NETWORKED IMPROVEMENT COMMUNITY HUB LEADERSHIP: A UNIQUE CASE STUDY OF STATE EDUCATION AGENTS OF CHANGE

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ABSTRACT

Networked Improvement Communities (NICs) are emerging, yet few empirical studies have examined implementation factors, efficacy, and outcomes. Fewer have examined structures, dispositions, and behaviors of NIC hub leadership, especially hubs led by State Education Agencies (SEAs). This unique, qualitative case study explores adaptive leadership and emerging improvement leadership models in the context of a NIC hub operated exclusively by an SEA. Through semi-structured interviews and document reviews, this study investigates how SEA hub leaders establish conditions to build educator capacity for continuous improvement within a NIC model, focusing specifically on leadership structures, behaviors, and mental models. Provisional findings demonstrate alignment with existing adaptive leadership theory and emerging models of improvement leadership. Additionally, the results expand upon existing literature by offering unique leadership challenges, adaptations, and considerations for SEA leaders initiating a NIC model. To further affirm and extend understanding of NIC hub leadership, suggestions for future implementation and outcome research is recommended, especially related to NIC hub leadership in similar contexts and configurations.

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CHAPTER 1: INTRODUCTION

The current educational system is often inequitable and insufficiently responsive to the needs of historically marginalized students (Mintrop, 2016). In PreK-12 schools, achievement gaps and inequities persist despite well-intended state and federal legislation and policies, and despite decades of research delineating effective educational processes and practices. National assessment data reveal ongoing variations in student achievement among historically marginalized students and their peers; this is especially true between low and high income status students (as defined by eligibility for the National Student Lunch Program) and between students receiving and not receiving special education services (e.g., National Center on Education Statistics, 2017; Reardon, 2013; O'Day & Smith, 2016). Even more recently, data indicate continual divergence in both math and reading performance among student groups based on race, ethnicity and socioeconomic status (National Center on Education Statistics, 2019). National and international assessment data both reveal that the achievement gaps between high and low performing students is increasing, and inequality is growing, with this variability even more prominent *within* American schools, in addition to across schools (Barshay, 2019). Further, the extent of COVID-19 related school closures and/or changes to instruction, may possibly result in further learning loss and may potentially increase achievement gaps, in some cases (e.g., Kuhfeld et al., 2020). Taken together, the achievement gaps preclude a significant, predictable portion of our student population from the advantage

of a quality, equitable educational experience. While some variation is expected in any system, perpetual and increasing achievement gaps imply a problem inherent within many public school systems. Wide variability in outcomes tends to sustain in systems with weak improvement infrastructures (Russell et al., 2017), and key to any improvement effort in education is recognition of, and response to, systemic complexity and variability in performance (Bryk, 2015). However, many past efforts at school improvement reform have not sustained wide scale success. Innovative networking approaches are emerging in the field of PreK-12 education as a strategy to improve teaching and learning, and build capacity *for* continuous improvement, some including the Networked Improvement Community model (e.g., Feygin et al., 2020; Hannan et al., 2015; Margolin et al., 2021; Proger et al., 2017). This unique, qualitative case study explores hub leadership in a Networked Improvement Community (NIC) model in which State Education Agency (SEA) leaders work collaboratively with educators to solve collective problems of practice and build capacity for continuous improvement.

Framing the Problem

Spreading and Scaling Promising Practices: Traditional Research-to-Practice Paradigms

PreK-12 educational organizations are complex systems in which educators must tackle complex problems with no one-size-fits-all solution. Perhaps helping perpetuate these problems, some argue that educational research is often detached from practice (e.g., Farley-Ripple et al., 2018; Tseng & Nutley, 2014). Within traditional research and development paradigms, typically researchers are classified as "knowers," conducting and compiling information from research, and practitioners are classified as "doers,"

applying knowledge generated by others (Bryk, 2015). In this infrastructure, practitioners are rarely involved, let alone given credit for improvement efforts (Bryk et al., 2010). Further, while many past improvement efforts may have had a credible research base, educators may have lacked the individual or organizational capacity to translate and apply them in practice (Bryk, 2015).

Some argue that research should expand upon what counts as evidence so to move beyond simple causal ascriptions to include research that can help practitioners make local predictions about the effectiveness of a program or practice (Joyce & Cartwright, 2020). While traditional, experimental design is useful in solving educational problems that are conceptually neat, they do not attend to *how and why* programs or practices work, and the social context in which they work (Berwick, 2008). When variation in setting is likely to affect implementation, and when capacity building is necessary, such approaches may be viewed as overly simplistic in design, as they assume that disciplinary knowledge is sufficient to produce improvement or that applied knowledge is contained in the intervention itself (Lewis, 2015). Findings from this type of research should not be the only sources of evidence, rather, evidence from educators' practice should also be considered a valid and complementary source of *practice-based* evidence for improvement (e.g., Bryk, 2015; Green, 2009; Farley-Ripple et al., 2018). Moreover educational practitioners may often feel that research is 'done to them, not with them' and want to hear from other practitioners how they implement practices and deal with problems of adaptation (Schneider, 2018). There have been calls for more generative research that bridges the knowing-doing gap and addresses real-world problems (Ball, 2012) by integrating more diverse, applied methods with knowledge from local contexts

(Berliner, 2002). Alternative scientific methods, that respond to practitioner needs, are necessary to study multidimensional programs and practices within complex social systems (Berwick, 2008). While continuous improvement strategies should be grounded in evidence-based theory from research, they should also match needs of practitioners' problems of practice and local contexts (Bryk, 2015 Farley-Ripple et al.2018; Henrick et al., 2017; Wilcox et al., 2015).

Past Federal and State Efforts in School Reform and Improvement

Historically, federal, state, and local educational leaders and practitioners have had limited success in replicating and scaling effective practices (e.g., Peurach & Glazer, 2012). During the 1990s, the U.S. Department of Education loosened restrictions on Title 1 program funds to allow for wider-scale comprehensive reforms, typically via the direct involvement of external providers. Concurrently, Congress also took steps to encourage adoption of such reforms (Glennan et al., 2004). Despite this attention, many past school reform initiatives have not yielded significant, lasting improvements in student achievement. In their meta-analysis of comprehensive school reform (CSR) models, Borman et al. (2003) found only a small group of CSR models showing strong or promising effects. In their review, they emphasized limitations, including contextual factors related to effectiveness and insufficient details for replication to occur. Further, strongest effects from CSR models seem to relate to long-term commitment and fidelity to implementation factors.

One of the most prominent reform responses to previous education policy was the long-running School Improvement Grant (SIG) program, in effect from 2009 until 2015, funded by the U.S. Department of Education (United States Department of Education,

2015b). This program was a response to the No Child Left Behind legislation (2001) that held schools to the standard of using scientifically-based interventions and programs to foster improvement. SIG funded program models were proposed by the U.S. Department of Education, selected by participating schools, and approved by their SEAs. Dragoset et al. (2017) examined the implementation and effectiveness of these efforts and found disappointing results in terms of improving educational practices and little to no significant effect on improving student performance outcomes in Math, Literacy, or graduation rates. Other attempts to build capacity for improvement have included strategies for improving educator quality, contracting with external organizations, developing district support teams, and requiring changes to curriculum and instruction; however, no particular strategy has yielded convincing evidence as an effective improvement model (Gottfried et al., 2011). Mazzeo et al. (2016) note that no single approach necessarily works reliably in multiple contexts, and that isolating the most effective features and spreading them reliably across contexts remains a challenge. Further, they note that despite good intentions in school reform efforts, research-based evidence is limited in quantity and quality, and student performance still lags, especially among historically marginalized students.

Comprehensive and systemic efforts at improvement have proved challenging for a variety of reasons. Harris (2011) suggests several reasons why large-scale reforms fail, including the expectations on schools to effect change in an unreasonable amount of time, the over reliance on *external accountability and punitive factors,* and insufficient attention to implementation factors. Others suggest strategies may not be successful due to educators' difficulty in translating ideas to classroom practice (e.g., Smith et al., 2016).

Some attribute poor results to the development of reform ideas by *outside reformers, or non-system actors*, with the suggestion that such efforts could possibly be strengthened and scaled if they were co-constructed, or reshaped, by educators and school leaders (e.g., LeFloch, 2008). Perhaps a paramount challenge with past—and most—improvement efforts is the lack of realization that educational problems are typically complex, ill defined, multi-factorial dilemmas. Further, the social systems tackling these issues are inherently complex (Stone, 1989). Some define such issues as wicked problems—problems for which there are no easy solutions (e.g., Head & Alford, 2015; Keast et al., 2004). However, many past policy and reform attempts toward equity and quality instruction have applied piecemeal approaches to change (O'Day & Smith, 2016), and have tried to solve complex educational problems with oversimplified approaches, which have not produced significant effects on student achievement (e.g., Dragoset et al., 2017). Issues of scale and sustainability have also plagued many past reforms, and some level of understanding exists regarding contributing factors. These depending factors relate to alignment of curriculum, instruction, assessment, and current policy initiatives, educator buy-in, professional development and implementation, and quality of school leadership and support (Glennan et al., 2004). Since these issues are adaptive challenges for which there is no silver bullet, or one-size-fits-all solution, they may require a new kind of framework for improvement (Head & Alford, 2015) and leadership (e.g., Brown et al., 2011; Goldsmith & Eggers, 2004; Provan & Lemaire, 2012; Silva & McGuire, 2010) across state and local educational systems.

The role that SEAs take in facilitating school reform is highly dependent on their internal capacity, including their infrastructure, and political and professional resources

(LeFloch et al., 2008), yet, as Brown et al. (2011) found, capacity and culture are often not conducive to the SEAs role as change agent for reform. While lack of financial and human resources, and authority have been cited as barriers to SEA roles in supporting school reform (e.g., Brown et al., 2011; LeFloch et al., 2008; Smarick et al., 2014). Jochim and Murphy (2013) emphasize that leadership commitment to transforming the traditional SEA organization is a strong barrier to improvement. In their year-long qualitative inquiry with SEA leaders, Brown et al. concluded that for SEAs to be change agents in educational improvement, they need to make organizational and cultural shifts—from a culture of compliance to one of support and continuous improvement, cultivating relationships with educators and developing partnerships with foundations and other organizations committed to educational improvement. This will entail redesigning how the organization functions and adopting new roles, building capacity beyond their organization, such as engaging in cross-district learning networks, and partnerships with researchers, other state agencies, and other experts, to accelerate and share learning (Weiss & McGuinn, 2017). In effect, "*U.S. classrooms, schools, districts, and state offices must become continuous improvement organizations.*" (Bryk et al., 2016, p. 2). Although documentation reveals some state agencies are beginning to innovate in these ways (e.g., Margolin et al., 2021; Proger et al., 2017), there is scant research, specifically case-study designed research, that focuses on state policy, practices, and related capacity to support Local Education Agencies (LEAs) in improvement efforts (e.g., McDermott, 2009). The current study is intended to help fill this gap and understand how state agency hub leaders are navigating in these new roles using improvement science and a Networked Improvement Community model.

Joint Capacity Building at the State and Local Level

Historically, SEAs have been perceived as bureaucratic, fractured bodies without a clear purpose or vision for educational improvement (Brown et al., 2011). SEAs were designed to address a relatively narrow set of compliance related tasks, and the traditional method for state and federal efforts toward school improvement has been to devote funds and exercise accountability systems (e.g., The No Child Left Behind Act, 2001). However, these monetary incentives, accountability systems, and related policies are often based on the assumption that many educational professionals lack the motivation, rather than the capacity, to improve student achievement (Jochim & Murphy, 2013). These educational policies assume that schools are capable of building their capacity for continuous improvement; however, that is not always the case. Recently, many educational policies have shifted from using inspection, or accountability, as methods for quality improvement, toward capacity building for continuous improvement (Ho & Lee, 2016).

The demand for increasing the capacity of states, districts, schools, and teachers for continuous educational improvement on a wide scale is high (Glennan et al., 2004). Variation among individuals, environments, and situations calls for more adaptive approaches to educational research and development that will contribute to improving student and educator performance, educator competence, and public confidence (Lingenfelter, 2016, p. 52). States vary in the ways in which they exercise their leadership and support for policy implementation (e.g., Louis et al., 2008), and based on policy shifts and recent research, there is a growing demand that states should elaborate their roles and responsibilities for leadership in improving teaching and learning (Childs &

Russell, 2017). However, persistent challenges exist that may hinder SEAs from doing so, in part, perhaps, as consequence of the traditional roles of SEAs in compliance-related activities (Manna, 2006), and in part due to lack of human and financial resources (e.g., Sunderman & Orfield, 2007). For example, in a study by Le Floch et al. (2008), education officials revealed that despite federal policies intended for school improvement, inadequate staffing and funding negatively impacts efforts toward school effectiveness. Similarly, in their interviews with SEA leaders, Brown et al. (2011) found that they lack human, financial and organizational capacity to support school improvement and large-scale educational change, especially considering the financial restrictions which prohibit them from recruiting and retaining talented individuals with high levels of expertise in research, evaluation, and innovation. It is widely held that building capacity for such work entails better staffing and diverse expertise (Smarick et al., 2014). However, abundant resources alone do not always result in better improvement infrastructures (Jochim & Murphy, 2013).

Taken together, these arguments imply the need for more innovative approaches to improvement. Practitioners need more user-friendly, relevant research and evidence produced from contexts and populations that resemble the ones in which they work—or produced *in* their contexts, such as in practice-based research networks using continuous improvement methods to produce practice-based evidence (Green, 2009). Further, since no silver bullet solution will transform education *from the outside* (Donovan, 2013), it seems fitting that state and local education agencies are taking more of a leadership and ownership role in this work, rather than relying solely on experts external to the system attempting to fix schools from the outside in.

Since state level leadership has become increasingly important, SEAs are experimenting with new organizational structures and expanding their expertise, in order to build capacity for improvement (Childs & Russell, 2017; Jochim & Murphy, 2013). Rather than perpetuating an exclusively compliance-based organization, it has been suggested that SEA representatives take a leadership role in focusing on educational improvement by finding ways in which to alter routines and change the culture of the agency (Brown et al., 2011), such as, strategic hiring, ongoing professional development, and engaging in partnerships with external specialists (Jochim & Murphy, 2013). Others suggest holding government agencies responsible for assisting schools in implementing effective practices by fostering regional networks of schools working toward continuous improvement, in which teachers are active participants in the research and in the evidence-informed decision-making processes (e.g., Slavin, 2010; Weiss & McGuinn, 2017). Ultimately, SEA capacity rests at the intersection of commitment, authority and resources (Jochim & Murphy, 2013). SEAs vary in size, expertise, priorities, and traditions, all of which influence their capacity to lead efforts in improving educator effectiveness and student achievement (Gottfried et al., 2011).

In striving to build capacity, many SEAs are choosing to redesign and reimagine their role in school improvement (Smarick et al., 2014), and considering new ways in which SEA and LEA capacity can be increased, given the imposing demands and multiple initiatives related to instructional reform (Spillane & Thompson, 2008). Even though they have not typically been perceived as possessing the resources, authority, or organizational capacity to lead or support school improvement (Brown et al., 2011; Jochim & Murphy, 2013; Le Floch, Boyle et al., 2008; Smarick et al., 2014), Mazzeo et

al. (2016) suggest that, contrary to past reform models, educational decision-makers and researchers could work together on implementation and design of evidence-based practices and test them in context. Further, the new provisions in The Every Student Succeeds Act (ESSA) allow for the flexibility to incorporate practices with an evidence base that are "under-evaluation" (Every Student Succeeds Act, 2015), recognizing contextual factors, complexity, and the role of practitioners in building and strengthening the evidence-base. As recommended, some of these designs include establishing improvement networks with both partners on the inside and the outside of their constituent educational organizations (Childs & Russell, 2017; Council of Chief State School Officers, 2017; Proger et al., 2017).

Improvement Networks as a Capacity Building Strategy

Ensuring equitable and quality education is an adaptive challenge. Adaptive challenges require more than authoritative expertise. They require changes in organizational habits, beliefs, priorities, and a deep understanding and diagnosis of the underlying system (Heifetz et al., 2009). Addressing these challenges also entails involving those closest to the work (e.g., Bryk et al., 2015). This expansion in the problem perspective implies a congruent expansion of problem-solving methods in educational research, policy, and practice. While many past federal, state, and local education agency efforts have not demonstrated reliable results at scale, more innovative approaches are being considered toward building and spreading capacity for improvement, some involving more joint efforts and networking approaches between state and local education agencies.

Some argue that SEAs do not—and will never—have the capacity to drive improvement and reform and suggest this work be left to non-governmental organizations (Smarick et al., 2014). However, others suggest the SEAs *can* be agents of change, when equipped with the commitment discipline, creativity and capacity to lead and sustain improvement (e.g., Brown et al., 2011). Several proposed alternatives to past reform efforts place government agencies responsible for assisting schools in implementing effective practices, and fostering regional networks of schools working toward continuous improvement in which teachers are active participants in the research and in the evidence-informed decision-making processes (e.g., Slavin, 2010; Weiss & McGuinn, 2017). The goal of such an approach is to merge the benefits of evidence-based practices, yielded from experimental research, with the pragmatic, practice-based evidence from iterative tests of implementation within the classroom, in order to build collective capacity for school improvement. The Networked Improvement Community is one such model that has been emerging as a method to reduce variation, accelerate improvement and equity within the PreK-12 educational systems.

Government sponsored networks have supported continuous learning and improvement at multiple levels of the educational system (Katz et al., 2009). In the United States, state agencies are beginning to adopt networking approaches, with local education agencies as a strategy for capacity and improvement (Childs & Russell, 2017; Russell et al., 2015), which places SEA and LEA representatives in a new and challenging role. The Council of Chief State School Officers (2017) highlights several examples of partnerships in which the SEA is pivotally involved. For example, the Massachusetts Department of Elementary and Secondary Education has used a research-

practice partnership to guide school improvement efforts, specifically related to improving data systems and policies. From this joint work, they were able to build SEA capacity for improvement by focusing on a pressing problem of practice, reorganizing staff and organizational elements, and using funding in creative ways. Similarly, the Tennessee Department of Education established a research alliance to develop a research agenda toward improving policies and practices related to school improvement. This alliance has helped the SEA build capacity for conducting research, analyzing data, evaluating impact of initiatives, and making data-based decisions. Additionally, the Oregon Department of Education has established a partnership with their Regional Education Laboratory to effectively monitor school improvement progress and provide appropriate, systemic support to schools. From this partnership, the SEA learned that district and school involvement in the research process is essential for building trust and shifting the SEA-LEA relationship to focus on support, rather than exclusively compliance.

The Research-Practice Partnership (RPP) is one network design gaining traction in the field of education. RPPs aim to help bridge the research-practice gap by shifting the traditional paradigm; instead of assuming researchers as producers and disseminators of information, this networking approach brings researchers and practitioners together as co-researchers with shared commitments to improvement (Tseng, 2012). In RPPs, the core activity entails members conducting practical research for the purpose of improving practice and student outcomes (Penuel & Hill, 2019). Growing evidence from the fields of public health, social work, community psychology, and education indicate positive outcomes (e.g., Farrell et al., 2017; Henrick et al., 2017; Riemer et al., 2012; Wilcox et

al., 2015). Since schools improve by collaboratively engaging in the process of co-constructing knowledge and skills (Elmore, 2004), this partnership approach may begin to address how interventions and innovations can work for diverse populations of students, across varied contexts. These examples provide promise for a networking approach to continuous improvement. Research partners could potentially help SEAs and their constituent LEAs build capacity in creating research agendas, especially toward using evidence-based practices for continuous improvement, examining the impact of initiatives, and conducting innovative research in school improvement (Council of Chief State School Officers, 2017).

In the PreK-12 public education context, there is growing interest and recognition in the promise for inter-organizational networks to accelerate and spread school improvement efforts (Wohlstetter & Lyle, 2019). These networked educational systems typically consist of a central, "hub" organization that collaborates with "outlet" schools to enact schoolwide improvement programs (Peurach & Glazer, 2012). Research from the field of networked science suggests that deliberately structured networks, involving participants with diverse areas of expertise, can foster progress toward solving complex problems (Nielsen, 2012). Networks are becoming an increasingly popular method for supporting large-scale change (Peurach & Glazer, 2012) and may contribute to collective efficacy among educators (Berebitsky & Salloum, 2017). In inter-organizational networks, members share responsibility for building collective capacity through the generation of collective knowledge, mutual learning, and a commitment to active collaboration on strategies to improve teaching and learning both within the individual member organizations as well as for the network as a whole (Wohlstetter & Lyle, 2019).

Broadly, inter-organizational network structures range from highly centralized to decentralized, many offering the opportunity to collaborate across district systems and states with designs varying widely. Many formal improvement networks emerge in response to external efforts or policy initiatives, while a few are initiated organically. Further, most network hubs have been operated by leaders external to the formal PreK-12 public education governance system (Peurach & Gumus, 2011). The focus of the current study is on a specific inter-organizational type of partnership, the Networked Improvement Community (NIC).

Networked Improvement Communities

Doug Engelbart (n.d.) pioneered the idea of Networked Improvement Communities (NICs), describing them as a collaborative group collectively pursuing a specific capability, with focused attention on improving their own collective IQ and problem-solving capabilities by innovating and implementing more effective tools and practices. While similar improvement network models have evolved in the field of healthcare, such as the Institute of Healthcare Improvement's Breakthrough model for collaborative improvement networking (Institute of Healthcare Improvement, 2003), the Carnegie Foundation for the Advancement of Teaching has led the evolution of NICs in the field of education, as a model for fostering continuous improvement. In the field of education, NICs have been described as scientific learning and design communities that expand upon other research-practice partnership formats to include the diverse expertise of researchers and practitioners applying improvement science principles and processes to address common problems that have eluded other educational reforms (LeMahieu et al., 2017). "They merge the disciplined inquiry of improvement science with networked

science" (p. 6) in a context in which members operate from a shared theory of improvement, and aim for quality outcomes, reliably, across contexts. Members address complex, but practical, educational problems in an applied infrastructure (Bryk et al., 2010; LeMahieu et al., 2017), using a model for improvement based on improvement science (e.g., Langley et al., 2009) and networked science (e.g., Neilsen, 2012). NICs typically resemble the type of inter-organizational network described by Wohlstetter and Lyle (2019), in that they bring together groups of already established organizations (schools or districts) to improve organizational productivity and innovation. They also attempt to accelerate the spread of improvement efforts across multiple contexts (Bryk, 2015).

In NICs, members are not passive recipients of knowledge but co-researchers. Members use improvement science principles to co-conduct improvement research (e.g., Mehta et al., 2012), by developing, testing, and refining interventions (Bryk et al., 2015). In this way, they respond to scholars' calls for the needs of practice organizations (e.g., school systems) to drive research agendas and knowledge building (e.g., Mehta, 2013; Mehta et al., 2012; Schneider, 2008). The salient feature of these professional communities is the application of an *improvement science approach* to building capacity for organizational change in educational systems (LeMahieu et al., 2017). The characteristics of NICs, as defined by Bryk et al. include the following:

- NIC members focus on a well-specified aim
- NIC members are guided by a deep understanding of the problem and underlying system
- NIC members use improvement research methods to engage in disciplined inquiry

- NICs are organized to accelerate the diffusion and integration of interventions across diverse contexts

In the field of education, NICs are emerging as unique, scientific professional learning communities that convene educational researchers, practitioners, and other experts, to solve complex educational problems and facilitate inter-institutional learning (Bryk et al., 2010). NIC members work collaboratively, tackling common problems, working toward shared aims, testing promising change practices and accelerating their diffusion and implementation, at scale, across varied contexts (e.g., Bryk, 2015). NIC members problem solve using an improvement science paradigm, an approach for improving quality and productivity in diverse settings (Cohen-Vogel et al., 2015). In addition to diffusing promising practices, a major goal of NICs is to build member capacity *for* improvement. NIC members effectively use best-practices to leverage what Engelbart (2004) terms their collective IQ—their capability for deeply understanding addressing complex problems, with stakeholder input, assessing system capabilities and effectively organizing and executing effective solutions, while monitoring progress and adaptively adjusting when unintended consequences occur. These types of partnerships have been propagating as a method for increasing capacity among educational professionals toward equitable, quality educational systems. However, empirical research is needed to assess both the efficacy on outcomes and implementation factors related to the NIC model in practice (e.g., Feygin et al., 2020; Margolin et al., 2021) and its various configurations.

