- Fullan, M., Bertani, A., & Quinn, J. (2004). Leading in tough times: New lessons for districtwide reform. *Educational Leadership*, 61(7), 42–46.
- Ghoshal, S., Korine, H., & Szulanski, G. (1994). Interunit communication in multinational corporation. *Management Science*, 40(1), 96–110.
- Gifford, B. R. (1986). The evolution of the school-university partnership for educational renewal. *Education and Urban Society*, 19(1), 77–106.
- Gupta, A. K., & Govindarajan, V. (2000). Knowledge flows within the multi-national corporation. *Strategic Management Journal*, 21, 473–496.
- Hannaway, J. (1989). *Managers managing: The workings of an administrative system*. New York: Oxford University Press.
- Hannaway, J. (1993). Political pressure and decentralization in institutional organizations: The case of school districts. *Sociology of Education*, 66(3), 147–163.
- Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44(1), 82–111.
- Hargadon, A. (2003). Organizations in action: Social science bases of administrative theory. *Administrative Science Quarterly*, 48, 498–501.
- Hassel, B., & Steiner, L. (2012). *Guide to working with external partners: Partnerships to improve teaching and learning*. Washington, DC: American Institutes of Research.
- Hatch, T. (2001). Incoherence in the system: Three perspectives on the implementation of multiple initiatives in one district. *American Journal of Education*, 109(4), 407–437.
- Hightower, A. M., Knapp, M. S., Marsh, J. A., & McLaughlin, M. W. (Eds.). (2003). *School districts and instructional renewal*. New York: Teachers College.
- Honig, M. I. (2003). Building policy from practice: District central office administrators' roles and capacity for implementing collaborative education policy. *Educational Administration Quarterly*, 39(3), 292–338.
- Honig, M. I. (2004a). District central office-community partnerships: From contracts to collaboration to control. In W. K. Hoy & C. G. Miskel (Eds.), *Educational administration, policy, and reform: Research and measurement* (pp. 59–90). Greenwich, CT: Information Age Publishing.
- Honig, M. I. (2004b). The new middle management: Intermediary organizations in education policy implementation. *Educational Evaluation and Policy Analysis*, 26(1), 65–87.
- Honig, M. I. (2008). District central offices as learning organizations: How sociocultural and organizational learning theories elaborate district central office administrators' participation in teaching and learning improvement efforts. *American Journal of Education*, 114(4), 627–664.
- Honig, M. I. (2009). "External" organizations and the politics of urban educational leadership: The case of new small autonomous school initiatives. *Peabody Journal of Education*, 84(3), 394–413.
- Honig, M. I., Copland, M. A., Rainey, L., Lorton, J. A., & Newton, M. (2010). *Central office transformation for district-wide learning improvement*. Seattle, Washington: Center for the Study of Teaching and Policy, University of Washington.
- Honig, M. I., & Ikemoto, G. S. (2008). Adaptive assistance for learning improvement efforts: The case of the Institute for Learning. *Peabody Journal of Education*, 83(3), 328–363.
- Honig, M. I., Venkateswaran, N., McNeil, P., & Myers-Twitchell, J. (2014). Leaders' use of research for fundamental change in school district central offices: Processes and challenges. In K. S. Finnigan & A. J. Daly (Eds.), *Using research evidence in education: From the schoolhouse door to Capitol Hill*. New York: Springer.
- Horn, I., Kane, B. D., & Wilson, J. (2015). Making sense of student performance data: Data use logics and mathematics teachers' learning opportunities. *American Educational Research Journal*, 52(2), 208–242.
- Hubbard, L. (2010). Research to practice: The case of Boston Public Schools, Education Matters and the Boston Plan for Excellence. In C. E. Coburn & M. K. Stein (Eds.), *Research and practice in education: Building alliances, bridging the divide* (pp. 55–72). Lanham, MD: Rowman & Littlefield.
- Ikemoto, G. S., & Honig, M. I. (2010). Tools to deepen practitioners' engagement with research: The case of the Institute for Learning. In C. E. Coburn & M. K. Stein (Eds.), *Research and practice in education: Building alliances, bridging the divide* (pp. 93–108). Lanham, MD: Rowman & Littlefield.

- Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2005). Managing potential and realized capacity: How do organizational antecedents matter? *Academy of Management Journal*, 48(6), 999–1015.
- Keating, P. J., & Clark, R. W. (1988). Accent on leadership: The Puget Sound Educational Consortium. In K. A. Sirotnik & J. I. Goodlad (Eds.), *School-university partnerships in action: Concepts, cases and concerns* (pp. 148–166). New York: Teachers College Press.
- 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.
- Kronley, R. A., & Handley, C. (2003). *Reforming relationships: School districts, external organizations, and systemic change*. Providence, RI: Annenberg Institute for School Reform, Brown University.
- Lane, P. J., Koka, B. R., & Pathak, S. (2006). The reification of absorptive capacity: A critical review and rejuvenation of the construct. *Academy of Management Review*, 31(4), 833–863.
- Lane, P. J., & Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal*, 19(1), 461–477.
- Lane, P. J., Salk, J. E., & Lyles, M. A. (2001). Absorptive capacity, learning, and performance in international joint ventures. *Strategic Management Journal*, 22, 1139–1161.
- Le Floch, K. C., Boyle, A., & Therriault, S. B. (2008). *State systems of support under NCLB: Design components and quality considerations*. Washington, DC: American Institutes for Research.
- Leithwood, K., Mascal, B., Strauss, T., Sacks, R., Memon, N., & Yashkina, A. (2007). Distributing leadership to make schools smarter: Taking the ego out of the system. *Leadership and Policy in Schools*, 6(1), 37–67.
- Levinthal, D. A., & March, J. G. (1981). A model of adaptive organizational search. *Journal of Economic Behavior & Organization*, 2, 307–333.
- Levitt, B., & March, J. G. (1988). Organizational learning. *Annual Review of Sociology*, 14, 319–340.
- Little, J. W. (2012). Understanding data use practices among teachers: The contribution of micro-process studies. *American Journal of Education*, 118(2), 143–166.
- López-Turley, R. N., & Stevens, C. (2015). Lessons from a school district-university research partnership: The Houston Education Research Consortium. *Educational Evaluation and Policy Analysis*, 37, 6S–15S.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87.
- Marsh, J. A., Kerr, K. A., Ikemoto, G. S., Darilek, H., Suttrop, M., Zimmer, R. W., et al. (2005). *The role of districts in fostering instructional improvement: Lessons from three urban districts partnered with the Institute for Learning*. Washington, DC: RAND Corporation.
- Massell, D., & Goertz, M. E. (2002). District strategies for building instructional capacity. In A. M. Hightower, M. S. Knapp, J. A. Marsh, & M. W. McLaughlin (Eds.), *School districts and instructional renewal* (pp. 43–60). New York: Teachers College Press.
- McEvily, B., Peronne, V., & Zaheer, S. (2003). Trust as an organizing principle. *Organization Science*, 14, 91–103.
- McLaughlin, M. W., & Talbert, J. E. (2003). *Reforming districts: How districts support school reform*. Seattle, WA: Center for the Study of Teaching and Policy, University of Washington.
- McMillen, J. C., Lenze, S. L., Hawley, K. M., & Osborne, V. A. (2009). Revisiting practice-based research networks as a platform for mental health services research. *Administration and Policy in Mental Health and Mental Health Services Research*, 36, 308–321.
- Meyer, J. W., Scott, W. R., & Strang, D. (1987). Centralization, fragmentation, and school district complexity. *Administrative Science Quarterly*, 32(2), 186–201.
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital and the organizational advantage. *Academy of Management Review*, 23(2), 242–266.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14–37.
- Norman, D. A. (1988). *The psychology of everyday things*. New York, NY: Basic Books.
- 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.
- Palinkas, L. A., Aarons, G. A., Chorpita, B. F., Hoagwood, K., Landsverk, J., & Weisz, J. R. (2009). Cultural exchange and the implementation of evidence-based practices: Two case studies. *Research on Social Work Practice*, 19(5), 602–612.

- Pea, R. D. (1993). Practices of distributed intelligence and designs for education. In G. Solomon (Ed.), *Distributed cognitions: Psychological and educational considerations* (pp. 47–87). New York, NY: Cambridge University Press.
- Pentland, B. T., & Rueter, H. H. (1994). Organizational routines as grammars of action. *Administrative Science Quarterly*, 39(3), 484–510.
- Polanyi, M. (1966). *The tacit dimension*. London: Routledge.
- Powell, W. W., & Grodal, S. (2006). Networks of innovators. In J. Fagerberg, D. C. Mowery, & R. Nelson (Eds.), *The Oxford handbook of innovation*. Oxford: Oxford University Press.
- Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41(1), 116–145.
- Reagans, R., & McEvily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, 48(2), 240–267.
- Rentner, D. S. (2013). *Year 3 of implementing the Common Core State Standards: An overview of states' progress and challenges*. Washington, DC: Center on Education Policy, George Washington University.