Networked Improvement Community Leadership

NICs are organized and managed by a leadership hub. Leaders in the hub are responsible for much of the leading, organization, and operation of the network, as members work toward their collective aim. These leaders typically initiate the network and help charter members' work (LeMahieu et al., 2017). In general, improvement network hubs vary in configuration, degree of responsibilities, and membership, sometimes including members from state and local education agencies and at other times consisting of solely external providers (Duff et al., 2019). Although empirical research has examined leadership in other network variations across disciplines, NIC leadership is an understudied area (e.g., Peruach et al. n.d.). Further, much existing research is conducted in NICs in which the leadership hub is organized around a central hub that is operated by entities external to the SEA or LEA. NIC models in which SEA leaders operate the leadership hub, in whole or in part, are few, and the related research is scant. This case study helps contribute to reducing this gap.

Problem Statement

Past school improvement policies and reform initiatives, including federal and state-led efforts, have not produced significant, positive effects for all students (e.g., Borman et al., 2003; Dragoset et al., 2017). To ensure equity, educational improvement should be context sensitive with educational leaders adapting, revising, and reinventing in response to diverse contexts (Mintrop, 2016). However, this remains a practice challenge for state and local public education agencies, for a variety of reasons, including: discomfort in acknowledging inequities and disrupting the status quo (p. 1); persistent detachment of research from practices (e.g., Farley-Ripple et al., 2018); lack of attention

to the details of implementation of practices (O'Day & Smith, 2016); and focusing in large part on external reformers or non-system actors (LeFloch, 2008). Innovative networking efforts are emerging as a strategy for state and local education agencies to build collective capacity for educational improvement. In general, empirical research on these joint efforts at capacity building for school improvement is scant, at best (Brown et al., 2011). Additionally, while NICs are emerging in the field of education, few empirical research studies have documented details about implementation factors and outcomes in Pre-Kindergarten (PreK)-12th grade educational NICs (Margolin et al., 2021), especially as they relate to hub leadership (Peurach et al., n.d.). Further, at the time of this case study, there were limited—if any—empirical case studies examining a NIC model in which a state education agency exclusively operated the leadership hub. Even more scarce is research exploring hub leadership within these configurations. This study attempts to fill this gap.

Rationale and Purpose

While NICs are emerging in the field of education, with some demonstrating promising evidence of success (e.g., Feygin et al., 2020; Margolin et al., 2021; Norman et al., 2018; Proger et al., 2017), empirical evidence needs to accumulate to determine the sustainability (Cohen-Vogel et al., 2015), feasibility, and efficacy of such models, as well as the implementation factors that contribute to expected outcomes (Margolin et al., 2021). Since they are still an emergent model, there is little empirical evidence available on the internal dynamics of NICs (Cannata, Redding et al., 2017). Further, leadership is expected to facilitate improvement network outcomes, but this area has not been widely studied (Díaz-Gibson et al., 2017; Peruach & Gumus, 2011; Russell et al., 2017;

Vangrieken, et al., 2017). Additional information is needed regarding how leadership processes can successfully influence network outcomes in educational contexts and which factors contribute to this success (Diaz-Gibson et al., 2017), especially in the context of NICs. Moreover, there is scant research examining NIC models with SEA leadership hubs. Toward this understanding, there is much more to be learned about how SEA hub leadership is conceptualized, as well as how leadership dispositions, structures, and behaviors help foster organizational learning and improvement within PreK-12 instructionally focused NICs. This unique case study contributes to the current research base in NIC leadership by exploring hub leadership within the context of an instructionally focused, K-12 NIC model in which the leadership hub is exclusively composed of leaders from an SEA.

The purpose of this exploratory, unique case study (Yin, 2003) is to examine SEA hub leadership mental models, structures and behaviors in the context of a NIC model. This in-depth study is intended to shed light on *how* SEA hub leaders strive to use the NIC model to build members' capacity in organizational learning and continuous improvement. A pragmatic, qualitative inquiry approach (Patton, 2015) is applied, using semi-structured interviews and document reviews, to examine NIC hub leadership from multiple perspectives of hub leaders and member leaders within the NIC. The intention of this research design is to contribute to, and expand upon, emerging theories related to network leadership and continuous improvement from the unique perspectives of an SEA-led hub.

This unique case study of SEA hub leadership is guided by the following research questions:

1. How do SEA hub leaders use a NIC model to enable the conditions for building member capacity for inter-organizational learning and continuous improvement?
2. How do NIC hub leaders build collaborative cultures and relationships with and among members?
3. How do hub leaders strengthen or shift mental models to facilitate this work?
4. How are they adapting to leadership challenges inherent in the work?

Significance of Study

This unique case study is intended to fill a gap in the research literature regarding how SEA hub leaders, using an improvement science approach, create the cultural conditions and relationships to build member capacity for organizational learning and improvement. The findings are expected to advance upon initial, tentative theoretical propositions and to establish working hypotheses and lessons learned that can potentially be applied in other situations (Yin, 2018), and applied to future replication or similar research studies. The results are intended to provide rich qualitative data to strengthen emergent theory related to NIC leadership, and build upon it, with evidence from the pioneering efforts of one SEA. It is expected that the results can contribute to future research in this area, and to practical applications for leaders initiating NICs. Most importantly, it is expected that the practical results yielded may suggest useful implementation factors to other state agency leaders initiating NICs and/or conducting needs assessments with the intention of further program evaluation of the model in the future. It is also expected that the provisional data from the current study may shed light on the unique conditions and challenges SEA hub leaders face.

Manuscript Organization

The following chapters delineate the literature, methodology, findings, interpretations, insights, and implications of this NIC hub leadership study. First, I present a comprehensive literature review in which I detail the configuration and expected outcomes of NICs, as it relates to organizational learning and continuous improvement. I also explain the leadership theories and propositions on which this study is founded, including a conceptual framework of the NIC with these theories embedded. Next, I explain the research design and methods for this unique case study. Subsequently, I present the case context, findings from data analyses, and my interpretations of these data. Finally, I share the potential implications, study significance, and conclude with recommendations for continued research exploration and practical application.

CHAPTER 2: LITERATURE REVIEW

Theoretical Foundations and Conceptual Framework: The NIC as a Capacity Building Model for Continuous Improvement

My approach to the literature review follows Maxwell's (2006) recommendations concerning selectiveness and relevance over comprehensiveness. Therefore, the following review focuses on the most relevant works which hold the most important implication for the design and interpretation of this study. That is, the focus is on relevance in terms of the literature related specifically to emergent findings from research related to organizational learning, leadership in improvement networks, and NICs, as well as leadership theories related to adaptive problem solving and continuous improvement. In addition to justifying the argument for the current study, the following literature review—and related conceptual framework—is built upon an ongoing learning process of actively reviewing the literature, sense-making, synthesis, and integration, *throughout the study*, (Ravitch, & Riggan, 2017), from conception through final analyses. Focusing on relevance, it prioritizes not only on the most current research but on legacy theories or findings, since, it is often the case that the most influential works are older works (p. 47). Finally, since NICs are an emerging model for educational improvement, there is not an established theoretical framework to underpin the NICs or the hub leadership within. Therefore, I propose the application of leadership models based on a synthesis of the literature and the relevance to continuous improvement and NICs.

In this section, I provide detailed explanations of the theories underlying the NIC model and purpose, as well as the proposed leadership theories related to NIC hub leaders. The foundation for this work rests prominently on theories from organizational

learning, and adaptive and high-impact leadership. I explore how these theories apply to the NIC model and underlying NIC leadership structures, behaviors, practices, and dispositions.

The NIC Model

In addition to promising evidence from partnerships applying the breakthrough model in healthcare (Daily et al., 2018), there is emerging evidence of promise for the improvement science paradigm and corresponding NIC model in improving educator capacity and student outcomes (e.g., Barron et al., 2015; Cannata, Cohen-Vogel et al., 2017; Feygin et al., 2020; Norman et al., 2018). Further, partnerships between SEA and LEA members are emerging. For example, Proger et al. (2017) studied two networks with involvement from the SEA. The Michigan Focus Networked Improvement Community included state education agency representatives and school and district representatives. The network was focused on inequality in math achievement. Minnesota Statewide System of Support Networked Improvement Community worked with their Regional Education Laboratory to improve supports for the six Regional Centers of Excellence that provide direct support for school improvement statewide. These network collaborations revealed important learning to members and researchers. They learned that, to be successful, networks should comprise members with diverse and relevant expertise; ensure clear roles and responsibilities of members; align with educational systems current initiatives; use improvement science tools and processes to help members focus and prioritize problems and change ideas; and embed capacity building strategies for members to gain confidence in conducting and/or using research. The Tennessee Early Learning Network (TELN) assembled a diverse group of educational professionals

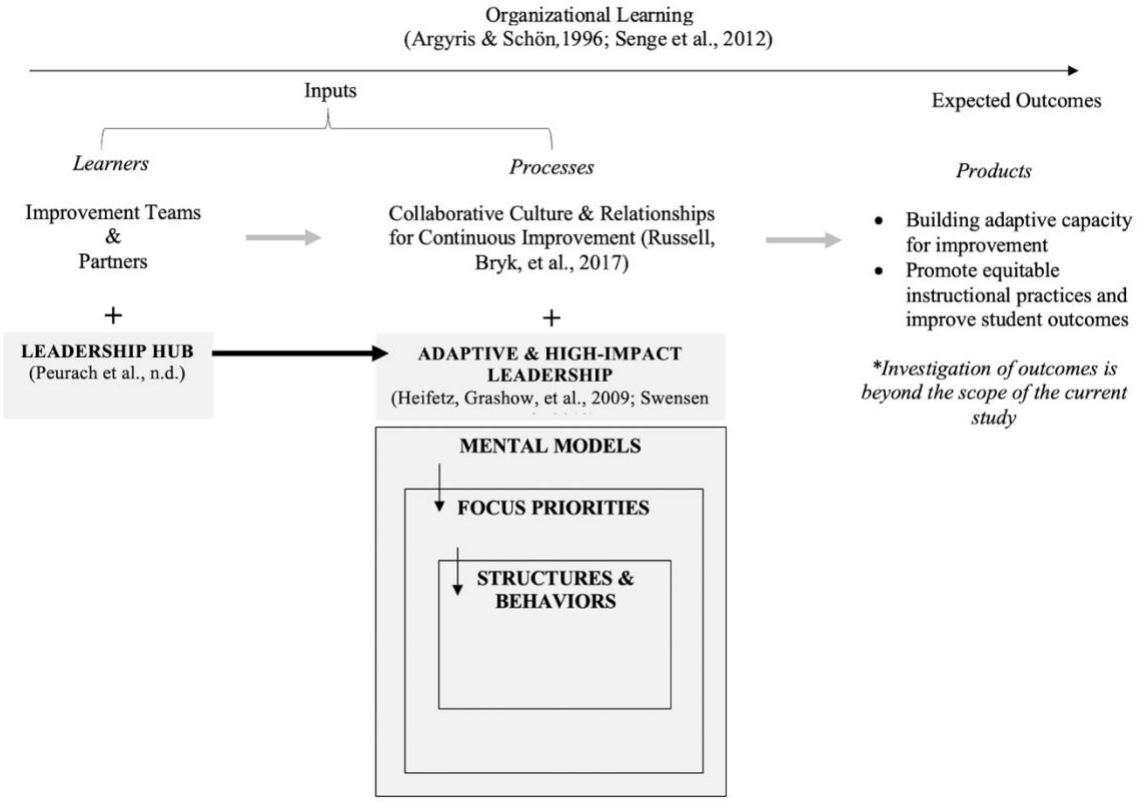
including those from the SEA, LEA, and school level, as well as outside experts. Network members developed working theories, based on problems of practice, and district personnel tested out solutions using disciplined inquiry; members regularly shared their experiences and learning with the attitude that failure is part of the learning and improving process (Curran, 2016). Further, the Minnesota Alternative Learning Center NIC engaged in a formative evaluation with research partners and found promising levels of engagement and learning from member participants (Margolin et al., 2021). From their systemic review of the literature on NIC implementation and outcome studies, Feygin et al. (2020) highlighted examples of NICs showing promising results, but determined the need for implementation research examining the factors that enable or hinder implementation.

Although promising examples are surfacing, questions remain about the feasibility, viability, and sustainability of the model when state and local agencies take on major leadership roles in these venues; especially if and when external entities do not serve—at least exclusively—as the coordinating hub; empirical evidence is still needed in this area (Cannata, Redding et al., 2017) and justifies the need for the current study and subsequent similar studies. The focus of the current study is on SEA NIC hub leadership, represented in the shaded portions of the conceptual model in Figure 1. However, I also contextualize theoretical propositions about NIC hub leadership within the conceptual model of the NIC as a whole. This conceptual model is underpinned by an emerging framework for NIC initiation (Russell et al., 2017) as well as theoretical propositions derived from a synthesis of findings from emerging improvement network leadership research in PreK-12 educational contexts (e.g., Peurach et al., n.d.), and theories related

to organizational learning (Argyris & Schon 1996), adaptive leadership (Heifetz et al., 2009), and high-impact leadership (Swensen et al., 2013).

Figure 1

NIC Leadership: Building Capacity for Organizational Learning and Improvement



Organizational Learning and the NIC Model

Organizational learning is a social process (Berta et al., 2015) that can help build educator capacity to improve student performance outcomes (Louis & Lee, 2016). The NIC is a professional community that resembles a learning organization, in which members use key disciplines, including team learning, systems thinking, personal

mastery, operating from shared visions, and shifting mental models (Senge et al., 2012), to build organizational learning and capacity for improvement (LeMahieu et al., 2017). They attempt to build capacity by intentionally seeking out conditions and people who can help members move beyond the status quo. Since professional learning communities, in general, are promising methods for building educator capacity for improvement (e.g., Stoll et al., 2006), NICs may hold promise for building inter-organizational capacity. Organizational theory addresses groups dealing with adaptation and integration (Shein, 2004). Organizational capacity is associated with leadership (Farley-Ripple & Buttram, 2015). Therefore, NICs may require adaptive leaders to foster adapting learning, which, in adaptive learning organizations, is fostered and distributed, and members share responsibility for the organization's shared vision, and institutionalized commitment to reflection and continuous learning (Heifetz et al., 2009).

Argyris and Schön (1996) note that organizational learning entails *learners,* the underlying learning *processes*, and ultimate learning *products*. During organizational learning, members engage in problem solving inquiry, the output of which is change in thinking and practice. Organizational knowledge is embedded in the routines and practices, as well as the products produced by its members. Practitioners are centrally important to this learning and collective knowledge. The organization operates from a shared theory of action, and organizational norms, values, and processes are essential in improving the organizational performance. Collectively, learners may engage in single-loop learning, which entails changing strategies or assumptions, while leaving overarching values of the organizational theory of action in-tact. They may also engage in

double-loop learning, whereby members change strategies and assumptions as well as the organization's underlying values and norms (p. 20-21).

Related to the double-loop learning concept, Engelbart (2003), who pioneered the NIC concept, suggests that organizational learning and improvement requires infrastructures in which members focus not only on selecting, understanding, and executing quality products and practices, but also on improving capacity *for* continuous improvement—improving how they improve. He claims that groups maximize progress and accelerate improvement through learning, sharing information, and dialogue as they work toward common goals and complex problems. Further, this *dialogue and organizational learning is just as important as the outputs and outcomes, and these dynamics "are the 'magic dust' that makes the whole system capable of solving complex problems"* (p. 12). While the measurement of NIC outcomes is beyond the scope of the current study, the goal is to shed light on details about NIC leadership structures, behaviors, and mental models intended to help build collaborative culture, relationships, and capacity for this type of organizational learning and continuous improvement.

Building on Argyris and Schön's (1996) structure of organizational learning, entailing the learners, processes, and products, I will now apply this overlay to the components and structure of the NIC.

Learners

NICs are structured to encourage collaboration and transparency, and to foster organizational capacity to learn to improve (Russell et al., 2017). NIC membership composition includes practitioners (e.g., state and local educational professionals), including classroom practitioners, as well as research partners and other subject matter or

educational design experts, as needed. *All are learners* within the network, using improvement science principles and processes to conduct improvement research (Bryk, 2015). Diverse membership in NICs is intended to facilitate development of social capital (e.g., Baker-Doyle, 2011; Daly, 2015) and ensure coherence among policy initiatives and related practices within the state's districts and schools (e.g., Cannata, Cohen-Vogel et al., 2018; Penuel et al., 2018). One unique feature of NICs is the high degree of practitioner participation (Meister & Blitz, 2016). Educators are not passive recipients but co-researchers, applying concepts learned as the improvement research is conducted (Bryk, 2015).

Local Improvement Teams

Instructionally focused NICs are composed of many local improvement teams, composed of educational practitioners from schools and districts, who are focused on making instructional improvements at a local level, while sharing learning with the full network. In PreK-12 instructionally focused NICs, these teams typically include classroom educators, coaches, principals, and other school and district level personnel.

The Leadership Hub

All NICs have a coordinating hub. This coordinating hub is the leadership core and consists of individuals responsible for much of the leading, organization, and operation of the network, toward helping members build capacity toward their collective aims. As LeMahieu et al. (2017) describe, hub leaders typically initiate the network and help charter members' work. These decisions may be made at the local or state level, but may also be made by policy organizations or other educational organizations committed to solving specific problems of practice. NIC members can share responsibilities or the

hub may be operated solely by a single organization (typically, research organizations). In general, improvement network hubs vary in configuration, degree of responsibilities, and membership, sometimes including members from state and local education agencies and at other times consisting of solely external providers (Duff et al., 2019).

Hub leaders are responsible for ensuring improvement coaching, network development, member participation and motivation, and providing feedback to participants (e.g., Proger et al., 2017). They are also responsible for organizing necessary professional learning and harnessing the knowledge development and learning so that ideas can be spread (Russell et al., 2017). In some improvement networks, hub leaders specialize in curriculum or program design and monitor and refine the codified knowledge or resources produced by the network (e.g., Duff et al., 2019; Wohlstetter & Lyle, 2019). Necessary leadership structures and responsibilities are recommended to facilitate this work, including building expertise in improvement science capabilities, ensuring data analytic infrastructures and capabilities, knowledge management, and coordinating convenings, communications, membership, participation, and technological support (Bryk et al., 2015). Most recently, emerging findings from research uncovered four specific domains that underlie the work of hub leaders (Peurach et al., n.d.):

- Developing and managing the hub organization, based on strategic vision and agendas;
- Developing and managing the network as an organization, which involves managing membership, leadership, strategic planning based on clear vision and agenda, and social aspects of the organization;

- Supporting and managing improvement activity, which includes supporting and engaging in the iterative improvement cycles, based on coherent vision, strategies, and operating agenda; and
- Managing environmental relationships, including the social, political, technical and financial aspects related to community members' values and priorities

Products: Expected Outcomes

The ultimate goal of most educational networks is to effect sustained changes in teaching practices that lead to equitable educational experiences, improved student outcomes (e.g., Katz et al., 2008). An additional goal for NIC members is to accelerate the diffusion of promising interventions and grow member capacity for continuous improvement. To achieve long-term outcomes, Wentworth et al. (2017) emphasize attention to the intermediary outputs as important indicators, including changing educators' mindset and practices. In addition to accelerating improvement in these outputs and outcomes, another goal of the NIC relates to building member capacity for organizational learning and continuous improvement, both during the lifecycle of the NIC, and beyond.

Building Adaptive Capacity for Improvement

Adaptive capacity relates to an organization's ability to acquire innovative knowledge, assimilate it, and apply it to make quality decisions (e.g., Zahra & George, 2002). Engelbart (2004) describes NICs as venues in which members can effectively use best-practices to leverage their capability for deeply understanding addressing complex problems, assessing system capabilities and implementing effective solutions, while

monitoring progress and adaptively adjusting when unintended consequences occur. NICs may be an essential lever for achieving long term outcomes in building educator capacity for conducting and using improvement science in order to understand and attend to variation in performance and contexts, and to replicate positive outcomes across diverse contexts (LeMahieu et al., 2017). As NIC members use improvement science to test innovations and adaptively integrate them in a variety of contexts, an expected output of the network's learning is the building of organizational capacity to develop/use evidence-based practices and make informed decisions about teaching and learning (e.g., Farrell et al., 2017; Henrick et al., 2017; Farley-Ripple et al., 2018). For network leaders, this entails helping the organization build collective efficacy and adaptive capacity to adapt to changing conditions and deal with future adaptive challenges so that the organization can thrive and continuously improve (Heifetz et al., 2009).

Capacity building has been defined as a process and outcome (Brix, 2019), which is fitting within the NIC, as members are building their capacity toward better instruction, while concurrently building their capacity for continuously improving their systems and practices by way of applying improvement science processes. Although empirical evidence related to inter-organizational culture and capacity building is emerging, many studies have illustrated correlations between social capital developed in professional networks and the impact on educators' collective efficacy and capacity (Berebitsky & Salloum, 2017; Louis & Lee, 2016; Nolan & Molla, 2017; Voelkel & Chrispeels, 2017). Research suggests that teacher capacity for implementing curricular changes and improving student outcomes may be increased with the participation in, and support from, cross-organizational learning in a strong network (e.g., Massell, 1998; Norman et

al., 2018; Voelkel & Chrispeels, 2017). Further, Hoyle et al. (2008) emphasize that effective network capacity building strategies depend on *effective leadership structures* and supporting policies. Examples of improvement networks that aim to build improvement capacity in local educational agencies are emerging (Louis et al., 2008), some of which have direct or indirect involvement of the SEA (e.g., Council of Chief State School Officers, 2017; Childs & Russell, 2017; Proger et al., 2017). However, empirical evidence related to both implementation factors and outcomes (e.g., Margolin et al., 2021) is needed to better understand how hub leaders can establish the organizational conditions to foster capacity building for improvement. The current study is intended to contribute to this learning, with specific attention to how SEA network hub leaders attempt to facilitate and foster processes that may contribute to inter-organizational learning and capacity within and across school systems. The scope of the current study is limited to the examination of how leaders establish the conditions for intended outcomes to manifest, specifically the leadership structures, behaviors, and mental models intended to achieve these ends, not specifically on the results of these actions. That is, the efficacy of hub leaders' intentions and action on outcomes is beyond the intended scope of this study.

Processes: Building Collaborative Culture and Relationships for Continuous Improvement

Schein (2004) describes organizational culture as "a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid, and, therefore, to be taught to new members as the correct way to perceive, think, and feel in

relation to those problems" (p. 17). The growing literature related to collaborative partnerships and improvement networks, in general, provides foundational knowledge regarding core processes in which members engage to build this culture (e.g., Duff et al., 2019; Peurach et al., n.d.; Proger et al., 2017; Russell et al., 2017). These are detailed in the following sections. Although slight variations occur across network literature, and domains, the following processes have been documented prominently, and are considered throughout the current study.

Applying Improvement Science Methods to Conduct Improvement Research

Unique to NICs, this process entails members using improvement science principles, processes, and methods to co-conduct improvement research (Bryk, 2015) in order to build collective knowledge about problems and underlying causes; co-design innovations; and test ideas in practice. Improvement science is a systematic approach to continuous improvement. This approach entails improving the quality of processes, products, systems (Moen et al., 2012) and productivity across diverse settings (Cohen-Vogel et al., 2015). In education, this involves studying problems of practice and their underlying systems and processes (Herrara, 2016) to achieve quality outcomes, reliably, across diverse contexts (Bryk, 2015).