- Rorrer, A. K., Skrla, L., & Scheurich, J. J. (2008). Districts as institutional actors in educational reform. *Educational Administration Quarterly*, 44(3), 307–358.
- Rosenkopf, L., & Almeida, P. (2003). Overcoming local search through alliances and mobility. *Management Science*, 49, 751–766.
- Rosenquist, B. A., Hendrick, E. C., & Smith, T. (2015). Research-practice partnerships to support the development of high quality mathematics for all students. *Journal of Education for Students Placed at Risk*, 20, 42–57.
- Rowan, B. (2002). The ecology of school improvement: Notes on the school improvement industry in the United States. *Journal of Educational Change*, 3(3–4), 283–314.
- Russell, J. L., Knutson, K., & Crowley, K. (2013). Informal learning organizations as part of an educational ecology: Lessons from collaboration across the formal-informal divide. *Journal of Educational Change*, 14, 259–281.
- Schlechy, P. C., & Whitford, B. L. (1988). Shared problems and shared vision: Organic collaboration. In K. A. Sirotnik & J. I. Goodlad (Eds.), *School-university partnerships in action: Concepts, cases and concerns*. New York: Teachers College Press.
- Shenkar, O., & Li, J. (1999). Knowledge search in international cooperative ventures. *Organization Science*, 10(2), 448–469.
- Sherer, J. Z., & Spillane, J. P. (2011). Constancy and change in work practice in schools: The role of organizational routines. *Teachers College Record*, 113(3), 611–657.
- Smith, J., & Wohlstetter, P. (2006). Understanding the different faces of partnering: A typology of public-private partnerships. *School Leadership & Management*, 26(3), 249–268.
- Spillane, J. P. (1996). School districts matter: Local educational authorities and state instructional policy. *Educational Policy*, 10(1), 63–87.
- Spillane, J. P. (1998). State policy and the non-monolithic nature of the local school district: Organizational and professional considerations. *American Educational Research Journal*, 35(1), 33–63.
- Spillane, J. P., & Thompson, C. L. (1997). Reconstructing conceptions of local capacity: The local education agency's capacity for ambitious instructional reform. *Educational Evaluation and Policy Analysis*, 19(2), 185–203.
- Stock, G. N., Greis, N. P., & Fischer, W. A. (2001). Absorptive capacity and new product development. *Journal of High Technology Management Research*, 12(1), 77–91.
- Stoll, L. (2009). Capacity building for school improvement or creating capacity for learning? A changing landscape. *Journal of Educational Change*, 10, 115–127.
- Supovitz, J. A. (2006). *The case for district-based reform: Learning, building, and sustaining school improvement*. Cambridge: Harvard Education Press.
- Supovitz, J. A. (2008). Melding internal and external support for school improvement: How the district role changes when working closely with external instructional support providers. *Peabody Journal of Education*, 83(3), 459–478.
- Supovitz, J. A., & Weathers, J. (2004). *Dashboard lights: Monitoring implementation of district instructional reform strategies*. Philadelphia, PA: Consortium for Policy Research in Education.
- Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, 17(Winter), 27–43.

- Togneri, W., & Anderson, S. E. (2003). *Beyond islands of excellence: What districts can do to improve instruction and achievement in all schools* (pp. 1–74). Washington, DC: Learning First Alliance.
- Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal*, *44*(5), 996–1004.
- Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly*, *42*(1), 35–67.
- Van den Bosch, F. A. J., Volberda, H. W., & de Boer, M. (1999). Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities. *Organization Science*, *10*(5), 551–568.
- Vaughan, D. (1996). *The challenger launch decision: Risky technology, culture, and deviance at NASA*. Chicago: University of Chicago Press.
- Volberda, H. W., Foss, N. J., & Lyles, M. A. (2010). Absorbing the concept of absorptive capacity: Realize its potential in the organization field. *Organization Science*, *21*(4), 931–951.
- Walsh, J. P., & Ungson, G. R. (1991). Organizational memory. *Academy of Management Review*, *16*(1), 57–91.
- Walter, J., Lechner, C., & Kellermanns, F. W. (2007). Knowledge transfer between and within alliance partners: Private versus collective benefits of social capital. *Journal of Business Research*, *60*(7), 698–710.
- Weick, K. E. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage.
- Wentworth, L., Carranza, R., & Stipek, D. (2016). A university and district partnership closes the research-to-classroom gap. *Phi Delta Kappan*, *97*(8), 66–69.
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *The Academy of Management Review*, *27*(2), 185–203.