Improvement science and related applied research diverges from, while also complements, the paradigm of traditional, experimentally designed research in education, and may help address the concern that educational research is often detached from practice (e.g., Farley-Ripple et al., 2018). While experimental designs are reasonable choices when dealing with problems that do not interact with systems knowledge (Lewis, 2015), when considering variations and complex problems involving multiple people and

factors, an improvement science approach seems a better fit. Improvement science recognizes the right of practitioners to use currently available innovations, rather than waiting for a "proven" program (p. 59). The overriding goal of improvement science is to ensure that quality improvement efforts are based both on research evidence and evidence from practice (Shojania & Grimshaw, 2005). The *practice-based evidence* (Green, 2009), produced in settings that use the science of improvement—such as in NICs—has the potential to supplement findings from experimental research and help reduce inequities and gaps in performance among diverse student populations.

When applied in NICs, improvement science is an innovative, problem-solving methodology that helps researchers and educators determine how innovations or interventions work over time and across contexts. As Bryk et al. (2015) emphasize, this work conceptualizes instructional systems as ongoing research and development projects. In such a system, refinement and continuous improvement is expected and practice drives theory, rather than the other way around. (Fullan et al., 2006). NIC members collectively problem solve by applying improvement science principles and processes, and use a model for improvement that applies iterative Plan-Do-Study-Act (PDSA) cycles of learning (Bryk et al., 2015; Langley et al., 2009). Members engage in collaborative, scientific inquiry around relevant problems, adopting a learn by doing orientation to generate practice-based evidence. The ultimate goal is for this evidence to be replicated, reliably, at scale (Bryk, 2015), as learning generates knowledge that is codified and spread across varied contexts.

There are accounts of the success with the improvement science approach in healthcare (e.g., Redpath Mahon & Neu, 2017; Weiss et al., 2017) and examples are

emerging in the field of education (e.g., Cohen-Vogel et al., 2015; Cohen-Vogel et al., 2016; Hannan et al., 2015; Martin & Gobstein, 2015). While improvement science principles and practices are currently being inducted into educational systems with some promise (e.g., Cohen Vogel et al., 2015; Proger et al., 2017), there is much to be learned about the practical application of improvement science within PreK-12 school systems, especially within NIC structures operated by state-level hubs.

Pivotal to the improvement research co-conducted among members within a NIC is adherence to and application of improvement science principles (Bryk et al., 2015), which include: (1) making the work problem-specific and user-centered; (2) attending to variation; (3) understanding the system underlying the problem; (4) using practical measures for improvement; and (5) applying disciplined inquiry through iterative PDSA cycles to test ideas and co-construct knowledge.

Developing Vision and Mutual Theory of Improvement

While engaging in analyses to understand the system producing the current outcomes, NIC members develop a shared narrative, agreed upon aim, (Russell et al., 2017), and a related theory of practice improvement (Bryk et al., 2015) in which they commit to potential change ideas that they believe will help them achieve their common aim. A common sense of organizational purpose and vision, and mutually beneficial goals are strong indicators of the health and effectiveness of a network (e.g., Drahota et al., 2016; Katz et al., 2008; Penuel, 2017; Russell et al., 2017). Generally, mutualism within partnerships refers to the collective mission/vision, purpose, goals, expectations, and benefits members share as a result of partnership participation and joint work (e.g., Drahota et al., 2016; Keast et al., 2004; Palinkas et al., 2017; Riemer et al., 2012; Schulz

et al., 2003). When studying the impact of interpersonal factors in professional communities, Drahota et al. gleaned from participants the necessity in having mutually agreed upon visions, goals, and expectations that yield mutual benefits. Palinkas et al. agree that members should have clearly defined outcomes, which are evaluated for efficacy. Further, Bradshaw and Haynes (2012) claim that such factors related to mutualism are important—if not essential—to the effective and efficient translation of research findings to practice and policy.

Building an Evidence-based Culture

Improvement work entails a high focus on evidence—results from multiple sources of data and data types (Swensen et al., 2013), for the purpose of continuous improvement. The theory underlying the NIC is that effective implementation involves more than simple translation and dissemination of research findings to practice. Evidence based practices do not work in and of themselves; they come with systemic conditionalities and contingencies related to contextual, cultural, and implementation factors (Pawson et al., 2011). Organizations must test approaches in real life, see how they interact with others, note emerging unexpected conditions, and adapt accordingly (Snow et al., 2015). In the NIC, this work involves bi-directional efforts among members so that practitioners can appreciate the quality and applicability of the research, and to apply it appropriately in the classroom (Farley-Ripple et al., 2018). The SEA hub leader's role, in part, is to ensure that innovations and evidence-based change ideas expand upon evidence from traditional, experimental research to provide practical frameworks that can facilitate implementation and cohere with initiatives in school districts (e.g., Penuel et al.,

2018), as well as build member capacity for engaging ongoing improvement research (e.g., Henrick et al., 2017).

Group Dynamics

Riemer et al. (2012) insist that group dynamics is a core component of successful partnerships and consists of key behaviors and elements. Generally, these elements relate to building trusting, collaborative relationships through iterative inquiry, and effective communication, decision-making, problem-solving processes, and conflict resolution (e.g., Keast et al., 2004; Schulz et al., 2003). In the field of education, effective collaboration entails team members systematically engaging in ongoing cycles of inquiry to analyze and improve practice and student outcomes (DuFour, 2004). Sharing and co-creating knowledge about practices can help educators tackle common problems and discover innovative practices that can improve teaching and learning (Louis & Lee, 2016). Collaborative inquiry allows educators to collectively work toward investigating practices, testing hypotheses, and challenging their beliefs, and should include time for iterative, critical analysis, interpretation, reflection, and decision-making (Katz et al., 2008). Similar to collaborative organizations within the healthcare field, improvement networks are unique in that members do not just simply disseminate information but engage participants in the improvement research, problem-solving, decision-making, and diffusion (Ghandour et al., 2017).

In professional learning communities, members must cultivate an open culture of trust and respect in which they can collaborate, share and feel safe enough to engage in reflective dialogue (Louis & Lee, 2016) and exercise vulnerability to take risks and experiment, for the sake of learning and sharing (Vangrieken et al., 2017). Similarly, NIC

leaders must foster a culture of collaborative interactions and transparency through building relational trust, engagement, and social connections (Russell et al., 2017). The development of trust contributes to effective reciprocal relationships, facilitating collaboration, reflective dialogue and sharing of practices (Bryk et al., 1999; Drahota et al., 2016). School improvement network leaders help establish and facilitate formal *and* informal opportunities for building trust and collaboration so that members can share ideas and co-learn (Duff et al., 2019). Taken together, these dynamics may form a foundation for effective collaboration and contribute to critical outcomes.

The following sections apply existing leadership theory and research to establish propositions about what it takes to lead a NIC. I then reiterate the focus research questions intended to glean detailed information specifically about SEA hub leadership within a NIC model.

Network Leadership Dispositions, Structures, and Behaviors

Network leaders are responsible for managing, supporting, and facilitating the aforementioned network processes related to improvement science, developing mutual vision and theory of improvement, building an evidence-based culture, and coordinating group dynamics for collaboration and problem solving. Structural and behavioral components of an organization's learning system foster the conditions for inquiry under which challenges, issues, and assumptions can be addressed, especially to facilitate double loop learning (Argyris & Schön, 1996)**.** By focusing on one, unique case, the current study explores SEA hub leadership with attention to the tentative theoretical proposition that particular leadership mental models, dispositions, structures, and behaviors are essential to this work. This tentative proposition rests on the assumption

that improvement network hub leaders are dealing with complex, adaptive challenges (e.g., Duff et al., 2019; Peurach et al., n.d.) and aiming for expected outcomes in which leaders help members build capacity for continuous improvement (Bryk et al., 2015; Engelbart, n.d.). Therefore, I prioritize theoretical models related to adaptive leadership (Heifetz et al., 2009) and high-impact leadership (Swensen et al., 2013) to ground this inquiry. *Adaptive* leadership attends to work that engages organizations in dealing with adaptive challenges, or complex problems. *High-Impact Leadership* is drawn from leadership studies focusing on continuous, quality improvement in healthcare settings, and emphasizes mental models and essential leadership behaviors. Within these frameworks, I embed a synthesis of the legacy and emerging research on network leadership from the field of public administration, and improvement network leadership in education.

Adaptive Leadership Dispositions and Behaviors

Not unlike other disciplines, educational innovation and improvement requires effective leaders who possess the theoretical knowledge, commitment, personality, accountability, and persuasive power to effect transformational change within organizations (Deming, 1994). Schein (2004) notes that positive organizational culture results from complex learning among members and is inextricably dependent on effective leadership. He claims that leaders contribute to organizational learning and improvement by helping members address adaptive challenges, helping to foster change processes that are adaptive, and helping create and sustain the learning culture by facilitating social processes, and instilling a culture of improvement. Heifetz et al. (2009) describe adaptive challenges as those for which organizational learning is required to understand problems

and make decisions about potential solutions. Adaptive change often requires organizations to disrupt the equilibrium-the status quo, and acquire or co-construct new knowledge and new methods for solving problems (Heifetz & Linsky, 2002), which implies engagement in what Argyris and Schön (1996) refer to as double-loop learning, by which members need to shift assumptions, values, and norms related to their work. NIC leaders must be able to facilitate and coordinate diverse stakeholder perspectives into a coherent framework that aligns with agreed upon member aims, which requires critical judgment and understanding of organizational structures and functions (Bryk et al., 2015). Adaptive challenges and change seem to typify the work of the NIC, and NIC leadership, therefore, it seems fitting to apply an adaptive leadership lens to the processes and organizational learning that occurs within the network.

Adaptive leadership entails an ability to: tolerate ambiguity and build an adaptive culture in which experimentation is honored; build trust and orchestrate conflict; balance multiple stakeholder priorities; and help sustain strong networks so that members can build capacity *for* adaptation (Heifetz et al., 2009). It also requires leaders to adopt a view from the balcony perspective, being both an observer and participant (Heifetz & Linsky, 2002), so to keep the big picture in mind while coordinating and managing the daily logistical details of network management. This birds-eye view skill has been noted as an important quality for educational improvement network leaders (e.g., Duff et al., 2019; Sherer et al., 2019). It aligns with the claim that engagement in ongoing systems thinking practices is a crucial discipline within learning organizations (Senge et al., 2012), and to findings in recent leadership studies in which leaders claim to prioritize systems thinking,

especially related to building systems for professional learning and for developing the capabilities across the system (Dixon & Palmer, 2020).

While the research base related to how state education agency leaders operate within improvement network hubs is lacking, it is possible to learn similar foundational information about network leadership from the field of public administration. For example, Provan and Lemaire (2012) emphasize that in shifting focus from single organization management to inter-organizational network leadership, government agency network leaders need to do more than transfer current skill sets to network settings; this work entails *adaptive* dispositions, the development of new skills and behaviors, and selective integration of necessary expertise for collaboration. Similarly, Eglene et al. (2007) studied network leaders' degree of authority and leadership patterns and determined that network leaders demonstrated charisma and adaptability, which led to increased member collaboration, progress and success. From the field of educational leadership, adopting a growth mindset, as well as demonstrating curiosity, humility, and vulnerability were found to be essential dispositions for fostering continuous improvement (Dixon & Palmer, 2020). However, empirical research detailing these competencies, skills and behaviors is minimal (McGuire & Silva, 2010), especially as they might relate to the leadership role of state hub leaders in NICs.

While NIC leadership may be adaptive, including various strategies and configurations, NIC leaders' descriptions and explanations about their experiences may help illustrate essential skills, knowledge, and dispositions related to *how* they facilitate improvement research among network members so as to build a strong framework for future research, evaluations, and especially for practical application. Although leadership

has been suggested a key driver of success within improvement networks (Díaz-Gibson et al., 2017; Peurach & Gumus, 2011; Russell et al., 2017; Vangrieken et al., 2017), vivid details about the specific practices of hub leaders in educational improvement networks has not been widely studied or described in detail within current network literature (Peurach & Gumus, 2011), especially in the context of NICs led by state and local agency leaders. The following sections continue the synthesis of network leadership literature from a variety of disciplines, in the context of the high-impact leadership model for quality improvement (Swensen et al., 2013).

High-Impact Leadership Dispositions and Behaviors

Swensen et al. (2013) purport that a strong improvement culture fosters motivation, capacity, and results, and is shaped by the collective influence of leadership behaviors and actions. They describe high-impact leadership in the health care improvement setting as a set of three interdependent dimensions which include elements related to: how leaders think (mental models), what leaders do (behaviors), and where they focus their efforts. They base this proposition on their synthesis of findings from leadership interviews and experiences from the healthcare domain. Although the model was not explicitly applied to leadership within NICs specifically, it is an organizational leadership model that aligns with improvement science and continuous, quality improvement—core processes within NICs. Therefore, the model seems a fitting proposition to apply in the context of SEA NIC hub leadership.

Mental Models

How leaders perceive the world impacts leadership behaviors. High-impact leadership pushes leaders to adopt new mental models including focusing on quality and

viewing all colleagues—including themselves—as improvers and partners in the improvement work. These mental models allow leaders to help foster adaptation, innovation and the shifting of perspectives relating to how success is defined. Senge et al. (2012) also prioritize the importance of mental models as a key discipline for effective organizational learning; this discipline requires members to engage in reflection and dialogue to surface underlying assumptions and attitudes to explore differences, perspectives, and misunderstandings that impact practice, and to re-form new mental models for improving collective practices. These actions are also congruent with the process of members' double-loop learning in organizations (Argyris & Schön, 1996).

Focus Priorities

Swensen et al. (2013) found that high-impact leaders focus their efforts in specific areas, and propose six critical domains in which high impact leaders focus their efforts to lead improvement and innovation. High-impact leaders are *driven by persons and community.* People are at the center of the work and their perspectives are critical. They should be a part of the design and decision-making process. High impact leaders *create vision and build will* at all levels of the organization requires a relentless focus on, and communication of, the strategic vision, open discussion and dialogue, and transparency of actions, progress, and results. They *develop capability* by employing an effective and efficient strategy for involving people in executing the vision. They need to build and sustain the organizational infrastructure (people, policy, budget, and resources), build capacity for improvement methods and devote resources to building leaders within subsystems, so that leaders at every level share responsibility. High impact leaders focus on *delivering results* by ensuring appropriate resources, infrastructure, tools and methods,

and they *shape culture* by prioritizing actions and behaviors, communicating and demonstrating these behaviors, and establishing infrastructure, routines, and procedures to create the conditions to facilitate these actions (e.g., training, coaching, data infrastructures). Finally, they *engage across boundaries* by modeling systems thinking and partnering with other organizations.

Behaviors

Finally, Swensen et al. (2013) highlight five high-impact behaviors that they claim naturally evolve from shifting mental models. These include the following behaviors: person-centeredness, front-line engagement, relentless focus on vision and strategy, transparency, and boundarilessness. The connections of these behaviors to similar findings from network leadership research are explored in the following sections.

Person-centeredness. High impact leaders directly engage the people closest to the work in the continuous improvement efforts, and focus on the issues that matter most *to them*. They demonstrate empathy, exercise active listening, provide deep support for colleagues, and ensure that decisions are patient-centered (Swensen et al., 2013). That the work is person-centered, or, user-centered is also a priority principle in improvement science and NICs (Bryk et al., 2015) and is supported in other network leadership literature. For example, from the field of public administration, Silva and McGuire (2010) tested the assumptions that network leadership is integrative and differentiates from hierarchical leadership, which is the traditional form of leadership organization within state education agencies. In their network roles, leaders prioritized people-oriented behaviors over task-oriented behaviors. The most prioritized behaviors in these network settings included freely sharing information among members, treating members as equals,

and fostering relational trust. Similarly, Eglene et al. (2007) found that leaders prioritized building trusting relationships over disseminating knowledge and information, assuming a consultation stance, focusing on conflict resolution and team building. From the field of education, Duff et al. (2019) found that school improvement network leaders empower teachers and principals by directly involving them in problem solving; sharing responsibilities for setting goals and making data-informed instructional decisions; and valuing their adaptations in practice.

Front-line engagement. Swensen et al. (2013) note that high-impact leaders authentically engage in the problem solving, learning and improvement efforts, and are transparent about results—good and bad. They ask open questions, solicit ideas from colleagues, and promote a team-work culture in which leaders are accessible for questions and support. Similarly, school improvement network leaders have been found to position themselves as learners, displaying their own vulnerability and sharing struggles with problem-solving (Duff et al., 2019). Further, executive leaders for improvement in education have demonstrated a lead learner stance, living the improvement principles, sharing vulnerability, modeling reflective behaviors, learning with and from peers, and building a culture in which risk taking is honored (Dixon & Palmer, 2020), for the sake of learning and improvement.

Relentless focus. Effective improvement leaders remain relentlessly focused on the shared strategic vision and the execution of a detailed plan for improvement. They constantly communicate and reinforce the vision and plan and prioritize it in daily work, while allocating resources to the effort, monitoring progress often, and removing barriers to progress. Further, they continually recruit and place effective leaders (Swensen et al.,

2013). In their public sector leadership research, Eglene et al. (2007) found that leaders use their roles to help members understand and work toward network purposes, appealing to members' commitment to quality, and common vision, values, and interests. Similarly, School improvement leaders have been found to ensure that members have coherent visions of effective instructional practices and mechanisms by which they can communicate these visions (Duff et al., 2019). Likewise, Peurach et al. (n.d.) found that a major responsibility for hub leaders in managing the network as a formal and social organization for improvement was helping establish and maintain a coherent vision, strategy, and operating agenda.

Transparency. As Swensen et al. (2013) describe, transparent leaders are data-driven and candid with stakeholders, sharing positive and negative results, and areas for improvement. They explicate an expectation of transparency among colleagues, acknowledge problems, and encourage problem solving. They track progress often so that improvement can be made quickly and focus on achieving high-reliability systems across the organization. Research in the field of education supports this theory, demonstrating that network improvement leaders foster a culture of openness and honesty (Duff et al., 2019).

Boundarilessness. Swensen et al. (2013) found that high-impact leaders model an openness to all ideas, convey the expectation of diffusion of ideas and learning, and encourage innovation and trying new approaches to solving problems. Similarly, improvement network leaders must cross boundaries to encourage team collaboration, share ideas, and integrate learning among individuals and organizations (Bryk et al., 2010; Duff et al., 2019; McGuire & Silva, 2010; Penuel et al., 2015; Swensen et al.,

2013), build coalitions with external experts (Eglene et al., 2007) and practice and foster systems thinking to problem solve and engage across boundaries (Bryk et al., 2015; Dixon & Palmer, 2020; Goldsmith & Eggers, 2004; Swensen et al., 2013; Senge et al., 2012).

The current study is based on the proposition that the preceding adaptive, high-impact dispositions and behaviors may apply to hub NIC leaders, and explores *how* SEA hub leaders may demonstrate mental models, focus areas, and behaviors in their work.

Leadership Structures

In addition to the above mental models, focus areas, and behaviors, detailed information about network leadership structures, including roles and responsibilities is needed (e.g., Bradshaw & Haynes, 2012). Some suggest that relational trust among network members may emerge from clarity and transparency in role expectations (Palinkas et al., 2017). Drahota et al. (2016) emphasize that clearly differentiated roles and functions of the partners is one of the most important factors for collaborative success. In contrast, Díaz-Gibson et al. (2017) found that network leaders prioritize enhancing connections among members over assigning individual roles and responsibilities. Wheatley and Frieze's (2011) assert that effective network leaders should view their role as leading as "host," or leading by convening, rather than leading as "hero." Similarly, Goldsmith and Eggers (2004) emphasize that governmental entities serving in network leadership roles—governing by network—apply approaches that diverge from traditional, hierarchical structures and focus on facilitation and convening diverse stakeholder groups and organizations to tackle complex problems that transcend single agency or organizational boundaries. Keast et al. (2004) note that many network

structures are unique from other organizational structures, since there is not necessarily an individual or group in charge, traditional structures of authority do not necessarily apply. Similarly, Eglene et al. (2007) found that network leaders commonly prioritize distributed leadership, and often deliberately choose non-authoritative strategies. While some have found that a certain level of top-down leadership may be needed or preferred (Vangrieken et al., 2017), shared responsibilities, in the form of differentiated and distributed leadership, has been demonstrated in educational improvement networks (Peurach et al., n.d.). Such shared responsibility has also been found to contribute to educator capacity for organizational learning (Louis & Lee, 2016). Further exploration and research is needed to better understand *how* leadership roles and responsibility structures might contribute to network success (e.g., Bradshaw & Haynes, 2012; Palinkas et al., 2017; Riemer et al., 2012).

In addition to gleaning additional information about the specific leadership structures within the NIC, the current study explores how leaders establish the conditions for members' collaborative learning about systems and instructional practices, so that members can build capacity for improvement science and continuous improvement. Duff et al. (2019) determined that school improvement network leaders prioritize organization and facilitation of formal structures and opportunities for collaboration among principals and teachers to build relational trust and bonds, share ideas, and learn from each other. These structures include joint professional learning opportunities, weekly meetings, intervisitations, planning forums, retreats, and other hub organized events. They also note that it is typically necessary for leaders to adapt structures and supports to meet the

shifting policy, political, and economic conditions. This may be especially relevant in networks led exclusively by SEAs.

Managing Complexity and Challenges

Finally, since NIC leadership is complex and adaptive work, an additional area of exploration for this study is related to how leaders manage the myriad challenges and complexities entailed in their work. Although some of the logistical management tasks within improvement networks may be familiar (Peurach et al., n.d.), much of the work for which network leaders are responsible is complex and uncertain (Duff et al., 2019; Peurach & Gumus, 2011; Peurach et al., n.d.). Peurach and Gumus analyzed the knowledge base on executive leadership in improvement network hubs. While determining the work of hub leaders is generally complex and uncertain, they uncovered a deficit in the empirical body of research and note a need for detailed accounts to describe the specific knowledge, skills, practices and nuances of network hub leaders. Surprisingly, Peurach et al. gleaned that although network leader responsibilities include a voluminous, diverse repertoire of work much of which is complex, many reported devoting more time to the more technical, managerial aspects of network leadership, with less time devoted to the core collaborative improvement science work. Authors note a potential implication is that organizational development may be a prerequisite to collaborative improvement activity, and they note the need for additional research on both complicating and enabling conditions that they experience to confirm, validate and elaborate upon existing findings and frameworks of improvement network leadership. Most importantly, they note the need for additional empirical research that includes more

representative samples, including member leaders, to support leaders in better understanding, appreciating, and enacting their own work.

This unique case study intends to address the current gaps in the literature, pertaining to NIC leadership, by applying adaptive and high-impact leadership theories within the context of one, unique case in which SEA leaders are employing the NIC model and leading and managing the hub. In addition to exploring how the preceding leadership theories and frameworks may apply, this case study is expected to elaborate upon current theories and frameworks, by providing rich, detailed lived experiences from these pioneering NIC leaders related to *how* they are applying the NIC approach to build culture, relationships, and capacity for continuous improvement. The current case study is anchored around the following research questions:

1. How do SEA hub leaders use a NIC model to enable the conditions for building member capacity for inter-organizational learning and continuous improvement?
2. How do NIC hub leaders build collaborative cultures and relationships with and among members?
3. How do hub leaders strengthen or shift mental models to facilitate this work?
4. How are they adapting to leadership challenges inherent in the work?

In addition to broadening the NIC leadership literature base, from an SEA perspective, results are intended to inform ongoing research efforts, and to fulfill a more practical purpose by offering SEA practitioners insight regarding *what it takes* to lead NICs, and the related implications in decision-making, for state and local educational leaders currently or prospectively considering undertaking such enterprises and how they might build the capacity to do so.

CHAPTER 3: METHODOLOGY

Purpose

The purpose of this exploratory, unique case study (Yin, 2003) is to examine SEA hub leadership mental models, structures, and behaviors in the context of a networked improvement community model, led by an SEA hub. This in-depth study is intended to shed light on how SEA hub leaders strive to build capacity in improvement science for organizational learning and continuous improvement. A pragmatic, qualitative inquiry approach (Patton, 2015) was applied, administering semi-structured interviews, and reviewing relevant documents pertaining to the case. Analysis of interview data and pertinent documents was used to examine NIC hub leadership from the perspectives of NIC hub leaders who also serve as leaders in a state education agency in K-12 public education. The intention of this applied research design is to contribute to, and expand upon, emerging leadership theories as they apply to NIC hub leadership within a K-12 instructionally focused NIC model. The results are intended to advance upon the initial, tentative theoretical propositions set forth in the conceptual framework, to establish working hypotheses and lessons learned that can potentially be applied in other situations (Yin, 2017, p. 38). More importantly, it is expected that the practical results yielded may be useful to other state agency leaders initiating NICs or conducting needs assessments with the intention of future program evaluation of the NIC model and its efficacy. Prior to beginning this research, I secured approval from the University of Vermont through the appropriate Internal Review Board procedures.

Research Questions

The following research questions guide the current case study:

1. How do SEA hub leaders use a NIC model to enable the conditions for building member will and capacity for inter-organizational learning and continuous improvement?
2. How do NIC hub leaders build collaborative cultures and relationships with and among members?
3. How do hub leaders strengthen or shift mental models to facilitate this work?
4. How are they adapting to leadership challenges inherent in the work?

Researcher Identity

Due to past experiences, as a classroom teacher and instructional coach, I empathize with educators in their efforts to meet the diverse needs of students. I further understand the necessity for research and theory to be relevant and practical to practitioner needs. As a researcher, in search of ways to reduce the perpetual gap between educational research and practice, I gravitate toward a practical, improvement science paradigm for continuous improvement. This paradigm focuses on collaborative, iterative problem solving among researchers and practitioners. Such an approach calls for methodological appropriateness over methodological orthodoxy (Patton, 2015). Therefore, I situate the current work under a pragmatic worldview, which is problem-centered, and deeply committed to multiple realities, multiple perspectives/stances, and practical, real-world goals in applied settings (e.g., Creswell & Plano Clark, 2018). This stance supports an iterative approach to problem solving and assumes that theories and concepts will be *adapted* by local settings, rather than just generalized within (e.g., Perla et al., 2013).

For the current study, I locate myself as a participatory researcher, in collaboration with SEA network leaders, collectively exploring leadership perspectives related to the processes and dynamic dimensions of using an improvement science approach within networked improvement communities. I bring perspective strength to the effort from personal experiences as a researcher, practitioner, NIC member, and policy developer at the state level. However, these experiences obviously preclude a degree of objectivity. My paradigm preference and positioning is important, as it affects my methodological choices and decisions, especially as they relate to the evolution and reformulation of my conceptual framework (e.g., Ravitch & Riggan, 2017) and research questions (e.g., Onwuegbuzie & Leech, 2006), and to my choices regarding data analyses and representation of findings, which are intended to inform future research efforts as well as serve a more practical purpose in being actionable in *policy and practice*. To that end, it is imperative that this case study report be accessible to *practitioners*, as well as researchers.

Research Design

Qualitative Case Study Design

A qualitative inquiry approach is fitting when attempting to gain a complex understanding of issues (Creswell & Poth, 2018). The research questions necessitate a qualitative, in depth design. Although leadership has been cited an important lever to network success (e.g., Díaz-Gibson et al., 2017; Peurach & Gumus, 2011; Russell et al., 2017; Vangrieken et al., 2017), more research is needed to understand *how* leadership can influence network outcomes in educational contexts (Diaz-Gibson et al., 2017). Previous case study methods have described how particular interventions or innovations were

developed and adapted by NICs, or on the structure and organization for initiating a NIC (e.g., Hannan et al., 2015; Martin & Gobstein, 2015; Russell et al., 2017). Such studies have delineated critical process and outcome elements of NICs, including improvement science research, group dynamics, and the codification of knowledge for translation to practice. Additionally, emerging empirical research has provided provisional findings on a broad framework for network hub leadership operations (Peurach et al., n.d.). However, the field needs more rich, detailed stories, from NIC hub leaders regarding *how* they create the conditions to build member capacity for improvement using a NIC model. Further, the field is absent empirical research containing rich, detailed stories from state leaders attempting to initiate or sustain these partnerships. This case study is intended to begin to fill these gaps.

Case studies are best served for "how" and "why" questions about contemporary conditions to better understand complex social phenomena, especially when the researcher does not require control over behavioral events (Yin, 2018). Further, a unique case study is appropriate when examining the existing options for studying a single case are so rare that they are worthy of analysis (Yin, 2003). In this unique case study, The NIC model examined is an emerging configuration for which complexities must be understood. NICs are an emerging model for which there is little empirical research, especially rich, contextual, qualitative data; therefore, NIC leadership studies are also rare, Additionally, since NIC hubs often comprise leaders from external entities, such as research institutions or organizations (Bryk et al., 2015), there is scant empirical data examining how state education leaders are serving as NIC hub leaders. Since these instances are rare, an exploratory, single, unique case study is the chosen research design.

Yin (2003) emphasizes that a case study is an empirical inquiry choice appropriate to investigate a contemporary phenomenon in real-life context, especially when the boundaries between phenomenon and contexts are not clearly evident (p. 13). This clearly applies to the phenomenon of NIC leadership, first, as it is an emerging phenomenon and, second, the boundaries of leadership within the NIC are not yet clearly defined, tend to be complex, and may be blurred or distributed, unlike traditional leadership boundaries that typically exist within traditional hierarchical organizations. Further, these complexities warrant expanding the perspective from which hub leadership is studied, to include member leaders' input (e.g., Peurach et al., n.d.). Therefore, this study aims to do so by including member leaders' perspectives on hub leadership.

While this study relies strongly on the adaptive and high-impact leadership theories described in the literature review and conceptual framework, few, if any empirical studies of NICs have explicitly applied these frameworks in the context of an instructionally focused NIC. Specifically, this unique case study is one of the first—if not the first—empirical study of a NIC model with a hub operated exclusively by state education agency leadership. Therefore, an exploratory design is chosen to examine elements of these leadership theories and frameworks in the context of this unique case. Although this is an exploratory study, based on a specific, unique instance, I established some initial, tentative theoretical propositions, based on current literature, while also leaving room for elaboration and rival hypothesis, with the intended outcome being analytic generalizations, and building confidence in propositions to put forth for further study and practical application (Yin, 2017, p. 28).

Pragmatic Inquiry Approach

A pragmatic inquiry approach is applied when the researcher intends to examine shared beliefs or experiences, and expects practical consequences and useful applications from the findings (Patton, 2015). This approach is fitting for the current study, especially since NICs are complex, dynamic, emerging models for improvement, lacking strong empirical evidence to support theories about process, leadership and outcome components, to date. This pragmatic decision is based on the nature of the research questions, the importance of attending to context, and, as mentioned, the desire to obtain detailed, practical, actionable information from concrete, real-world issues (Patton, 2015). Under a pragmatic, realist approach, a researcher is not bound to one philosophical approach and may apply analytic methods and techniques as needed (Miles et al., 2014). I adopt this pragmatic stance throughout the study and apply an iterative research design process, in which methods decisions are based on situations and opportunities that emerge rather than being bound to a fixed paradigm (Patton, 2015). Using this dynamic approach, I apply both inductive and deductive analytic techniques (Patton, 2015), occurring concurrent with data collection (e.g., Miles et al., 2014; Brinkman & Kvale, 2018), beginning with a-priori codes established from my synthesis of theories in the present literature, and leaving abundant room for emergent ideas and rival theories to evolve (Yin, 2018). Additionally, taking an open inquiry approach, the research questions served as a foundation with the in-depth inquiry process being flexible to emergent ideas that arise during the course of the study (Patton, 2015; Rubin & Rubin, 2004), leaving open room for re-evaluation and re-formulation of the questions for subsequent study (e.g., Collins et al., 2006; Onwuegbuzie & Leech, 2006). Similarly, the conceptual

framework served as a guide, expected to evolve as the research proceeded (Ravitch & Riggan, 2017).

Case Selection, Unit of Analysis, and Boundaries

In this adaptive design, I began the study with tentative boundaries established, and left room for adaptations throughout data collection, based on discoveries from the data (Yin, 2018, p. 29). The population from which I drew my final sample was quite limited in size. Although NICs are growing in initiation, few developed NICs exist to date. The number of NICs with a hub operated by SEA leaders is even more scant. Therefore, I employed a purposive, instrumental-use, sampling scheme based on predetermined criteria, in order to select information rich cases that will provide insight into the research questions (Patton, 2015), and to ensure inclusion of leaders who can provide compelling insight on the specific phenomenon of study (e.g., Collins, 2010). The selection of the unique case of study was based on the following criteria:

- NICs with a hub comprised solely of representatives from a State Education Agency;
- NICs with a classroom instructional focus within PreK-12 education (i.e., an Instructionally Focused NIC); and
- NICs applying improvement science methodologies, including the development of a theory of improvement/driver diagram, and Plan-Do-Study-Act (PDSA) cycles of inquiry to test change ideas in practice.

I began the search by accessing my network of professional contacts, most of whom are leaders either working directly with practitioners in NIC partnerships or conducting NIC research. With the above criteria in mind, I considered potential cases

and appealed for referral requests from professional contacts, and their networks, who had knowledge or access to NIC organizations. Only a few cases met the above criteria, based on my investigation, and one case stood out, with a hub composed solely of SEA leaders. This case met my above criteria, according to preliminary scans of website descriptions, and in initial email follow ups from potential participants. Since case studies are especially valuable when examining a unique or unusual case (Yin, 2003, 2018), I selected this single, unique case, to which I established sufficient access, and which met all of the above criteria, confirmed by early correspondence with SEA leaders and their research partner referrals, to ensure that the case would best illuminate my topic of study and research questions (Yin, 2018, p. 25).

NIC hub leadership is the phenomenon to be explored within this unique case. Since previous research has cited the need for more representative perspectives, including member leaders, to gain a better understanding of and appreciation for hub leadership, I aimed to explore the concept from multiple perspectives, including hub and member leaders within the NICs. The unit of analysis for this unique case is the SEA leadership hub that manages a Networked Improvement Communities organization—a network of networked improvement communities. Although the case study includes hub leaders who operate individual NICs, and their participant member leaders from these NICs, a holistic, rather than embedded approach, was adopted for several reasons, based on Yin's (2018) recommendations and justifications. First, I am not examining the outcomes of each of the individual organizations, rather, the global nature of the organization (i.e., hub leadership), the relevant theory underlying the case study is of a holistic nature (i.e., theories related to adaptive and high-impact leadership (examined in the context of NIC

hub leaders), and the investigation is being applied to the level of the original program (Yin, 2018), which, in this case is the hub leadership of the network of NICs.

This case is bound by time and role to include NIC hub and member leaders that have participated in this network of NICs program at any given time since its inception. At the time of the study, the NICs were in operation for approximately 2.5 years. To ensure sufficient data from multiple leaders and member perspectives across the organizations, I employed a snowball sampling procedure, by which I began by securing initial interviews with state hub leaders, and requested references for additional hub leaders, and member leaders within the NICs to glean information from member leaders about the hub leadership. A follow up interview was scheduled when specific inquiries arose during initial data analysis. I further requested access to publicly available documents that would confirm, or expand upon, the details provided during interviews. The final composition of the sample is displayed in Table 1.

Table 1

Data Sources for Investigation

Research Questions:

1. How do SEA hub leaders use a NIC model to enable the conditions for building member will and capacity for inter-organizational learning and continuous improvement?
2. How do NIC hub leaders build collaborative cultures and relationships with and among members?
3. How do hub leaders strengthen or shift mental models to facilitate this work?
4. How are they adapting to leadership challenges inherent in the work?

Source	**Rationale**	**Method & Analysis**
Executive Leader Interview (1)	SEA executive level leadership for initiation details related to establishing the conditions for building member capacity for inter-organizational learning and continuous improvement, as well as perspective on the underlying mental models, structures, and behaviors of hub leaders	Semi-structured interviews Deductive and inductive coding and thematic analysis
NIC Hub Director Interviews (2: initial and 1 follow up)	Hub director level leadership perspective to understand underlying mental models, challenges and how leaders build collaborative cultures, knowledge, motivation, and relationships, with and among members	
NIC Hub Leadership Team Interviews (4)	Hub leaders perspectives to understand underlying mental models, challenges and how leaders build collaborative cultures, knowledge, motivation, and relationships, with and among members	
District Level--Member Leaders Interviews (2)	District level leadership to understand member leaders' perspectives on how hub leaders build collaborative cultures, knowledge, motivation, and relationships, with and among members	
Publicly Accessible NIC Documentation	Triangulation--corroboration, support, and elaboration for interviewee statements Documents reviewed: ● Participant initiation document/handbook; ● Implementation Guide ● Co-developed Theme and Strategy Briefs ● Planning document ● Application document ● Professional Development Website and Course Materials ● Roles and Responsibilities Document ● Program Website ● Readiness Checklist ● Program Overview Document ● Site Visitation Guide ● REL Partnership Overview Brief	Documents Review Deductive and inductive coding and thematic analysis

Data Collection and Analysis

The qualitative inquiry applied in this case study involves in-depth interviews, and examination of relevant case documentation. Multiple sources of evidence were collected and multiple methods of analyses were conducted to ensure triangulation, corroboration and/or elaboration among the data sources. A list of these data sources are displayed in Table 1. The examination of multiple sources of evidence was also intended to establish detailed descriptions and understandings of the case, as well as contribute to the development of operational definitions related to the leadership structures and behaviors within the NIC and a stronger theoretical proposition for possible future study and application.

To strengthen this case study, prior to data collection and analysis, I prepared a case study protocol and established theoretical propositions related to the construct under study, based on the current literature base in organizational learning, networked improvement community leadership and related leadership theories. This protocol helped guide my research design, data collection, and analysis processes (Yin, 2018). A copy of the case study protocol is included in Appendix A, along with interview protocols in Appendix B, and an illustration of the final coding scheme in Appendix D. Further, I established a case study database (Yin, 2018), which served to organize and annotate the trail of evidence for the purpose of replication. This database includes:

- original interview transcripts;
- data table indicating record of dates, links to each interview protocol, original transcripts, and memos for each individual interview;

- reflexivity notes to attend to biases and to note concerns or insights about the process and data collected;
- aggregated codes and themes; and
- final codebook.

In the following section, I explain how I applied analytic induction, using initial deductive techniques, along with inductive techniques, to analyze the multiple sources of qualitative data (Patton, 2015), while concurrently using a descriptive case study framework (Yin, 2018), based on my original, tentative conceptual framework and research questions, in search of developing and strengthening concepts and a well-established theoretical proposition for potential further study and application. During analysis, I applied a recursive spiral approach to analyze the data including strategies for organizing and preparing data; exploring and coding the data; developing themes and interpretations; and representing interpretations and conclusions (Creswell & Poth, 2018).

Organization and Preparation

Interviews

I conducted in-depth, semi-structured interviews to glean more detailed information about the constructs being explored. The interview protocols were designed to interrogate participants about their experiences related to NIC hub leadership to glean detailed descriptions about their pioneering efforts, and lived experiences, as they pertain to leadership mental models, structures and behaviors toward building capacity for members' inter-organizational learning and continuous improvement. Interviews were administered to both state education agency hub leaders and teacher member leaders, in order to gain unique perspectives of various participants to better illuminate the topic of

study (Yin, 2018, p. 16), Case study interviews often employ open-ended, guided conversation formats (Yin, 2003). Therefore, I adopted an interview guide approach, in which general topics were decided upon prior to the interview, with sequence and wording flexibly adapted based on the course of the interview, allowing interviews to remain conversational and situational (Patton, 2015). This approach served two purposes. First, it allowed for common, general lines of inquiry to proceed (p. 439) across interviews. The topic foundational questions were based on the emerging findings about network hub leadership, adaptive leadership (Heifetz et al., 2009) and high-impact leadership (Swensen et al., 2013), with attention to leadership dispositions, structures, and behaviors, as they relate to operation within a NIC hub. Second, it allowed for some flexibility in exploring NIC hub leadership from multiple perspectives—from SEA hub leaders themselves, and from LEA member leaders. Accordingly, while maintaining the common line of inquiry, semi-structured protocols varied slightly in wording to accommodate the interviewee leadership role. This approach also allowed me to exercise active listening, adaptiveness, and flexibility necessary to collect quality evidence in the case study, holding fast to the theoretical and policy issues underlying the research questions, while also being unbiased and open to contrary findings which often results in shifts in design along the way. (Yin, 2003). The interview protocols were administered with willing participants, recorded using Zoom technology, and transcribed using Otter.ai services. Verbal consent was obtained from all participants prior to each interview. Interviews lasted approximately 60 minutes with the duration of 1 follow-up interview running approximately 45 minutes. Copies of interview protocols are included in Appendix B.

As in many qualitative inquiry studies, analysis was integrated into the data collection process in order to review data for clarity and appropriateness of content, as related to research purpose and questions, and to make appropriate adjustments to the data collection process throughout the study (Rubin & Rubin, 2004; Yin, 2003). Prior to initial analysis, I transcribed and formatted all audio files, and any hand-written notes, to typed text files, to facilitate analysis. All data was maintained in a secure folder with subfolders for each case participant. These secure folders were stored on the researcher's computer, which is encrypted. Each file was labeled with the pseudonym of each participant. Names and locations remain confidential throughout this report. Prior to each interview, each participant provided verbal consent for their participation in the study and for interview recordings. A copy of the consent form is included in Appendix C.

Document Reviews

To corroborate and augment evidence from interview sources, I collected a variety of publicly available documents, pertinent to the case, through systematic search and requests, and referral from interviewees. These included initiation documents; application procedures; network routines, protocols, and procedures; website descriptions; handbooks; strategy and theme briefs; and documents describing roles and responsibilities. A complete list of documents reviewed is included in Table 1.

Exploration

During the analysis process, I attempted to understand the connections among ideas through ongoing coding, memoing, and summary notes, as recommended by Creswell and Poth (2018). To initiate data analysis, I completed a thorough read of all interview transcripts to get an overall sense of the data and to note emerging ideas. This

action helped me achieve an overall understanding of the data before focusing on the coding processes. I also noted comments, insights, and questions in the margins to indicate emerging ideas that seemed salient.

Memoing and Reflexivity Notes

Following each interview, I engaged in a memoing process, whereby I noted salient ideas, insights, potential follow up questions, and summaries of emergent ideas or rival theories; this process served as a validation strategy to assess the quality of my collection and analyses so far, to guide improvement in further analyses, and to revise and develop codes (Creswell & Poth, 2018; Miles et al., 2014). In addition to these memos, I also maintained reflexivity notes, in an attempt to examine how my own research identity and procedures may have influenced my participants and the data they provide (Glesne, 2011), and to document personal reflections and questions I wish to explore during further analysis. In these reflexivity notes I documented my interpretations, summaries, biases, and general feelings about how the process was proceeding, and noted any potential follow-up questions (for interview or document collection) that emerged from the readings.

Initial Coding

As recommended by Creswell and Poth (2018), I applied a lean coding technique, beginning with a short list of codes. A-priori codes were based on my research questions and the underlying leadership elements in the tentative theoretical propositions in my conceptual framework and reflected in the case study protocol questions. These relate to adaptive and high-impact leadership dispositions, structures, and behavioral components that emerged in the literature review. These comprised my initial codebook. This lean

coding procedure allowed for expansion of categories during multiple reviews of the data, since NIC leadership is under-explored and emerging codes and themes were expected. Based on my research questions, I attempted to identify code segments that I expected to find, in addition to surprises and conceptually interesting information that may benefit the audience (p. 193). In addition to adopting code names directly from the literature on which my conceptual framework is based, I considered in-vivo codes from my data, and at times revised the a-priori code names to expand upon previous research, and to better suit the case under study.

For both document and interview data, I coded by word, phrase, and extended text data units, working both deductively with my a-prior codes and conceptual framework, and inductively to remain open to the ongoing development of the conceptual framework, and potential rival theories (Yin, 2018), as the research proceeded. I added codes and categories as needed, based on insights from unexpected or interesting information that I had not previously considered, or that did not fit into existing categories. I expanded these initial codes as I proceeded to analyze the data, and as I referenced the literature to refine the final codes and descriptions. During this process, I attended to my research questions and conceptual framework to prevent overload, coding drift (Miles et al., 2014), and to prioritize salient elements. For documents review, I applied an identical coding scheme, leaving room for emerging codes, as well as contradictory or rival explanations. Once all interviews were completed, I returned to each of the participant cases for a final re-coding of all individual transcripts and documents, using the revised codebook. I assembled polished codes, descriptions and themes, to articulate the boundaries for each code (Creswell & Poth, 2018; Patton, 2015) to facilitate reliability

checks for potential replication studies. The final coding scheme is detailed in Appendix D.

Theme Development

Once initial coding was completed, I explored the collection of data further, informally searching for patterns, insights, and promising concepts (Yin, 2018) that could inform theme development. I performed these analyses in relation to my originally constructed theoretical propositions and research questions development. I grouped coded categories and sorted them into single files, including labels and summaries for each (Rubin & Rubin, 2004). This aggregated collections of similarly coded units of information across data sources emerged into broader categories, or themes. To preserve the qualitative orientation of this unique case study, I operate from a stance similar to Creswell and Poth (2014), in their emphasis that relying on counting frequencies of occurrence to prioritize the salience of the codes conveys that all codes should be provided equal emphasis, and, further, projects more of a quantitative rather than qualitative orientation. Accordingly, as I aggregated data, I considered the *weight* of passages associated with each code as an indicator of participants' interest but did not quantify numeric counts in the report (p. 192). I established a classification scheme to represent the broad conceptual elements represented in the data; this classification scheme was determined using two approaches, noted by Merriam (1998). First, by considering a-priori categories from the theoretical leadership frameworks on which the study is based. Second, by developing unique classification categories, based on emerging patterns recognized from the data. Along with the coded data, during this

process, I also used my memos and margin notes to winnow the information down to final overarching themes and sub-themes.

Concurrently, I established a tentative descriptive framework, based on a synthesis of my conceptual framework, related theoretical constructs, research questions, and the tentative report outline established in my case study protocol (Yin, 2018), which is included in Appendix A. This technique served to help me stay on track, adhering to my research questions, conceptual framework, and underlying constructs. However, I also attended to emerging rival theories, in conjunction with my original propositions, in order to preserve the validity of findings. Further, the initial descriptive framework was a guide, and many iterations were explored during analyses before arriving at the final report outline. Finally, I returned to the data to examine my established themes against them, checking for accuracy, omissions, and making necessary revisions.

Interpretation and Representation

I began making interpretations, as I compared the themes that were emerging from the data with my research questions, and the aligned case study protocol questions and descriptive framework. I also framed these themes in relation to my original theoretical propositions from adaptive and high-impact leadership theories, as well as to other relevant literature, as the data dictated. As I proceeded, I made connections between the themes and underlying leadership constructs. I drew tentative conclusions and iterative representations of the data, using an adapted logic model technique (Yin, 2018), which aligned with my original conceptual framework and theoretical propositions, and were guided by the descriptive framework established in the case study protocol. This logic model technique is fitting, since the work within a NIC is underpinned by a driver

diagram—a visual representation of the working theory of improvement, containing the inputs/drivers and change ideas that the network believes will help them achieve their shared aim/outcome (Bryk et al., 2015). Additionally, the logic model is the framework typically employed for evaluating programs; therefore, these types of representations may be practically useful for leaders engaging in needs assessments or formative and developmental evaluations, particularly, as findings may relate to the *leadership* inputs, resources, activities, and implementation factors theorized to lead to the expected outcomes. Therefore, fitting to the topic of this study, and the potential application of the results, an adaptation of the logic model seemed a reasonable format for representing the themes and provisional conclusions about hub leadership that were drawn from the findings. A final representation emerged and serves as the main visual representation of the provisional findings from this case study.

Trustworthiness

I employed several methods for ensuring the trustworthiness of my data collection procedures and analyses. First, I attempted to build trust with my interviewees. To build rapport, I made initial contacts by email or telephone, inquiring about their work and telling them briefly about mine. After making the request for their participation, I communicated about interview times that would best fit their schedules. Prior to the interview, I informed each participant about the purpose of the study, the value of their participation, and responded to any questions they had about the study. Since I have participatory experience within a NIC, I was able to build rapport with my participants by discussing the commonalities around our work, prior to—and during—interviews. This disclosure also served to clarify my potential biases up front (Creswell & Poth, 2014).

Additionally, in an attempt to address potential perceived power imbalances, I aimed for reciprocity in our interactions in several ways (Glesne, 2011). I explained how their valued responses could contribute to further research and assist others who may be initiating or leading a NIC. During the interview, I maintained my role as an active listener, meticulously ensuring that I allow participants to think, reflect, and elaborate, probing for detailed information so as to understand their perspective. Following the interview, I offered my future support to them, should they need it in their work, since *"rapport comes when the interviewee gets something out of the interview* (Glesne, 2011, p. 144). These considerations created a reciprocal learning experience beneficial to both parties. Finally, to further ensure dependability of the results, I transparently disclosed my research identity and role in the research process; clearly explained the focus constructs in my coding scheme; and attempted to collect data across a range of respondents.

To ensure the validity of my findings, I employed several strategies, based on data source, methods, theory, and data type, while applying researcher, participant, and reader perspectives (Creswell, & Poth, 2018).

Researcher Lens

To triangulate my data, I collected and analyzed documents and interview data from multiple sources to converge findings and increase the construct validity of the study (Yin, 2018). I also attempted to corroborate evidence by using multiple methods of reviewing data (e.g., coding, memoing, reflexivity notes), and multiple theories from the literature, including those proposed in my original conceptual framework, as well as any emerging theories based on the data. This was in an attempt to explain why this evidence

has emerged and possibly connect it to alternative theories that may not have been considered in my original conceptual framework, or to uncover variability in the phenomenon that I may not have originally considered (Miles et al., 2014) and provides a more realistic illustration of the phenomenon of study (Creswell & Poth, 2018), especially considering this unique case of study. Additionally, I contacted an individual with strong knowledge of the phenomenon of study to assess the validity of the constructed interview protocol (Creswell & Plano-Clark, 2018). To address potential researcher bias, and provide an audit trail of researcher thought processes, I engaged in memoing and reflexive note taking to disclose my understanding and expose values and experiences I brought to the study (Creswell & Poth, 2018).

Participant Lens

To ensure accuracy of data, I employed member checking by requesting participants review the findings for accuracy (Yin, 2003). During this process, to ensure the credibility of the data, I asked for participants' feedback regarding the final report of data (Miles et al., 2014; Creswell & Poth, 2018). I requested their feedback on my descriptions, interpretations, and conclusions, while allowing for their input on confirmations, disconfirmations, clarifications, omissions, and needed additions or alterations to language (Creswell & Poth, 2018).

Reader/Reviewer Lens

In an attempt to ensure a quality, final product, I strived to generate thick, rich language, descriptions, quotations, and concrete examples relating to actions, behaviors, contexts, and activities pertinent to the participant accounts, within the case report, allowing readers to translate findings to other settings (Creswell & Poth, 2018; Miles et

al., 2014). Additionally, I solicited peer examination for interrogation of my methods and tentative conclusions (Creswell & Poth, 2018; Merriam, 1998; Patton, 2015). A trusted colleague who is also a fellow researcher familiar with NICs, agreed to code a random selection of my interview data for intercoder consistency, with my revised codebook. I made a few necessary adjustments to the final coding scheme based on these consultations. For example, dual codes appeared in a couple of instances, which were common to my own initial coding dilemma. After re-examining the data, and descriptions in the literature, it made sense to collapse these individual codes into a broader coding category. I also had this peer examinee review and comment on my emergent findings (Merriam, 1998) and final report. Finally, negative evidence and rival explanations were considered during analysis and surprising or unexpected results were explained in the final report (e.g., Creswell & Plano Clark, 2018; Miles et al., 2014).

Additional Case Design Validity and Reliability Considerations

Yin (2018) recommends several strategies for ensuring reliability and validity when using a case study approach. I employed these suggestions, including having a case study protocol to guide the research, collecting multiple sources of evidence, and maintaining a case study database. The case study protocol contains an overview of the research, data collection procedures, protocol questions, and a tentative outline of the report. Multiple sources of evidence included a series of interviews with multiple individuals, as well as a variety of documents used to triangulate the data. The case study database is a compilation of evidence including reflexivity notes; memos; coding protocols and definitions; and aggregated codes and themes. This database also served to increase the construct validity of the study by allowing for a chain of evidence to be

followed (Yin, 2018), from data source to report, and vice versa. In also served to ensure I was addressing possible rival explanations to ensure internal validity, using theories to guide the research design to ensure external validity, and using systematic procedures in my case study protocol during data collection and analysis (Yin, 2003, p. 34). Taken together, these steps serve to build the credibility of my study and could serve to assist others to engage in similar replication studies in the future.

CHAPTER 4: BACKGROUND AND CASE CONTEXT

Glossary of Terms

Networked Improvement Community: An execution, as opposed to sharing, network (Hinnant-Crawford, 2020), in which members use improvement science processes for problem-solving, to work collaboratively toward a common aim and accelerate improvement across multiple contexts.

Improvement Science: A methodological framework or paradigm that helps scholar practitioners define problems, understand the system that contributes to these problems, identify potential change ideas that may improve the system, test the efficacy of these change ideas (using Plan-Do-Study-Act learning cycles), and spread and scale the changes that demonstrate improvements (Hinnant-Crawford, 2020). Improvement science is underpinned by specific principles that guide the work of improvers (leaders and practitioner participants) within the NICs: 1. The work is problem-specific and user-centered, 2. We cannot improve at scale what we cannot measure 3. Focus on variation in performance 4. Use disciplined inquiry to drive improvement 5. See the system producing the current outcomes (Bryk et al., 2015).

Aim: Similar to a SMART (Specific, Measurable, Attainable, Reasonable, Time-bound) goal, an aim statement is a concise description of NIC members' desired outcomes, typically including information about What? For Whom? By When? And by How Much?

Driver Diagram/Theory of Improvement: a working theory of practice improvement, or, a causal pathway that depicts the NIC members' aim statement, primary and secondary drivers (influencers on the aim) and promising change ideas that members predict will generate positive change and improvement toward achieving the aim.

Change Ideas: Ideas [promising instructional practices] that NIC members hypothesize will generate change in the system.

Plan-Do-Study-Act (PDSA) Cycle: A signature improvement science methodology that combines inductive and deductive inquiry to perform rapid, iterative cycles of learning for the purpose of improving practice. The four distinct phases involve planning the change to be tested, doing the test, studying the results, and acting upon them.

Description of Case

The unique case explored in this study is bound by a State Education Agency (SEA) program that employs improvement science principles and processes, using a Networked Improvement Community (NIC) model. The model encompasses multiple NICs—a network of NICs—each focused on a particular subject matter area, including English Language Arts, Mathematics, and Science. At the time of this case study, this emergent model has been in operation for approximately 2.5 years and is located within the Office of Curriculum and Instruction at the SEA.

The Network of NICs: Purpose, Vision, and Objectives

The network of NICs model was established in partial service to a broader SEA initiative for serving the whole child. This larger initiative includes the development of detailed rubrics and indicators, across a variety of domains, from which educators and school systems can self-assess progress and make improvements to advance "student outcomes in a well-rounded, safe and healthy environment." To support this "ambitious vision" to improve teaching and learning, the SEA has devoted financial and human resources to establish a dedicated program team to operate NICs. This dedicated team is the NIC leadership hub, and the unit of analysis in this case study.

The manifestation of this vision is a network of NICs, with this SEA team serving as the coordinating leadership hub. Within this NIC program model, the NIC hub leadership team partners with interested districts/sites to engage in improvement science processes within the identified subject matter areas, to effect change and continuous improvement. At the heart of the NIC effort is ensuring that students have "access to a rigorous, well-rounded education in a safe and healthy environment." A conversation with a NIC hub leader, or an in-depth visit to their website, reveals the hub team's deep commitment to promoting social justice and equity within their educational systems. They draw from a wide variety of research to shape their shared vision of the NIC model. For example, they honor the power of empathy and related strategies, and practical measures that are directly relevant to educators and which provide frequent, rapid feedback about instruction. Additionally, they highlight a need to attend to the importance of context, implementation factors, and building systemic capacity to improve conditions in their educational systems. They also build their model from research in culturally responsive teaching, and rigorous, equitable instructional strategies that focus on dialogue, and diversity of identities and worldviews. Finally, as expected, they highlight how the vision for this NIC model is grounded in *improvement science methods and principles*, and the related model for improvement, as essential to a true NIC model.

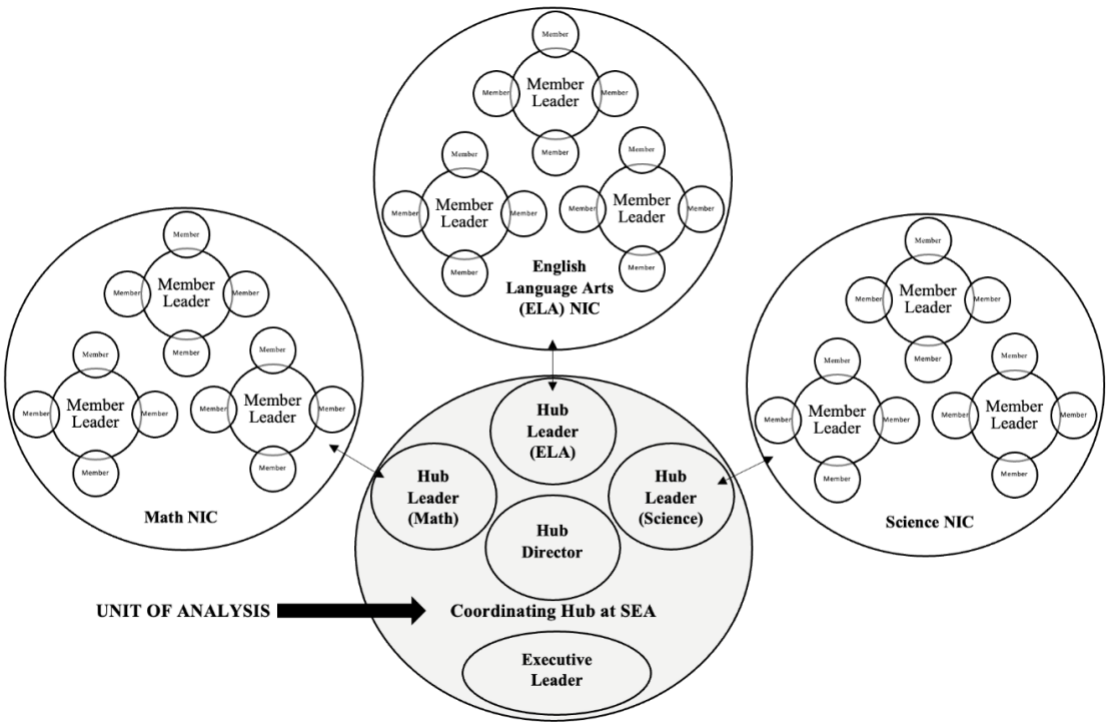
The objectives of this NIC model include: promoting equitable instructional practices; using practical measures for improvement to investigate instructional practices; engaging members in improvement cycles within networked communities to test and refine practices; and engaging in co-learning, ongoing collaboration, and professional learning opportunities.

Configuration, Membership, and Focus Areas

The following sections describe the configuration of the network of NICs including details about membership and areas of focus. Details are illustrated in Figure 2 to accompany this narrative. To preserve the confidentiality of participants, all titles are designated pseudonyms, serving solely for the purpose of describing the case in the current study.

Figure 2

Configuration and Membership of NICs



The Leadership Hub

All NICs have a coordinating hub. This coordinating hub is the leadership core and consists of individuals responsible for much of the leading, organization, and

operation of the network, toward helping members build capacity toward their collective aims. As LeMahieu et al. (2017) describe, hub leaders typically initiate the network and help charter members' work. Hub leaders are responsible for ensuring improvement coaching, network development, member participation and motivation, and providing feedback to participants (e.g., Proger et al., 2017). They are also responsible for organizing necessary professional learning and harnessing the knowledge development and learning so that ideas can be spread (Russell et al., 2017). Necessary leadership structures and responsibilities are recommended to facilitate this work, including building expertise in improvement science capabilities, ensuring data analytic infrastructures and capabilities, knowledge management, and coordinating convenings, communications, membership, participation, and technological support (Bryk et al., 2015). Most recently, emerging findings from research uncovered four specific domains that underlie the work of hub leaders (Peurach et al., n.d.):

- Developing and managing the hub organization, based on strategic vision and agendas;
- Developing and managing the network as an organization, which involves managing membership, leadership, strategic planning based on clear vision and agenda, and social aspects of the organization;
- Supporting and managing improvement activity, which includes supporting and engaging in the iterative improvement cycles, based on coherent vision, strategies, and operating agenda; and

- Managing environmental relationships, including the social, political, technical and financial aspects related to community members' values and priorities.

The SEA leadership hub in this case study coordinates, manages, and facilitates multiple NICs in several subject areas, including Mathematics, Science, and English Language Arts. This dedicated and dynamic group of instructional specialists partner with local school or district teams in these content focused NICs to offer guidance, professional development, coaching, and support. The hub includes *hub leaders* who are responsible for leading individual content area NICs, a *hub director* who oversees the leadership and management of the collective NICs, and their *executive leader*, the initiator of the original NICs vision who provides general oversight to the NIC program.

Membership

The membership context within the NICs ranges from small, rural K-8 districts to large urban and suburban districts. Participating members hail from K-12 classrooms and, on average, each NIC comprises approximately 25-30 members. Interested members (local school and/or district teams) join in yearly cohorts, although hub leaders hope and expect members to sustain their membership for multiple years. Each school or district team that joins a NIC is responsible for designating a team leader whom the SEA hub leaders invest in taking a sub-leadership role. In the NICs, these *member leaders* help manage and lead other participant members within their school or district team. These NIC member leaders serve as liaisons between their home school/district team and their NIC hub leader. Member leaders are an integral part of the NICs and hub leaders design additional professional learning experiences for these member leaders so that

they can lead collegial collaboration to promote team learning and improvement efforts within their local schools/districts. The goals of this design is to cultivate change agent leaders who can develop expertise in improvement science methods and the instructional strategies employed in the NICs, as well as advocate and expand the work within their local systems. These member leaders are expected to come to the table with extensive content knowledge and understanding of the state academic standards, and some demonstrated leadership abilities. By joining a NIC as a member leader, they commit to providing their team members professional learning in improvement science, change ideas, and in analyzing practical measures for improvement during regular improvement team meetings. Member leaders are included in this study to glean their perspective of the NICs' leadership hub, based on the research questions and leadership constructs under investigation.

Research Partners

The hub leaders benefit from their established partnership with their Regional Education Laboratories (REL). Research partners serve as mentors and coaches to ensure the hub leaders are holding fast to improvement science processes and principles. In part, the researchers' roles include providing hub leaders with in-depth coaching and consultation on establishing, managing, and sustaining NICs and on applying improvement science to educational settings. In partnering with the REL, the hub leadership team aims to build state capacity for implementing content-area NICs to test and scale innovative and effective school programs and practices that support a well-rounded education, safe and healthy schools, and the effective use of technology. Additionally, they aim to increase state and district understanding of improvement

science and the use of data *for improvement* in education settings. Hub leaders are also working with their REL partners to collect, analyze, publish, and disseminate their processes and results. In addition to this partnership, the hub solicits the expertise of other researchers and subject matter experts in the content areas of focus, to assist with the design and facilitation of professional development related to the instructional change ideas that members are testing in their classrooms.

Focus Areas

Members within each NIC operate around shared aims and test identical evidence based instructional strategies, or change ideas. For example, in the Science NIC, a common aim was to increase student scientific sensemaking by the end of the 2019-20 school year. An example of a common change idea the NIC members tested included focused productive classroom discussions using detailed discussion protocols and prompts. In the Mathematics NIC, a common aim was to increase student mathematical reasoning and justification ability each quarter of the 2019-20 school year, and the change ideas included selecting, implementing, and facilitating rich, authentic tasks including rigorous problem-solving using puzzle problems (e.g., Number Talks, and Which One Doesn't Belong). For the English Language Arts NIC, a common aim was to increase the percentage of students who demonstrate mastery of writing objectives. The common change ideas tested in this NIC included developing standards-based learning goals and utilization of success criteria and feedback strategies, which included aggressive monitoring and conferring.

Application Process and Expectations

Members are encouraged to join via an application process. As the hub leadership team considers participation in the NICs an enrichment opportunity, prospective members are expected to have a strong degree of content knowledge and understanding of the academic standards. Membership is considered on a first-come first-serve basis. School or district teams apply for membership by self-selecting a team of three to six participant teachers, one of whom must serve as the team *member leader*. Members incur no cost to attend, nor are schools awarded grants to participate (although a limited number of professional development awards are available for select participants). Administrator support is considered critical for the spread and scale of the improvement processes and products that NIC participants use and produce. Therefore, principals are encouraged to join as team members. Whether they actively join as team members or not, principals are expected to protect time for participants to engage in the NICs, allow the SEA hub leadership team access to sites for coaching visits, and set aside sufficient funding for participant engagement, transportation, lodging, substitutes and stipends, as needed.

Members are expected to attend all pertinent network convenings. These convenings include an introductory boot camp for member leaders to begin building leadership skills in improvement science, a new team kick-off for new NIC members, a launch event, and subsequent, customized professional learning workshop convenings, some of which are for member leaders only, others for the entire network. Coaching session site visits are scheduled during the interim between NIC convenings. Additionally, members agree to conduct at least five local improvement team meetings,

and use common practical measures to collect and submit their ongoing process data, and student learning data, as they test the target instructional change ides in the classroom.

Network Processes

Professional Development and Coaching

Hub leaders understand that leading professional development for continuous improvement is complex. They are explicit about how the work within these NICs is differentiated from traditional professional development and improvement efforts. To offer professional development that creates real and lasting improvement, they focus on specific, salient features, so that it is sustained, intensive, collaborative, job-embedded, data-driven, and classroom-focused. To lead improvement efforts that lead to positive change, they aim for efforts that are problem-specific, user-centered, systemic, data-driven, and anchored in the disciplined inquiry of improvement science.

In addition to facilitating professional development workshops on the instructional change ideas during network convenings, hub leaders conduct on-site or virtual coaching visits with participating school improvement teams. During these visits, hub leaders coach teachers using strategies to effectively implement the instructional change ideas being tested in the classroom, as well as facilitate reflection protocols, and data analyses.

Plan-Do-Study-Act Cycles

As essential to any NIC, hub leaders employ improvement science principles and processes to help members test and refine evidence-based change ideas related to Math, Science, and English Language Arts content areas. Member teams from participating schools engage in 36-60 hours of professional learning to prepare them for implementing

"high-leverage instructional strategies." Member educators test these change ideas within their classrooms using iterative Plan-Do-Study-Act (PDSA) inquiry cycles, and changes are adapted, refined, and codified for spread and scale collectively within the NIC. The leadership hub coordinates, manages, and facilitates these efforts.

As described in interviews and the participant handbook, members engage in four, five-week improvement cycles over the course of a school year. During these blocks, members receive professional development on the high-leverage instructional strategies, and then test these change ideas using PDSA cycles for learning. During testing, they collect relevant data related to student learning and progress, and subsequently convene with the NIC to collectively share learning, study the data, and make necessary adaptations to the change idea. The PDSA cycles follow this paradigm:

Plan. The leadership hub team conducts research, analyzes data, works with advisory groups and subject matter experts to determine the focus and aims. They also work with practitioner stakeholders and subject matter experts to select specific evidence-based instructional strategies—change ideas. Hub leaders, in collaboration with research partners, plan and deliver job-embedded professional learning to participants, based on the selected instructional change ideas.

Do. During this phase, member school/district improvement teams test the instructional change ideas and collect data to determine how the implementation of these change ideas is impacting student learning and performance. Hub leaders plan and develop the practical measures, which they note that many new teacher members are not accustomed to collecting. These measures include student surveys every other week, to offer perceptions into students' attitudes and beliefs. They also use frequent, academic

achievement measures to examine and assess student work for evidence of student learning and growth. These data are collected using a user-friendly format but allow for hub leaders to create visually powerful displays of the aggregate data.

Study. During this phase, members engage in collaborative inquiry and data analysis directly related to the results they are seeing from the practical measures data. Hub leaders coach member teams in how to make sense of these data and act upon them.

Act. During this phase, members network and "surface the wisdom of the group" during collaborative inquiries at network convenings, Hub leaders guide members on next steps to take, based on the results of their data. The hub provides tools and develops resources to facilitate member engagement in these collaborative inquiry processes. They also use participant data and input to adjust professional learning or make necessary course corrections, as needed.

Products

In addition to the expectation that members will build adaptive capacity for organizational learning and improvement, using improvement science processes, members co-construct codified knowledge about the instructional change ideas and their implementation in classroom contexts. These products are intended to facilitate the spread and scale of the change ideas to multiple contexts, beyond the membership of the NICs. To this end, NIC members and hub leaders co-produce Strategy & Theme Briefs as culminating products. In addition to explaining the research underlying the instructional practices, these briefs help educators understand how they can be effectively implemented into practice, based on the on-site testing and collective learning in which the NIC members engage. Further, to assist member leaders in spreading and scaling their

efforts locally, hub leaders produce online professional development modules and facilitation guides to assist practitioners with the transfer of practices across classrooms and schools.

Participant Profiles

The following section describes more in-depth profiles of the specific sample of individuals who participated in this case study. Again, titles are designated pseudonyms for the purpose of this study.

Executive Leader

Deemed by one hub leader the innovative "ideas guy" who thinks big, this SEA leader was the impetus for the development of the current, yet constantly evolving, NIC model. He held the original, draft vision on which the program is based and initiated the development of the vision in its current state. He is currently serving in a deputy leadership position at the agency, but is designated *executive leader* for the current case, since he oversees the hub director and each of the subordinate hub leaders.

This leader's motivation for initiating the NICs was inspired from both his belief in improvement science and the NICs model, as well as to fill the void of the dissolving U.S. Department of Education's (2015a) Math and Science Partnership program (MSP) and related funding. In conversation with him, he alludes to the serendipity of events and opportunities. As a former Director of Mathematics Education at the state department, and a strong advocate for Research Practice Partnerships (RPPs), he was deeply involved in the MSP. Attributing the value of MSP projects to the collaborative partnerships between K-12 school systems, higher education, and the community, he was inspired to keep the partnership model going through instituting the NIC model. Another opportunity

that helped him along was the shift from the No Child Left Behind Act (2001) to the Every Student Succeeds Act (2015-16), which offered a window in which he could build this NIC model into the state plan for improvement and accountability.

His experience in working with schools, statewide, also provided him with deep insight into the various problems of practice with which educators were grappling. Further realizing that the biggest problem for teachers was lacking empowerment, he felt that what educators needed was "permission to solve problems" and the space and support to do so. From his past partnership work, he also discovered the value for shared solutions, shared measures, and the "collective progress to similar aims." Prior to the NIC development, however, he realized that the gaps in past work related to missing pieces that could be found in design-based implementation, the improvement science inquiry cycle, and the spread and scale features that improvement science offered. Hence, the extension of the efforts to sustain a partnership model became grounded in improvement science through the NIC model.

He describes his creative endeavor as a "crazy idea," alluding to the innovative nature of attempting to institute such a model in a bureaucratic state agency. He drafted the state's ESSA plan and convinced senior leadership to invest in the NICs, a model he insists, "empowers local solutions to real problems" by building members' leadership and expertise so that they are able to spread and scale "not just the solution, but the improvement aspect, locally and regionally." He describes the disparity of conditions in their state's landscape in that a small fraction of big districts hold about half of the student population, and the other smaller districts are typically isolated and lack the opportunity to engage in meaningful professional learning. He insists that the evolution

of the model he has helped to build is one that is intended to serve the "lonely and isolated teacher."

Hub Director

This SEA leader serves as the director of the NIC program. She is responsible for the leadership and management of each of the hub leaders across all NICs. The hub director in the current NIC model has worked at the SEA for approximately four years, initially serving as a School Support Specialist in the Office of School Support before moving on to serve as the NIC hub director for the past couple of years. Prior to joining the SEA, she worked as an instructional coach coordinator in public schools and established an instructional coaching program in the state's largest school district. She has also served as an elementary school classroom teacher, peer evaluator and instructional coach. She holds a Bachelor's Degree in Elementary Education and a Master's degree in Organizational Leadership, Instructional Design, and Organizational Training. She helped launch the initial NIC pilots, focusing in the areas of Science and Safe and Healthy Schools. As her team was launching the NIC model, she spent time visiting and learning from other NICs, taking the successes and challenges, and making decisions, based on "knowing the clientele"—that is, her understanding of the local context and landscape of potential participants. She also is adamant in committing to the NICs as learning organizations, operating with flexibility and partnership principles in mind. She describes her transition from the Office of School Support to her current role with the NICs as an intriguing, positive move, as it provided her with the exciting opportunity to build an innovation as well as employ her skills in coaching and organizational learning. For her, it meant moving from a position where she felt she was

taking more of a surface level "drive-by" approach to school improvement that focused on punitive measures (making it very difficult for schools to get of the stigmatizing school support list) to one in which she can make a real difference, not by focusing on stigmatizing labels, but, rather, by way of intensive professional learning, coaching, and deep supports for improvement.

Hub Leaders

Each hub leader is responsible for leading and managing the NIC focused on his or her subject matter area of expertise, and for synthesizing the collective learning of its members for codification and spread. For the current study, current and former hub leaders were interviewees, to capture as robust a description of hub leadership as possible. The hub director describes these leaders as some of the best professionals with whom she has worked, "incredibly passionate, motivated, thoughtful educators" who are able to provide high support and motivation to NIC teams. Hub leaders participating in this case study include a leader of the Science NIC, a current and former leader of the Math NIC, and an ELA hub leader.

The hub leader for the Science NIC has 26 years of experience as a science teacher, teaching both elementary and middle level science in public schools. She played a pivotal role in implementing a STEM program, overseeing science curriculum, as well as taking a leadership role in state conference presentations, developing instructional frameworks for science, and science assessment development. A self-proclaimed life-long learner, she reflects on her time with the NICs (both as current hub leader and former member leader) as valuable in more ways than one. She expresses a deep passion for this work, noting that this experience has caused her to change her mindset about

teaching practices, and her self-expectations, acknowledging that she has learned more from her current leadership role than in 26 years of teaching. She wishes that she could have engaged in a similar professional learning experience during her tenure as a classroom teacher, admitting that throughout her long history of teaching, she never prioritized studying practices and for the purpose of improvement.

The current hub leader for the Math NIC has taught elementary mathematics for 15 years, and previously served as a member participant within a state-led NIC. During her years in the classroom, she also participated in curriculum development and training, the development of math instructional frameworks, and assessment item reviews. In addition to being a National Board Certified Teacher, presenting at state math and science conferences, she has also been honored with the Presidential Award for Excellence in Math and Science Teaching. In her experience as a hub leader, she has learned that building strong, trusting relationships with teachers is imperative for this work to succeed. She takes great pride in her stewardship to teacher colleagues in providing quality professional learning, coaching, and customized support in the NICs. Further, while she projects her own excitement for the work—in part based on her own experience as a member—she insists, that, regardless of the level of excitement she projects, teacher "buy-in comes from doing," that is, testing the change ideas in their classrooms and examining the timely classroom-generated evidence that motivates them to continue.

The former hub leaders for the Math and ELA NICs also participated in this case study. Both of these leaders are younger, with more novice experience in the field of teaching and education, but with leadership experience from Teach for America. One is a former classroom teacher and instructional coach at KIPP schools, who cites his work

with the NICs as a valuable learning experience in which he was able to develop deep skills in improvement science and coaching. He holds a strong belief in the power of collaboration, networked improvement, as well as formative assessment and feedback practices, which are highly congruent with the inquiry cycles and methods in the improvement science approach. Believing that educators can learn more together than alone, he believes that bringing educators from different contexts together creates the "opportunity to scale ideas in a way that we haven't really accomplished…in the past." Incidentally, this hub leader is currently moving into a new position with the hub, serving as a data analytics specialist, as this is an area in which the hub needs to expand their expertise and leadership.

The other former hub leader's experience lies in early childhood education, and she previously served as an instructional coach for early career teachers. In her role as a hub leader she describes being highly committed to doing her homework and research to ensure she had the skills she needed in evidence-based practices that could span the range of K-12 educators with whom she worked in the Math NIC. She also thinks that her past experience in coaching and delivering professional learning to educators was a great asset to helping her carry out her hub leadership responsibilities. She expresses excitement in talking about the NIC efforts, claims that it was one of the best experiences in which she has ever been involved, and describes the work of her fellow hub leaders, and the NIC model, as a "radical shift" from their typical state department efforts, noticing how they are "dismantling the views of what the state department is and does."

Both of these leaders voiced their concern in the importance of building their competence and credibility with the NIC team members whom they lead—especially

being the more novice leaders on the hub team. In conversation, they describe their determination to build this credibility through extensive research and professional development, and in their demonstration of knowledge and understanding in working with their NIC team members.

The hub team highly values relationship building and coaching. Therefore, when considering recruitment and retention of hub team leaders, in addition to looking for individuals with strong content and pedagogical knowledge and skills within a particular content area, the team strives to onboard people with skills in improvement methodologies, delivering professional learning, and interpersonal skills for coaching and building trusting relationships with partnering practitioners in the field.

Member Leaders

As previously mentioned, each school or district team that joins a NIC is responsible for designating a team leader to serve as liaison between their home school/district team and their NIC hub leader. Two member leaders participated in this case study, offering their perspectives on hub leadership. The perspective of these hub leaders was important to obtain a broader view and understanding of hub leadership.

One member leader is a high-school teacher with over 17 years of experience teaching Advanced Placement Literature, Spanish, and English as a Second Language. At the time of this case study, she was serving as a lead teacher in a virtual middle school and had participated as a member leader in the English Language Arts NIC for two years. She admits to being initially hesitant about joining the NIC, as she has seen many ideas come and go in education and assumed this was another idea that would fizzle out in a year or two. In describing her reasons for continuing with the NIC she credits the sense of

community it provides, especially for the isolated teacher, and the relationships she has built with other member leaders, referring to them as family. She also appreciates the extensive planning, preparation, and support provided by the hub leadership, explaining that the support and training she has been provided make her feel like an asset to her local team, prepared and able to lead them effectively in the NIC efforts.

The other member leader participant is a veteran high-school teacher of Mathematics, also in his second year of service as a member leader, he participates within the Mathematics NIC. At the time of this case study, he was teaching pre-calculus and calculus to seniors with additional responsibilities in mentoring and coaching teacher colleagues. In reflecting upon his experience with the NICs he describes his former reticence to share or "give away" the best pedagogical practices he had learned over the course of his career, for fear of "losing them." He shares that he continues his membership in the NIC because it has helped him "open the door to sharing ideas" with colleagues, understanding that sharing ideas allows him to grow professionally and find even better ones, and, as the member leader for his district, he feels that is exactly what he should be doing. He admits to now being more open in sharing promising practices and asking colleagues to test them out in their own classrooms, and co-reflecting on how ideas work with their students. Both member leaders highlighted the importance of their coaching relationships with their fellow team members, including observing, reflecting, and co-planning in relation to the instructional change ideas being tested in their classroom, as their collective responsibilities in the NIC.

CHAPTER 5: RESULTS

Findings

This unique case study of SEA hub leadership was guided by the following research questions:

1. How do SEA hub leaders use a NIC model to enable the conditions for building member capacity for inter-organizational learning and continuous improvement?
2. How do NIC hub leaders build collaborative cultures and relationships with and among members?
3. How do hub leaders strengthen or shift mental models to facilitate this work?
4. How are they adapting to leadership challenges inherent in the work?

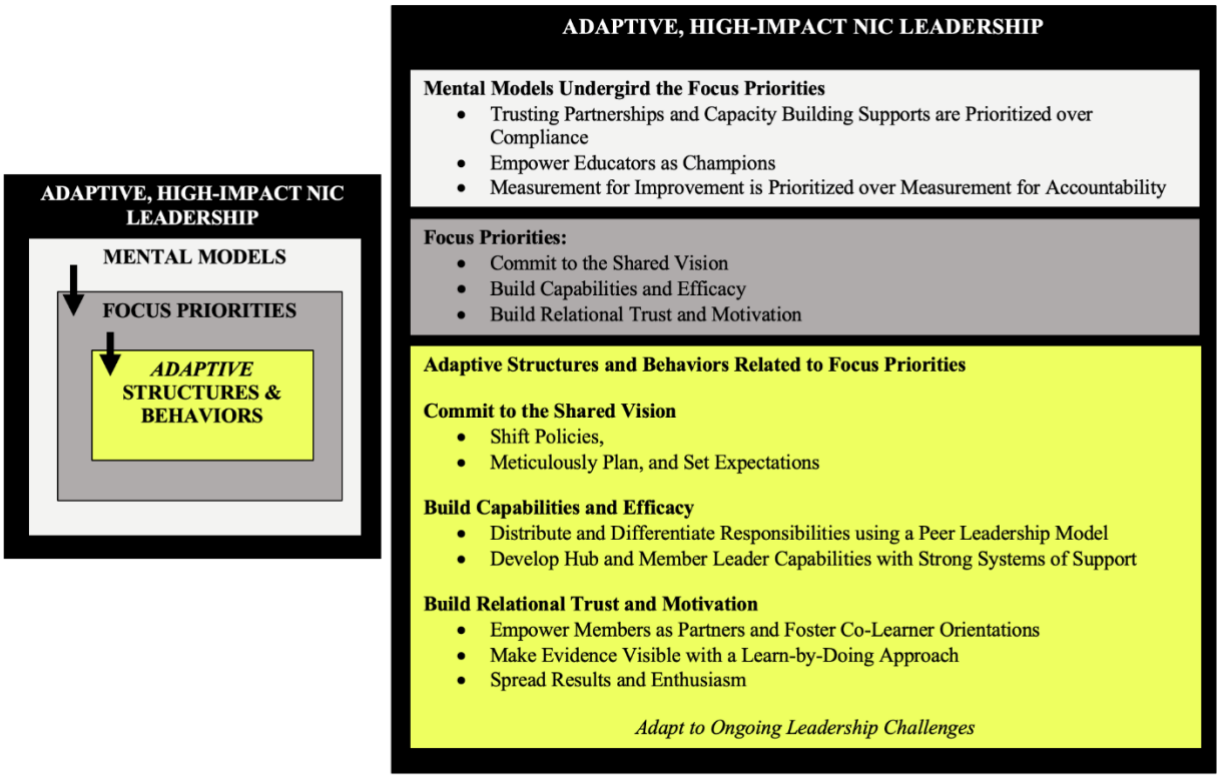
The findings related to these questions are presented in context of the theoretical propositions and leadership theories set forth in the original conceptual framework, illustrated in the literature review section, including adaptive leadership theory (Heifetz et al., 2009), and the foundational components of the high-impact leadership model (Swensen et al., 2013), which include leadership *mental models*, *focus areas,* and demonstrated *behaviors*.

The hub leaders in this case study work toward specified, expected outcomes related to promoting equitable instructional practices; using practical measures for improvement to investigate instructional practices; engaging members in improvement cycles within networked communities to test and refine practices; and engaging in co-learning, ongoing collaboration, and professional learning opportunities. In service of these objectives, leaders operate under specific *mental models* which undergird their shared vision. They act on these mental models by adhering to specific *focus priorities.*

Within these focus areas, they build and adapt specific *structures and behaviors*. The following sections detail the aggregated findings from interview and document data in this case investigation, as they relate to these mental models, focus priorities, and related leadership structures and behaviors, first, in overview, in the overarching leadership framework, presented in Figure 3, then, in the subsequent narrative, and accompanying tables, highlighting salient evidence and participant quotes.

Figure 3

SEA Hub Leadership Mental Models, Focus Priorities, and Related Structures and Behaviors



Mental Models Undergird the Vision and Focus Priorities

In an effort to work toward the expected outcomes of their NIC model, hub leaders in this unique case operate from the following, underlying mental models.

Trusting Partnerships and Capacity Building Supports are Prioritized over Compliance

In conversation with the hub director, she makes several references to their dynamic as a "learning organization." The executive leader emphasizes that in the development of the vision, he prioritized a partnership approach, wanting to create a model that would empower the wisdom of teachers and "local solutions to real problems," a model to "build better partnerships with practitioners, experts, and researchers. In describing a previous role in school support, the hub director compares her experience to a "drive-by" approach, in which she had approximately 90 schools on her caseload, and felt that she could not be effective, insisting that such an approach does not work and does not entail quality professional learning. She explains that the state's vision for the NIC model is based on intentional decisions based on the value they place in quality professional development. The model, in part, is based on a more robust vision for professional development, similar to the one defined in the 2015-16 Every Student Succeeds Act (ESSA)—one that is "job-embedded, sustained, and data-driven." She further purports that the NIC structure, along with applying improvement science and related principles, is their way of honoring this definition and providing this method of support to teachers, insisting they have learned, "the more support the better." The executive leader likens their work to multi-tiered systems of support. This support allows hub leaders to focus their responsibilities exclusively on the NIC work, providing

intensive, job-embedded professional learning that entails both formal professional development during network meetings, as well as ongoing coaching and support to NIC members during applied practice.

The hub director imports that such work entails building strong relationships, which brings a level of authenticity to their work, noting how crucial it is for hub leaders to express to members that they are not interested in spying or evaluating, rather, their intention is to truly help them grow as professionals and to help them grow their kids. She credits their State Superintendent in helping to create a culture and climate among state and local professionals, stating, “it's an expectation...we are here to support, we're here to help.” The executive leader further attributes a shift in dynamics to the Superintendent, claiming that in her leadership, she has emphasized the importance of relationships and partnerships. A hub leader explains the shift in this way, “we really try to build relationships so that our members see us as partners in the work…” She further differentiates this partnership approach from the more compliance-based approach applied in previous years by SEA leaders.

Empower Educators as Champions

Leaders express the importance of honoring teachers as professionals and believing in their capacity—both their capacity in instructional practices and their improvement capacity. They see educators as the best advocates for students and refer to them as champions in this work. The NICs model they have established is part of a larger, coherent initiative intended to build educators’ efficacy and capacity for excellence. The model they are honing is intended to empower teachers and extend their capabilities in content, instruction, *and* improvement science. The executive leader asserts that they do

not believe that teachers "need to be fixed," therefore, they aim to make this model one that is not framed as an intervention, but rather as enrichment experience in which members have "permission to solve problems." He describes the work as follows, "we are not interested in what's going wrong in our schools. It's not to say that we don't care...those are the problems we want to solve together….the model is believing in the potential of the schools and the wisdom of the teachers." To that end, hub leaders employ routines that build instructional capabilities, as well as continuous improvement capabilities—that is, applying improvement science methods to solve ongoing problems of practice, beyond the lifecycle of the NICs.

Measurement for Improvement is Prioritized over Measurement for Accountability

NIC hub leaders are prioritizing the building of an evidence-based culture that focuses on just-in-time, frequently collected practical measures from the classroom over focusing solely on state accountability measures. Hub leaders are helping participants change their perspectives regarding what counts as data, as the hub director recalls that, early on, many NIC members were limiting their definition of data to those received from standardized tests. The hub director emphasizes the meaningfulness of practical, classroom-based data as compared to the longer-term state assessment data, and claims these are more important for *improvement,* expressing, "…getting off the school support list was almost impossible," since it is reliant on state test results. In reference to the practical measurement system they apply in the NICs, she insists, "it allows me to see that...we're actually putting in the work and...making a difference….kids are growing as mathematicians, as scientists." Their executive leader expands on the dilemma of relying on measurement for accountability rather than measurement for improvement: "The story

that we tell our agency tended to be somewhat superficial. We served 5000 teachers with all this money, what a great thing…but we never wonder, did it change something meaningful in their classrooms…" He goes on to explain that, in the past, they were not tracking the efficacy of the professional development provided, in terms of how it helped or changed teacher and student experiences. Further, he stresses that attempts to extrapolate data from state assessments "doesn't ever address what happens in the...classroom."

Focus Priorities & Related Adaptive Structures and Behaviors

In service of their objectives using the NIC model, hub leaders commit to this shared vision, focusing on building will and capacity for improvement science and content pedagogy, by prioritizing the development of trusting, collaborative relationships with members, empowering members as partners and leaders, and by establishing a system of support for their ongoing learning and development. Congruent with the hub leaders' mental models and aligned vision, they operate from the following *focus priorities* in their interactions with members:

- Commit to the Shared Vision
- Build Capabilities and Efficacy
- Build Relational Trust and Motivation

Within these focus areas, hub leaders execute specific *structures and behaviors* to manifest their shared mental models and vision. These will be detailed, as they relate to the above focus priority themes, in the remaining sections of this chapter.

Focus Priority 1: Commit to Shared Vision

Hub leaders demonstrate specific behaviors directed at committing to their shared vision of the NICs model. These are summarized in Table 2 and subsequent narrative, and include making essential policy shifts in the ways in which they operate, strategic planning and execution, and setting the expectations of leaders and participant members.

Table 2

Leadership Structures and Behaviors Related to Committing to Shared Vision

Focus Priority 1: Commit to Shared Vision	
Related Structures and Behaviors	**Salient Quotes**
Shift Policies	● "we're kind of doing what we feel we set out to do in our ESSA plan…" (hub director) ● "ambitious vision," based on the "landscape of participants." (executive director)
Meticulously Plan, and Set Expectations	● "Everything we do is very intentional and deliberate" (hub leader) ● "We spelled out everything for the administrator so they knew exactly what they were getting into." (hub director) ● "…we strive to offer a different kind of support that pushes schools from good to great" (hub director).

Shift Policies

The mental models form the foundation of the hub's vision for the NICs model in their state, which is about empowering teachers by building and spreading trust, motivation, capacity, and efficacy. SEA hub leaders work within a NIC model, conceived by the executive leader. He deems it an "ambitious vision," based on the "landscape of participants," which was conceived by the executive leader, based, in part, on his experience with the now defunct Math and Science Partnership (MSP) Program (U.S. Department of Education). During interviews, he conveys how he had witnessed the

value in the partnership approach, and in fear of losing these valuable experiences, due to funding cuts, he realized that if they did not make an intentional state effort, they would be in jeopardy of losing access to continue building such partnerships and opportunities. He describes their current program model as one which allows members to work collaboratively toward solving problems and measure progress together. He explains how he took advantage of the opportunity to build in the NIC model when revising the state's accountability plan for delivering on their responsibilities as set forth by the ESSA (2015-16) and convinced senior leadership. He adds that this plan did not require senior leadership to change their practices, rather, to just provide more flexibility. Further, he expresses the hub's effort at cohering this NIC vision with other state initiatives, as part of a larger system to provide students with well-rounded educational experiences. The hub director adds, he is a "pretty persuasive guy" who dreamed up the idea of having a network hub at the state agency. She confirms how he made a case for applying federal Title funds to support teachers in doing improvement work and then proposed it to senior leadership, who allowed the team to engage in a pilot so they could "learn on the job, make mistakes, and develop the proof of concept." She adds that he covered all of his bases in presenting to senior leadership and they were fortunate to have leadership see value in the work to continue beyond the pilot.

The team also made the intentional decision to prioritize ongoing, job-embedded professional learning, and coaching cycles, seeing another opportunity in ESSA (2015-16) to build a more robust system of professional development using the NIC model. As the hub director explains, their provision of professional development in the NICs is consistent with the definition of professional development in ESSA, based on job

embedded, sustained, data driven classrooms. She claims that the support they provide, using improvement science processes in the NIC structure "is a really good way to honor that and to live that out. So we're kind of doing what we feel we set out to do in our ESSA plan anyway." In carrying out the shared vision, the hub commits to devoting financial and human resources to their efforts, so to maintain a *dedicated* hub leadership team within the agency, who are devoted exclusively to the NICs.

Meticulously Plan and Set Expectations

Hub leaders are also detailed in their planning and hold high expectations of members. The hub director explains that "everything we do is very intentional and deliberate" and they execute the vision by way of a detailed plan. This plan comprises overarching goals, short-term, mid-term, and long-term objectives. One member leader notes that everything participants are asked to do is based on intentional and deliberate decisions made by the hub leaders, and from the first meeting, hub leaders have everything mapped out, a roadmap, detailing how they arrived at the priority change ideas that members will be testing in their classrooms. She describes the hub plan as a roadmap that is so meticulously thought out and organized step-by-step, comparing it to a drive-through experience at Chick-fil-A, which she refers to as an amazing experience. While meticulously planning, hub leaders also maintain adaptability, as the hub director shares, "we never tried to box ourselves into a narrow view of improvement science; we never wanted to feel like we had boxes to check…and if we deviated from that we aren't a true network." She professes that they are trying to do what is best for NIC participants and their students. In order for them to do that well, she admits, hub leaders need to be

flexible enough to make adaptations and course corrections to be responsive to members' needs.

Hub leaders also have expectations and non-negotiables that members must meet in order to ensure that the NICs are living up to the intended purpose, based on the SEA vision. The director notes that they bill themselves as a "learning organization," which allows them to exercise flexibility. However, they also have expectations related to NIC membership, laid out in the application for membership. These include providing evidence of at least five local improvement team meetings per year, as well as the submission of meeting agendas, notes, and their process and outcome data which measures progress toward intended goals of the NIC. As educational professionals from various schools and districts consider participation, they are also provided a readiness checklist from the hub leaders. This checklist sets forth additional expectations as a condition of membership, which include members' willingness to work collaboratively toward a collective goal, testing high-leverage instructional strategies in practice, and openly reflecting on their professional growth. As the hub director explains, "we spelled out everything for the administrator so they knew exactly what they were getting into." She also emphasizes that they are constantly striving to balance their expectations of members, while being responsive to their needs, open to feedback and learning from mistakes and making improvements. She notes, "we're not a school support initiative...doing...intensive remedial work with teachers…we strive to offer a different kind of support that pushes schools from good to great." Overall, these behaviors reflect both meticulous attention to the strategic plan for the vision, while being adaptive to meet the landscape of the participants.

Focus Priority 2: Build Capabilities and Efficacy

Hub leaders use several strategies for building capability and efficacy of NIC members. Although they operate from a very centralized hub for the purpose of facilitating and consolidating organizational learning, they also share leadership responsibilities with designated member leaders within the NIC. Using a peer leadership model, they distribute and differentiate responsibilities and clarify member roles. Further, in addition to building member capabilities and efficacy through intensive professional learning and coaching support, they also build their own hub capabilities. These structures and behaviors are summarized in Table 3 and the subsequent narrative.

Table 3

Structures and Behaviors Related to Building Capabilities and Efficacy

Focus Priority 2: Build Capabilities and Efficacy	
Related Structures and Behaviors	**Salient Quotes**
Distribute and Differentiate Responsibilities using a Peer Leadership Model	● We have "layers of leadership" (hub director) ● "It's like a peer leadership model" (hub leader)
Develop Hub and Member Leader Capabilities with Strong Systems of Support	● "being able to show credibility and...competence in what you are leading was really, really crucial." (hub leader) ● The goal of this extensive training is to "groom" the member leaders to...take on much of the coaching...we are growing leaders... to spread their wings" (hub director) ● "I think that the work would have been less valuable to teachers if they weren't getting feedback on their practice...very deliberate leadership coaching…" (hub leader)

Distribute and Differentiate Leadership Using a Peer Leadership Model

The SEA hub is "highly centralized," as described by the hub director, as they drive the majority of the up-front chartering work of the NICs by engaging stakeholders and practitioner advisory groups to better understand the current system. Members from districts or schools are provided the flexibility to tweak their aims in terms of the degree of improvement they hope to achieve. However, NIC members are working toward common aims and problems of practice. The hub director claims that this level of centralization on the hub's part allows members to better "consolidate learning."

Of notable concern is the struggle experienced by hub leaders regarding the degree of fidelity to which they are implementing the intended NIC model. One hub leader voices his personal struggle with the decision regarding how much the state is "holding, versus how much is the district holding" in terms of engaging in the improvement science work. He reiterates that the hub leaders are making up-front decisions related to the aim, the theory of improvement/driver diagram, practical measures, and the selection and prioritization of the change ideas. He wonders if it may be more helpful to have the districts directly engaged in making those decisions as well, noting the dilemma about which to prioritize, "do you prioritize it being done well? Or do you prioritize it being done in a way that matches what each district needs?" He claims there are no easy answers to these questions. The hub director indicates that, from their early research and visitations with NICs, they were cautioned to be mindful and consider the potential effects of such decisions on members' motivation and engagement. She adds that they are paying close attention to the impact of these decisions and may need to make adaptations.

Despite this high centralization of the hub, hub leaders attempt to build their own capacity, and that of members through a distributed leadership structure in which leadership is shared among hub leaders, and with designated member leaders within the NICs. Described by the hub director as “layers of leadership” and another hub leader as a “peer leadership model.” Their executive leader uses the term “super hub” to refer to the SEA hub, since they operate multiple NICs. The SEA hub includes the hub director and hub leaders each with an area of content expertise, including Mathematics, English Language Arts, and Science. A representative of each participating school or district team within a NIC is selected (by a school or district administrator) to serve as a member leader for their team. Table 4 delineates the major roles and responsibilities within this structure.

Table 4

Major Responsibilities in the Distributed and Differentiated Peer Leadership Model

Leadership Role	Major Responsibilities & Expertise
Executive Leader	The current executive leader of the NIC, developed the vision, initiated the model, and now oversees the NICs program and the hub leaders within.
Hub Director	The hub director is responsible for managing the overall work and progress of each of the operating NICs. She describes herself and the executive leader as a "beautiful pair" with him as the "big picture… vision caster," while she executes the detailed strategic plan and objectives, directing the day-to-day work, managing the other hub members and the NIC operations, and overseeing progress.
Hub Leaders	Hub leaders are content specialists in their respective area of expertise, and are responsible for leading the individual NICS, focused either on Mathematics, English Language Arts, or Science. Hub leaders are expected to have strong knowledge about their content area and the related evidence-based practices and develop expertise in improvement science, in order to facilitate improvement processes among members. According to the hub director, they engage in interfacing with the member leaders and members of each of the NICs. In this role, they plan the network events, design the initial change ideas, and design and deliver the professional development related to these evidence-based change ideas that members will test in their classrooms. According to interviews with hub leaders, and roles and responsibilities overview documents, hub leaders provide professional development in improvement science, change ideas, data collection and using practical measures. They also provide onsite coaching and support, using a partnership approach, and help design measurement tools and strategies that members use to collect data on student progress and the fidelity of the change implementation. They provide guidance to member leaders about facilitating local improvement team meetings. As the hub director notes, they don't dictate but, rather, give guidance. Finally, they co-develop and publish reports, briefs, videos and toolkits to celebrate and share the collective work of members.
Member Leaders	Each district or school team that joins a NIC has a designated team leader, a teacher leader, expressed by the executive leader as a specific feature of their NIC model that differentiates them from others. He explains that they are responsible for "gaining a level of expertise so that they would be able to spread and scale the improvement science…" One hub leader describes member leaders as liaisons between their school or district team and the hub leaders. Based on interview data and roles and responsibilities overview documentation, member leaders are responsible for coordinating, scheduling and leading local improvement team meetings. Member leaders must also ensure that teacher members are testing change ideas using improvement science (PDSA cycles) as expected, and collecting and inputting data along the way. At network meetings, team leaders facilitate within-and-across district level conversations about data. Additionally, member leaders' roles extend to providing instructional coaching support to their team of teachers as they test and refine promising instructional practices to suit their unique contexts. In the member leaders overview document, hub leaders describe one of their major responsibilities is to foster the development of member leaders so that they can serve as change agents who can "harness the power of collective efficacy and improvement science."

Develop Hub and Member Leader Capabilities with Strong Systems of Support

The SEA holds high expectations for their NIC hub leaders. They receive more intense training than any other members of the NICs, so that they can lead and support members effectively. Notably, the SEA devotes human and financial resources to allow their hub team to devote sole responsibility exclusively to NIC hub leadership. One hub leader purports, "I have never been more focused on anything ever," and notes appreciation for not "being pulled in 1000 directions," and covering multiple projects. As the hub director indicates, "we ask a lot of our...hub leaders, they have to learn improvement science, they're content experts, subject matter experts," and she compares their initial training as a crash course in improvement science. The executive leader refers to hub leaders as "unicorns." The hub director notes that in addition to content expertise, they also prioritize skills in facilitation and conflict resolution, and coaching skills, which relate to inquiry, paraphrasing scales, partnership principles, coaching conversations, and techniques for observing classroom lessons. In aggregate, the hub leaders are building personal mastery in subject area content and pedagogy, improvement science principles and processes, and skills in coaching and leadership.

Several hub leaders insist on the importance of demonstrating credibility with NIC members, in both expertise of content and pedagogical knowledge for their subject area focus and in improvement methodology. Hub leaders highlight their high expectations for personal masteries among themselves as a unique feature of their NIC model, and building the hub capability is a key focus area, as previously detailed. In reference to the NIC members, the hub director explains "we've got veterans that are 20

years in the profession...so being able to earn your keep...is really important." To that end, the state hub prioritizes hiring hub leaders who have strong content and pedagogical background in a given subject area. One leader explains, "being able to show credibility and...competence in what you are leading was really, really crucial." This requires leaders to build extensive background knowledge and engage in ongoing research.

Since leadership responsibilities are distributed and differentiated, the degree to which NIC members develop skills and knowledge in improvement science is scaffolded across the NIC. As several hub leaders convey, they serve as the improvement science and subject matter experts in their content area, with member leaders sharing a smaller degree of expertise in each of these areas, so that they can coach their teacher team members. The hub director declares that one area in which they are going to be building or growing their skills is data management, visualization, and analytics. The hub leaders benefit from their partnership with their Regional Education Laboratories (REL). Research partners serve as mentors and coaches to ensure the hub leaders are holding fast to improvement science processes and principles. The REL partnership overview brief explains that, in part, the researchers' roles include providing hub leaders with in-depth coaching and consultation on establishing, managing, and sustaining NICs and on applying improvement science to educational settings. The hub leaders also provide each other peer support in developing their improvement, leadership, and coaching skills. They work in very close proximity, on a daily basis, which facilitates their collaboration and brainstorming. One leader claims, "we lean on each other very heavily," including observing each other's coaching, surveying staff to assess their own needs, providing ongoing feedback, and generally helping to improve their collective practices.

According to the NICs' program overview document, one of the overarching goals is to "build collective efficacy of teachers through ongoing professional learning and collaboration." A major role of the hub leaders is to provide the deep, job-embedded professional development related to the evidence-based change ideas that the NIC members test in their classrooms during PDSA cycles. To that end, they engage members in ongoing professional learning experiences during NIC meetings, about how change ideas look in practice, and how they might vary across grade levels, while maintaining the core underlying evidence-based practices. The hub director asserts that they are all working on the same change ideas, allowing them to have "apples to apples conversations…," which, she claims, facilitates network management; team collaboration and learning across grade levels; and the consolidation of learning. A hub leader insists that they are providing high-quality professional development that is "engaging...not the...sage on a stage model of teaching…it was breakout discussions and teachers sharing ideas." Another hub leader describes the team learning relationship between hub leaders and NIC members in this way, "I'm listening to them and they're listening to me and it's not me lecturing them. You know, we really are working together to sort of hone an idea...or a couple of ideas."

Hub leaders provide additional training to member leaders in improvement science and leadership capabilities. The hub director explains a vision for developing and empowering these member leaders so that, ideally, after a few years of "getting groomed" within the NICs, they would build enough confidence with their professional development that they could "go off and lead some of these efforts in their own schools and districts." Some member leaders confirm that hub leaders have helped them develop

the skills, knowledge, and confidence to lead professional development in their districts, some even starting their own "mini-NICs." To facilitate the spread, hub leaders have developed facilitated professional learning guides, as well as self-paced online learning modules to allow individual educators to learn about these practices at their own pace and convenience.

As NIC members are testing change ideas in their classrooms, hub leaders provide a differentiated layer of customized coaching support, using a partnership approach and principles. One member leader explains that this focused coaching is offered, over time, as a follow up to the more direct professional development and instruction on the change ideas. Of this partnership approach, one member leader describes the role of hub leader coaches not in a position to mandate or prescribe, but rather to "be an ear to the teacher and allow them to reflect on what they've done," and provide guidance. Their implementation guide and site visitation guide details the goals of the coaching model employed by hub leaders. These include learning observations of the change ideas being tested in the classroom; establishment of mutual goals and understandings between educators and hub coaches; provision of structured feedback on the change idea implementation; modeling and co-teaching of the change practice; collaborative reviews and analyses of student data, as they relate to the change idea; and ongoing reflection of the change ideas, based on student and teacher feedback.

The hub director explains that these feedback loops also help hub leaders identify trends and misconceptions, and provide members targeted, job-embedded support toward improving how they execute the change ideas. These intensive efforts in professional learning and coaching demonstrate the hub's commitment to their mental model related

to empowering educators and prioritizing capacity building supports rather than compliance practices. Several hub leaders emphasize the significance of their coaching routine. The hub director concurs, insisting the coaching cycle is one of the most impactful routines that the hub institutes, describing it as a great way to build relational trust between the state hub leaders and the local practitioners. Hub leaders demonstrate additional behaviors to build relational trust for fostering partnerships between hub leaders and members, and among members themselves. These are explored next.

Focus Priority 3: Build Relational Trust and Motivation

Hub leaders express that a crucial part of their job in leading the NICs is to build relationships with members and member leaders, helping them to grow professionally and personally. One hub leader emphasizes the importance of building trusting relationships quickly, especially through demonstrating credibility and competence. A fellow hub leader indicates that if she cannot build trusting relationships with teacher members, "why are they going to do anything we're asking them to do?" Another hub leader explains that much of the trust building comes through the coaching conversations, dialogue, and informal moments during professional development. The executive leader, who is also responsible for casting the NIC model vision, describes himself and fellow hub leaders as "stewards of the system," summarizing, "we have relationships with people, long-term, meaningful, difficult relationships with people." Hub leaders attempt to foster trusting relationships by empowering members as partners, and fostering co-learner orientations; making evidence visible; and spreading results and enthusiasm. These structures and behaviors are summarized in Table 5 and the subsequent narrative.

Table 5

Leadership Structures and Behaviors Related to Building Relational Trust and Motivation

Focus Priority 3: Build Relational Trust and Motivation	
Related Structures and Behaviors	**Salient Quotes**
Empower Members as Partners and Foster Co-Learner Orientations	● ...So I see the folks at the state level, walking with us...and actually living out what they expect us to do, not just telling us... sort of living out in front of us the ideal to which we would aspire." (member leader) ● "we're all there to do one thing, and no one's better than anybody else. We're all learning….with growth mindset (member leader) ● We "facilitate [members] getting to know each other so that they could trust each other to give feedback and ask questions and actually work together." (hub leader)
Make Evidence Visible with a Learn-by-Doing Approach	● "...if our goal was improving outcomes for students...the fastest way to get there to start was going to be to get people invested in the system. And to get people invested in the system quickly, we needed to do some of the legwork for them." (hub leader) ● "buy in comes from them doing" (hub leader) ● professional development was grounded in research, and the research was visible. (hub leader)
Spread Results and Enthusiasm	● [hub leaders] really believed in what they were doing, just their excitement... is amazing." (member leader) ● "being around people who care so deeply about the work gave me the ability to really dive in and learn as much as possible. (hub leader) ● "after that first meeting, I was hooked. And I think that just my excitement for it really helped when pushing that out to my team members." (member leader)

Empower Members as Partners and Foster Co-Learner Orientations

As previously noted in the underlying mental models from which hub leaders act, the executive leader shares that their model is about taking people "who need permission to solve problems," and giving them permission and support to solve those problems. To that end, hub leaders attempt to build trusting relationships with members, and *empower members as partners* valuing their voice, and involving them directly in the work. Hub

leaders convey to members that they are not intent on coming in to fix their schools from the outside. Rather, they are committed to building partnerships with them to solve problems that matter to them. The hub director describes their state hub leadership role as one of support, honoring and believing in teachers as "capable individuals who can solve their own problems without hiring...consultants from an outside firm." One hub leader emphasizes the credit that SEA hub leaders provide to participants, she conveys to her members that if the hub leaders were not able to "learn from you…and figure out how these ideas actually work in practice…" they would not have been able to create the products—the strategy and theme briefs, and the online professional learning supports—which she makes known, are a product of *their* work.

Incidentally, member leader participants expressed a degree of surprise or incredulity at their prospect of being involved in a joint effort with the state that is of positive quality, one noting, "Very often, it feels like things that come from the state are so far removed from the issues that we're facing day to day….the heart of the success of this NIC is not dictating...giving people enough understanding of the change idea to be successful and letting them be the professionals that they are." Another member notes, similarly, "I have faith in the…state department of education, probably for the first time ever, just because of these people." She goes on to say that, in the past, she perceived the state as a system but not actual people, and that working with the hub leaders has changed her outlook because they have made the effort to get to know the NIC members as people, and were willing to "be a part of what we're doing…not acting like an expert," and, in return, members have come to know these leaders as individuals—as people. She suggests that if other state department employees across the board committed to building

similar relationships with their constituents, getting to know "what they stand for and what they really care about," that it may make a big difference in LEA perspectives of the state.

In addition to employing a partnership approach to coaching, hub leaders indicate other ways in which they project their partnership stance to members, including being mindful and intentional with vocabulary and communication so to project the hub team as partners in the work, and in operating with non-evaluative roles of support, not lecturing members, but rather, collectively working together to hone change ideas for effective practice.

Hub leaders involve members directly in the work. Members are directly involved in the development and testing of the change ideas, and in the co-design of strategy and theme briefs, which are the products detailing the culmination of the codified knowledge that NIC members have collectively built. One member leader notes his appreciation for being involved directly in this work and having the opportunity to "look behind the curtain into the planning part of it, in the building of the change idea, which generally is prescribed." According to one hub leader, participants also provide the hub leaders with feedback on the subsequent change ideas that should be tested in the upcoming years. The executive leader is adamant in the necessity of teacher involvement in this work, declaring, "they are providing the boundaries...the guidance for us...we're facilitating the voice and experience of the participants...they do the actual work." Finally, as one hub leader emphasizes, they communicate to members about the importance of their contributions, highlighting the impact they are having beyond their own classrooms.

These hub leadership behaviors collectively align with the hub's operating mental model related to empowering teachers as champions, to carry on the work in their local context.

To further project their roles as partners, rather than evaluators, state hub leaders foster a *co-learning orientation* with and among members, and model these co-learner behaviors themselves. In emphasizing the importance of hub leaders being as authentic and transparent as possible to remain in touch with the needs of NIC participants, the hub director shares that hub leaders attempt openness and demonstrate their own learning needs, shortcomings, and vulnerability, "modeling the ability to...continuously learn and evolve and get better" and explains that the hub leaders are "constantly making it known [to members] that this is our current best guess," and that they will continually revise plans and actions, based on members' feedback. Relatedly, she admits, "I tell my people all the time...we are a learning organization," and reminds members that learning involves making mistakes, and when hub leaders make mistakes, they are "going to be honest about it…and we're going to get your input on what we need to do to fix it." She claims that these efforts have been beneficial in creating a trusting environment in which members easily confide in hub leaders and share their own classroom struggles.

One hub leader insists that hub leadership requires demonstrating one's own need for feedback and seeing yourself "as a person who needs to listen to others and provide and get feedback...the most important thing for me was to be seen as one of them…learning along with the teachers." The hub director adds that hub leaders need to be flexible enough to make adaptations and course corrections in response to members' needs. She claims, "I don't think you can work in this field, and not roll with the punches... we're going to learn together…we'll probably fail together at some point, but

we'll pick ourselves back up....” Her humility and adaptive disposition is clear when she claims, “we're still a baby network. We're still learning,” which is supported by the executive leader’s claim that the work is evolving, and they still “have to do a lot of proving to people.” About her own role, the hub director humbly insists, “good leaders put good people around them, and let them do the work you know, the team, sometimes I feel...like I get too much credit for this work. I mean, it's really the team... they're the ones doing it…” Therefore, she prioritizes these qualities when hiring and recruiting new hub leaders.

These co-learner behaviors of hub leaders are also reflected in discussions with their NIC member leaders. One member leader reflects that the hub leaders are extremely open with members and “do not come with any pretense that they know everything” or project themselves as leaders with the members followers. Rather, they promote a team atmosphere. The hub director’s statements support this claim when she ensures that all member ideas are good ideas and mistakes are expected so they can “fail fast” for the sake of learning. One NIC member leader describes the relationship with hub leaders in this way, “we're all there to do one thing, and no one's better than anybody else. We're all learning….with growth mindset, and [hub leaders] really establish that from the beginning that we're in this together....willing to...roll up their sleeves and get to work with us.” Similarly another member leader shares, “I see the [hub leaders], walking with us...and actually living out what they expect us to do, not just telling us... sort of living out in front of us the ideal to which we would aspire.” The executive leader adds that he believes their current relationship with participants is strengthening because they believe the hub is legitimately trying to support rather than evaluate. Connecting back to the

mental models under which the hub operates, these behaviors reflect their commitment to empowering educators as champions, as well as prioritizing trusting relationships with members, over compliance related behaviors.

Stressing the necessity to build strong relationships among NIC members early on, several leaders note the benefit of employing strategies to facilitate collaboration among members, including icebreaker activities and similar team building games throughout network meetings. Most leaders specifically highlighted the strategy of "forced placement" or mixing teams during the professional development and learning exercises. These strategies vary from organizing members in district grade-level teams, cross-grade level teams, school type, or content areas, to intentionally build connections and relationships among members from different schools or districts. One leader attributes these strategies to members being excited to come back together and share during network gatherings, sharing, "the geometry teacher from this school is super excited to see this geometry teacher from that school because they've all been off doing their change ideas separately, and are now together and kind of get to talk about it...and play ideas off of each other." Additionally, one hub leader emphasizes that community rituals and culture builders are the norm for each of the NIC meetings, which allows members to share appreciations, "ahas" noticings, ask lingering questions, or give "shout outs." She claims that these strategies "facilitate them getting to know each other so that they could trust each other to give feedback and ask questions and actually work together."

Adopting these co-learning orientations and strategies for building collaborative partnerships was a driving force in the initial NICs vision to reduce isolating factors and

strengthen the sense of community among members. As their executive leader recalls, they had an "opportunity to say, let's build something that serves the lonely and isolated teacher…." He describes the message they communicate regarding the partnership they wish to build with educators, informing them, "we don't think we have a solution that we're going to try to tell you to implement. We believe that we are building a group of people who are here to *find* the solution...together, adding that teachers need to know 'there's a community for you.'" A member leader illustrates the sense of isolation that the NIC hub leaders attempt to mitigate. She laments, "I felt like I was an island of hope in a sea of despair...and so I feel like here...we're working together and we're not alone...I'm not alone." Several member leaders express the benefits of the collaborative conditions that the hub leaders have set up in creating a sense of community and also credit these efforts as contributing factors toward building members' will and motivation to sustain the work. Additional motivational factors are explored next.

Make Evidence Visible with a Learn-by-Doing Approach

One way hub leaders are motivating members and building the will for improvement work is by making the evidence from research, and the classroom-based evidence, visible. In order to expedite the visibility and use of classroom-based evidence for the purpose of improvement, the hub leaders do a majority of the up-front chartering work, including detailed planning, data collection and analysis about current educational issues, as they actively work with stakeholders and practitioner advisory groups to use these data to better understand the system, root causes, and the related evidence-based practices that could serve as promising change ideas. One hub leader describes this chartering process as a "think tank," from whom the detailed problems of practice and

related drivers emerge to help the hub leaders develop the initial, working theory of improvement, or driver diagram. Then, according to their executive leader, they frame this work to potential NIC members by telling them, "we have...a compelling story. If you see this as compelling, join this group...we think the thing you're trying to solve is something we want to solve too." The hub director cites the decision to take on this up-front work as a way to help members see some small successes quickly, in hopes that this will spark enthusiasm and motivation among members to "keep the ball rolling."

Since the hub does not front load intensive training on improvement science processes, the hub director articulates the use of a learn-by doing "spiral approach" to ensure that improvement science processes and principles are *embedded* in the work that member leaders and members do over the course of the year. Based on their understanding of their clientele, the hub director explains that they thought it would be beneficial for members to quickly engage in "doing the work," which entails members using PDSA cycles to test change ideas, examine practices and reflect on where and how they can improve. This is the work in which members are deeply involved, and the remainder of the "driving," as one hub leader describes it, comes from the hub, in collaboration with research partners. He summarizes, "sometimes you have to drive the car before you can understand how all the pieces of the engine fit together. And if our goal was improving outcomes for students...the fastest way to get there to start was going to be to get people invested in the system, and to get people invested in the system quickly, we needed to do some of the legwork for them." Several hub and member leaders attribute member buy-in or motivation to this decision. A NIC member leader concurs, explaining how "none of us in the NIC had time to do all that research and

gather it and figure out what would be the best course of action for what would be the best change ideas...the best way to implement them." Another appreciating that "state level folks have done a lot of research upfront to let us know...the education sphere where people are being successful.…"

Hub leaders design practical measures, which members use to assess implementation integrity of the change idea and student performance, and they maintain a data dashboard to collect, organize, display, and manage data as it comes in from members. Several hub leaders convey how they help NIC members dive into these data, examining the data among their own district, as well as across districts, looking for variations in performance or processes. One hub leader claims that receiving this type of "instant" timely data from their students, "hearing the voice of their students," is causing teachers to immediately change their instructional behaviors. Another concurs, further insisting that what NIC members care about most is examining these practical data and then reflecting on how they can immediately act upon it when they return to the classroom, stressing that these data are essential to the learning and improvement process. Therefore, the hub director is often asking members to trust the process and have an open mind, in order to get them to the point where they see the results from these data. She recalls an instance in which a member was initially resistant, and how allowing this teacher to get it right to doing the work of testing the change ideas and generating classroom-based evidence helped shift her mindset, once she saw its value. Another hub leader adds that no matter the excitement she projects to members about doing the work, "buy in comes from them doing." As another leader claims, "I think that's why the teachers are showing up…."

Hub leaders also show members the research-based evidence underlying the change ideas during the initial network meetings. One hub leader describes this process as making the "research visible," walking through what the change looks and sounds like in classroom practice. In reference to a particular change practice related to mathematical justification and reasoning, a hub leader describes the importance of explaining "why the change idea matters" and how it is backed up by research. She asserts that this was a crucial decision in their professional development design, insisting, "if we hadn't gotten that right, we would have never gotten people on board with us." Another hub leader insists that this strategy helps leaders develop trust and motivation among members, stating, "they need to see that what we are giving them works."

Spread Results, and Enthusiasm

Another way in which hub leaders are motivating educators to engage is by spreading members' collective results, as well as their own enthusiasm for the work. Leaders harness the NICs' collective knowledge and codify it in two distinct ways. First, both member and hub leaders draw attention to their co-development of strategy briefs and theme briefs. These briefs detail the specific evidence-based change ideas and the related theories and instructional practices underlying these changes. In addition to the production of these concrete artifacts, hub leaders are making presentations to educators and administrators, state-wide, to inform them about the NIC work, publicizing the resources they have curated, and crediting the work of the NIC members who have co-developed these products. Additionally, they are, as one leader puts it, "telling the data stories" related to the evidence of their collaborative efforts to date, conveying to educators, "teachers across the state have been actually implementing these things and

here's the data that they're getting back from it. You might want to try this in your classroom." Finally, the hub's research partners are also conducting evaluative research, and communicating in other informal ways, to publish and spread information about their results and outcomes.

Another strategy hub leaders are using in an attempt to build will and motivation for their NIC model is through their own belief and enthusiasm. From the initial NIC meetings, according to member leaders, hub leaders demonstrate enthusiasm about the vision, the underlying improvement processes, and the belief in members' capacity to do the work. According to one hub leader, they all care about the stakes, and are deeply convicted about making sure that they are supporting each other as a team. The hub director refers to the NICs endearingly as their "baby" and that they are all "nurturing" its growth, because of their ability to focus solely on the NICs in their leadership roles. One hub leader insists that NIC members can trust that they have the best interest of members and their students, and that interest is a driving force for hub leaders. In describing part of what motivates her to continue the work, one member leader attributes the motivational nature of the hub leaders, stating, "they really believed in what they were doing, just their excitement...this is amazing." A hub leader also credits the motivational impact of their executive leader, insisting that it would be impossible for others not to be enthusiastic about improvement science after engaging with him. This same hub leader also attributes his own will to learn and improve, to the enthusiasm of his team, expressing, "being around people who care so deeply about the work gave me the ability to really dive in and learn as much as possible."

This motivation and enthusiasm helps to build will for the work as it trickles down to members. One member leader voices hope that other members will "catch our enthusiasm." Another member leader explains, "after that first meeting, I was hooked, and I think that just my excitement for it really helped when pushing that out to my team members." Hub leaders relay that one of the best vehicles for spreading and scaling the work of the NICs is via the NIC member leaders and members themselves, noting that they are the "best champions and cheerleaders of the improvement work" in both their word of mouth and practices within their schools. The hub director imports that one of the reasons they can exude such enthusiasm and dedication to the work is because they feel they are "making a difference in the lives of kids." She muses, "I need to be in a place working where I know that I'm not...spinning my wheels, and...hopefully doing a little bit of good out there...leadership created that culture." Similarly, a hub leader cites an article that explains the "why" of NICs. He voices his belief in the power of continuous improvement as a better approach than "one-off" professional learning. He offers his reason for believing in the NIC approach. "Anyone who's been in a school or been in a district understands that pretty inherently that...when you are working with others, and sharing ideas and working towards a goal together, it is better than doing it alone…" In addition to acting on member commitment and motivation, this evidence of enthusiasm shows a relationship to hub leaders' commitment to their original vision for this work.

Adapting to Ongoing Leadership Challenges

While the findings generally project positive reception and/or progress related to hub leadership structures, decisions, and actions to date—with even the hub director

admitting feeling “lucky” in their efforts so far, this work has not come without its challenges, some of which were brewing concurrent with the finalization of data collection in this case study. While relentlessly committing to and executing their shared vision, hub leaders attempt to adapt to the ongoing challenges. One challenge pertains to members’ will and capacity to engage successfully in the work. Despite meticulously setting forth the expectations, roles, and responsibilities in their application process, readiness checklist, participant handbook, and roles and responsibilities overview, the hub director admits that the variation in the level of educator capacity, or preparation to engage in the testing of change ideas, has been a big challenge, and it is often a “coalition of the willing.” Similarly, the executive leader reveals that, according to self-efficacy surveys, many teachers report entering the NICs with already high levels of efficacy. While some come willing and ready, others, who may have been recommended by an administrator, or told to join, may not be ready or as willing. A hub leader concurs with this assessment, noting that some participants are “voluntold” to participate by their administrators. She further adds that while principals frequently select educators who are prepared and have the capacity for the work, this is not always the case. One member leader self-identifies himself as a “professional development junkie...looking for every opportunity to learn.” Additionally, according to one hub leader, the hub team hopes that their member leaders evolve into “master teachers” who can lead similar improvement projects in their districts. However, he confesses that this is true in some, but not all cases. The hub director acknowledges they are considering how to make course corrections, as they proceed, based on participant feedback and needs.

Hub leaders also note challenges related to the scale and sustainability of the

work. At the internal level, hub leaders mention the inherent challenges of turnover and the legacy bureaucratic systems in the agency. One hub leader notes, “this is the vision of our leaders...so when that leadership changes...it could change.” Additionally, the hub director shares the experience of being “hamstrung by red tape and bureaucracy,” which can impede their ability to be flexible, responsive to member needs, and live up to their expectation of operating a learning organization that is iteratively changing and making adjustments. At the local level, two hub leaders recount a surprising challenge in that they struggle in their attempts to encourage local education agency administrators to allocate funds to engage practitioners in the NICs. One noting his surprise, “I thought we'd have more buy-in...districts are really satisfied with how they're investing their money right now, even though I don't think it's necessarily making an impact...they don’t want to change it.” Additionally, hub leaders identify the need to have more direct involvement from principals, as it impacts the spread and sustainability of the work in which members engage. One hub leader voices her frustration that many principals and district level staff are not seeing the impact of the NIC members’ work, nor do they understand the improvement science and its value, admitting they need to improve their outreach with administrators. A hub leader concurs that teams with active administrators who witness the work in progress have “total buy-in.” The hub director shares that efforts to help administrators understand the work and realize its value has been a struggle. In response to this challenge, she emphasizes that they are building language into the application process to encourage administrators to join their teacher teams. Finally, in general, the executive leader expresses that they still have proving to do in terms of how to “tell their story better,” and help practitioners see the value in understanding their systems. He adds

that increasing their ability to help members spread and scale is imperative for the NICs to be sustainable.

Despite these challenges, leaders remain committed to their shared vision, and maintain adaptive orientations and willingness to course correct along the way. By holding fast to underlying mental models that see educators as champions and that prioritize partnerships and internal accountability over compliance, hub leaders are establishing structures and behaviors to attend to building trusting relationships and partnerships with and among members, as well as building member will, capacity and efficacy to spread and scale improvement science and improve teaching and learning. The original caster of the vision captures their vision in this way:

> "We believe every teacher deserves a champion. Every school leader deserves a champion, and this model is about building a system of champions who believe in the best capacity of those that they serve and create that opportunity for them. So I think if we do it right, in the end, we'll tell that story of what it looks like to be a leader and ensure the people that you believe in that [they] are champions."

CHAPTER 6: DISCUSSION

Summary of Findings

Although minimal case study research exists specific to operations, dispositions, structures, and behaviors of leadership hubs in NICs, findings from the current case study help fill this gap. Further, findings align with adaptive and high-impact leadership models, as well as with findings from emergent improvement network leadership literature. NIC hub leaders in this case study exercise shifts in mental models, focus priorities, and related structures and behaviors to establish conditions for building trusting relationships, capabilities, and motivation among members, empowering them to lead locally toward spreading and scaling capacity for organizational learning and continuous improvement. Further, since this unique case study is one of the first—if not the first—empirical studies of a NIC model with a hub operated exclusively by a state education agency, it offers unique findings related to leadership challenges and opportunities in SEA organizational innovation, as well as policy development and implementation.

As previously noted, hub leaders in this case study work toward building members' capacity for continuous improvement by adopting the following objectives in their NICs model: promoting equitable instructional practices; using practical measures for improvement to investigate instructional practices; engaging members in improvement cycles within networked communities to test and refine practices; and engaging in co-learning, ongoing collaboration, and professional learning opportunities. From investigating NIC hub leadership within this unique case, three major insights emerged from analyses:

1. SEA NIC hub leaders demonstrate adaptive dispositions and behaviors similar to other high-impact leaders, and improvement network leaders.
2. SEA NIC hub leadership structures are adaptive, with both tight and loose elements, and focus on building member capacity to lead locally.
3. SEA NIC hub leaders act as creative agents of change, disrupting or *adapting* legacy SEA routines, procedures, and structures related to policy development and implementation.

These conclusions align with and build upon past network leadership findings, and adaptive and high-impact leadership theories. Further, unique insights emerged from this exploratory case, which build upon current theories and findings, and offer suggested areas for future research and exploration. In the following discussion, these insights are explored in the context of the original propositions and leadership frameworks on which the study is based, related empirical literature, to date, and in the context of implications for research, policy, and practice.

Study Insights

Not surprisingly, in this case study, the hub director made several references to their NICs model operating as a learning organization. Argyris and Schön (1996) claim that during organizational learning, members engage in problem solving inquiry, the output of which is change in thinking and practice. Similarly, a major goal in NICs, as Engelbart (n.d.) explains, is for members to become more effective at solving problems, collectively, by using better practices in innovative ways. In other words, hub leaders should help build member capacity *for improvement*—beyond the immediate membership and lifecycle of the NIC. These outcomes are beyond the measured scope of

the current study. However, they are important to reiterate, since hub leaders should have them in mind as they attempt to enable the conditions for these outcomes to be possible. Further, Senge et al. (2012) elaborate on learning organizations by describing key disciplines in which members engage, including prioritizing shared vision, addressing and shifting mental models, and attending to personal mastery. These disciplines closely align with the high-impact leadership model (Swensen et al., 2013) and adaptive leadership theory (Heifetz et al., 2009) which underlie the propositions on which this case study is based. The results in the current case suggest that hub leaders demonstrate many related behaviors in effort to operate as a learning organization. These insights, in addition to some unique implications that emerged throughout this study, are explored in the following sections.

Leaders Demonstrate Adaptive Dispositions and Behaviors Similar to Other High-Impact Leaders, and to Other Improvement Network Leaders

While explored in other contexts, adaptive and high-impact leadership dispositions and behaviors have not been empirically investigated in the context of NICs led by SEA hubs. In regard to the assumptions and proposition, derived from previous research, that NIC hub leaders might apply structures, dispositions, and behaviors congruent with adaptive leadership (Heifetz et al., 2009) and high-impact leadership (Swensen et al., 2013), hypotheses were widely confirmed by the findings. In their high-impact leadership framework, Swensen et al. purport that high-impact leaders operate from underlying *mental models,* which drive both the areas on which they *focus efforts,* and their leadership *behaviors*.

Mental Models

Addressing long-held assumptions and shifting mental models is a key discipline of learning organizations (Senge et al., 2012), and an essential factor in engaging members in double loop learning (Argyris & Schön, 1996). Improvement leaders adopt new mental models, which include seeing clients as partners in the provision of services and viewing everyone as an improver (Swensen et al., 2013). As expected, hub leaders in this case study operate from underlying mental models that drive their vision and strategies, including seeing themselves as improvers and partners in the improvement work with educator members. Toward this goal, as demonstrated in the findings, hub leaders prioritize trusting partnerships and capacity building supports over compliance and empower educators as champions. Further, they prioritize measurement for improvement over measurement for accountability. This mental model shifts the value from high-stakes standardized assessments toward ongoing classroom-based evidence, in alignment with Swensen et al. claim that high-impact leaders shift the ways in which they define success.

Focus Priorities

Swensen et al. (2013) suggest a framework for improvement leaders in terms of six domains in which they focus their efforts; these include: focusing on people; creating vision and will; shaping culture; engaging across boundaries; developing capabilities; and delivering results. Hub leaders in the current case prioritize many similar focus areas. They maintain a strong commitment to their vision and strategic plans to execute it. Hub leaders set up structures and processes to develop member capabilities and efficacy by providing intensive, job-embedded professional learning and customized coaching

supports, so that member leaders can help spread and scale improvement work in their local districts. This focus area also aligns with a key discipline of members in learning organizations, highlighted by Senge et al. (2012), that is, the development of personal mastery in relation to the shared vision. In the current case, this personal mastery is fostered both in hub leaders and among member leaders. Additionally, hub leaders emphasize that relationships are paramount, and they attempt to build member will, in part by developing relational trust and motivational strategies to engage and sustain members. These include engaging with members as co-learners, making classroom-based evidence and results visible in a timely manner, and by demonstrating their own belief and enthusiasm in the vision. Finally, hub leaders shape their culture in the NICs by empowering members as partners and modeling and fostering a co-learner orientation in which all members and leaders are continuously learning and improving together. Swensen et al. further emphasize that shaping a culture that fosters motivation, capacity, and results entails the collective influence of leadership *behaviors,* many of which overlapped with the findings in the current case. These are summarized in the following sections.

Behaviors

The findings from the current case study reflect that relationships are paramount in all that SEA hub leaders do. This is evident from their mental models, which prioritize partnerships with, and empowerment of, educators, and their attention to building relational trust and motivation among members. Several of their leadership behaviors align with the "person-centeredness" behaviors that Swensen et al. (2013) highlight of high-impact leaders. These include directly engaging the people closest to the work in the

continuous improvement efforts, and focusing on the issues that matter most to them; building relationships by frequent communication and consultation; demonstrating empathy and active listening; and providing deep support for colleagues. Likewise, the science of improvement necessarily empowers and engages those closest to the work in the process of improvement and decision-making (e.g., Bryk et al., 2015; Deming, 1994; Langley et al., 2009; Swensen et al., 2013). Accordingly, in the current case, hub leaders empower members as equal partners, directly or indirectly engaging teachers in the problem-solving and decision-making within the NICs. Additionally, hub leaders customize professional learning and coaching to meet the needs of participants as they engage in iterative PDSA cycles.

In attempting to build relational trust and motivation among members, SEA hub leaders demonstrate active listening, responsiveness, and adaptive behaviors to meet the needs of NIC participants. Hub leaders exercise these behaviors via their system of deep support, which includes ongoing, needs-based professional learning and partnership coaching routines. Additionally, they establish a variety of collaborative learning opportunities to bring members together, across their traditional boundaries, to get to know each other and build relational trust to have open dialogue and inquiry and collectively solve problems. These behaviors are also congruent with findings from network leadership research in the public sector in which leaders prioritized people-centered behavior, building relational trust and treating members as equals (Eglene et al., 2007; Silva & McGuire 2010).

Deming (1994) stresses the importance of intrinsic motivation in the work of continuous improvement, noting that when people master skills, they develop intrinsic

motivation and the work is meaningful to them, which helps them develop self-efficacy and the will to continuously improve. So, part of a leaders' work, in addition to directly involving those closest to the work, is to discover what matters most to them, "aligning improvement work with what people believe in and are passionate about" (Langley et al., 2009, p. 84), in effect, inciting their intrinsic motivation for continuous improvement. In the current case, hub leaders attend to these motivational factors, in part, by facilitating the voice and the experience of participants, and involving them directly in the problem-solving and decision-making. Further, in addition to exhibiting strong belief and enthusiasm for the improvement science methods and the NIC model, another way in which hub leaders build intrinsic motivation is by building member trust in the improvement science process and methods through a learn-by-doing approach, which makes their classroom-based evidence visible, quickly and motivates buy-in.

In addition to emphasizing person-centeredness, Swensen et al. (2013) prioritize "front-line engagement" and transparency as essential behaviors in the high-impact leadership framework. These behaviors have leaders authentically engaging in the problem solving, learning, and improvement efforts, and promoting a team-work culture in which leaders are accessible for questions, support, and are transparent about results. Transparency is also prioritized in the adaptive leadership theory and literature of Heifetz et al. (2009), who stress that adaptive leaders exercise transparency so that there are no elephants in the room and no bad ideas. Hub leaders in this case study exhibit both of these behaviors by demonstrating and fostering *co-learner orientations*. In the current case, hub leaders self-identify as a learning organization, projecting their own vulnerability as co-learners who are learning with partners, making mistakes, and

adjusting. They demonstrate front-line engagement as co-learners as they work directly with members in providing job-embedded professional learning and needs-based coaching to members. Additionally, hub leaders are listening and adapting to feedback from participants, and engaging in co-inquiry about local data. Further, they are co-designing strategy and theme briefs with members. These behaviors are consistent with claims that *all* NIC members are learners within the network, using improvement science principles and processes to conduct improvement research (Bryk, 2015), and with emerging findings from improvement network leadership research noting that hub leaders support and manage iterative improvement activity through collaboration and engagement (Peurach et al., n.d.). Further, as expected, based on network leadership findings from the public sector (e.g., Eglene et al., 2007; Provan & Lemaire, 2012), these behaviors deviate from the traditional roles and skill sets of state leaders, and demonstrates the degree to which hub leaders are working alongside educators toward collective goals, as opposed to traditional compliance-based activities.

In their adaptive leadership theory Heifetz et al. (2009) suggest that adaptive leaders are able to tolerate ambiguity, build trust, foster an adaptive culture in which experimentation is honored, and help sustain strong networks so that members can build capacity *for* adaptation. They highlight that adaptive leaders foster an adaptive culture by institutionalizing reflection and continuous improvement by committing to and modeling risk taking and experimentation, as well as fostering and honoring these behaviors in others. As expected, SEA hub leaders demonstrate these dispositions and behaviors in modeling their own co-learner orientations, exercising transparency, as detailed in their accounts of modeling their own vulnerabilities, being transparent about their mistakes,

listening and being responsive to partner needs, hearing all member ideas, and making course corrections as needed. They project to members that decisions are always best guesses and that mistakes are expected so they can "fail fast" for the sake of learning. These statements are congruent with the tenet of improvement science that improvers learn fast to implement well (Bryk, 2015). These findings are also consistent with recent educational leadership research, suggesting that adopting a growth mindset, and demonstrating curiosity, humility, and vulnerability are essential dispositions for fostering continuous improvement (Dixon & Palmer, 2020). These actions serve to help hub leaders foster a partnership approach with members.

Finally, SEA hub leaders adapt their own skill sets in order to integrate the NIC model into their work. They demonstrate multipotentiality, building a strong skill set in improvement science, subject matter content, pedagogy, and coaching. In addition to expecting these skills in new and existing hub leaders, they foster the aforementioned adaptive and high-impact leadership behaviors. These efforts help to both build relational trust and credibility with NIC members, but also to provide the intensive support needed to help members infuse instructional practices and improvement science into their daily practice. These shifts are consistent with some research from the public administration literature that notes when shifting to inter-organizational network leadership, government agency leaders need to expand their skill set, exercising *adaptive* dispositions and behaviors, and selectively integrating necessary expertise into their repertoire to improve collaboration and progress with and among members (e.g., Eglene et al., 2007; Provan & Lemaire, 2012).

In addition to confirming many of the original theoretical propositions, findings from this case study elaborate upon these expectations, revealing unique insights, including some surprises. Some of these findings reflect the unique role and context of hub leaders in this case, in that they are operating within a state agency organization, subject to unique challenges and organizational factors that other NIC hub leaders may not encounter. These findings are explored in the next section.

SEA NIC Hub Leadership Structures are Adaptive, With Both Centralized/Tight and Loose Elements, and Focus on Building Member Capacity to Lead Locally

It was initially surprising to uncover the degree to which the hubs' organizational infrastructure appears centralized. A deep review of the documents and interview data demonstrate highly centralized decision-making and even up-front planning and development from the hub. It may even be perceived as a top-down approach. However, the hub leaders in this case also take a balanced approach to leading the NICs, which includes both tight (centralized) and loose (adaptive) elements. The hub is highly centralized in terms of planning, delivery of professional learning, and expectations for roles and responsibilities. At the same time, hub leaders exercise adaptive dispositions and behaviors that allow for course corrections and continuous improvement, as well as provide flexibility in executing the NIC model and underlying improvement research methods with *integrity* over prescriptive fidelity.

Planning

As expected, and previously detailed, based on adaptive leadership (Heifetz et al., 2009) and high-impact leadership theory (Swensen et al., 2013), findings indicate that hub leaders are flexibly adaptive in terms of making adjustments in their planning,

professional learning sessions, and change idea designs since they treat members as equal partners, involve them directly in the work, and share decision-making responsibilities. However, it was also revealed that they are highly centralized, engaging in meticulous planning, which includes developing detailed expectations, roles and responsibilities, timelines, and roadmaps for professional learning in the NICs. One finding that initially seemed surprising was a member leader's comparison of SEA leadership and organization to her experiences at Chick-fil-A. Upon investigation, it was revealed, and worthy to note, that Chick-fil-A is an *agile* organization that operates around principles that are congruent with improvement science and continuous improvement, including applying rapid cycles of testing for improvement, and including those closest to the work in the quality improvement decision-making (e.g., Norville, 2019). Therefore, although the hub is diligent with planning and setting tight expectations, statements such as these imply that the hub leaders are also adaptive, living the improvement science principles and processes they are striving to instill in members. This was also evident in the findings. While they meticulously plan, they refer to constantly listening, adapting, and making course corrections, based on their learning and participant needs.

Professional Learning of Change Ideas and Improvement Science Processes

The hub leaders' plan for professional learning on the instructional change ideas is tightly designed and coordinated. Their vision is underpinned by a commitment to high-quality, ongoing, job-embedded professional development to develop hub and member leaders' capabilities. The professional learning model employed by hub leaders is designed to be intense, sustained, and job-embedded. These are criteria deemed to be effective in past studies (e.g., Darling-Hammond et al., 2009). Further, coaching has been

deemed an essential feature within NICs (e.g., Proger et al., 2017) and documented as a more robust strategy to improve the quality and transfer of professional development experiences compared to those with no such follow up supports (e.g., Joyce & Showers, 2002). Contrary to previous findings related to improvement network leaders' accounts of focusing more on technical, managerial aspects over the core collaborative improvement science work (Peurach et al., n.d.), hub leaders in this case clearly devote a great deal of time, effort, and resources to building hub and member capabilities in the core work of improvement science, *and* to the coaching content and pedagogical practices.

As noted in the results, the hub is highly centralized in that they perform much of the up-front chartering work—from determination of the common aim to development of the driver diagram and change ideas. Frequently, this work is a collaborative effort among members. However, this tight approach helps hub leaders facilitate the consolidation of network learning, which is a responsibility consistent with the expectation that NIC hub leaders will harness learning and codify it for spread and scale (e.g., Bryk et al., 2015). While several hub leaders question this decision as a possible deviation from the *fidelity* of the NIC experience, Bryk et al. express the flexibility with which a NIC model may be initiated, noting that a hub may take on a variety of different structures, with a single entity taking on the responsibility, or with shared responsibilities among members (p. 157), noting the potential for advantages and disadvantages with either approach.

The hub is less centralized when it comes to delivering up-front professional development for improvement science. While the hub team works closely with their research partners to adhere to improvement science methods, they are adapting to ensure

that their approach works best for their context, based on member needs. The rationale is based on their learn-by-doing approach in which they feel it is important to have teachers get right to the work of doing improvement science. It is notable that they are noticing some challenges related to this approach and are considering making further adaptations. Incidentally, Bryk (2021) admits, referring to the organization of NICs in the field of education, "we still have not figured out how to do that well," emphasizing that it is under-resourced and not yet normative. Further, proponents of NICs and improvement science apply the phrase *adaptive integration* to refer to the shift in thinking from implementing practices and programs with prescriptive *fidelity* to ensuring they are implemented with *integrity* (e.g., Bryk et al., 2015; LeMahieu, 2011; Lewis 2015). SEA hub leaders seem to be practicing adaptive integration with the NIC model itself, using a balanced approach with tight and loose elements.

Roles and Responsibilities

Consistent with research that has found that a certain level of top-down leadership may be needed or preferred (Vangrieken et al., 2017), hub leaders in the current case study do exercise a degree of top-down decision-making, in terms of previously described chartering work, and in assigning roles and responsibilities to network members. While some have found that network leaders prioritize building member connections over assigning roles and responsibilities (e.g., Díaz-Gibson et al., 2017), others have suggested that relational trust among network members may emerge *from* clarity and transparency in role expectations (Palinkas et al., 2017), and that clearly identified roles and responsibilities may be an important factor for collaborative success in partnerships (e.g., Drahota et al., 2016). Hub leaders in the current case focus on both

building relational trust by sharing leadership responsibilities and decision-making with members, while also clearly defining and delineating hub and member roles and expectations.

Heifetz et al. (2009) claim that in adaptive learning organizations, capacity for adaptive leadership is fostered and distributed, and members share responsibility for the organization's shared vision, as well as an institutionalized commitment to reflection and continuous learning. Adaptive leaders strive to make themselves indispensable by distributing leadership to others so that they can develop their capacity, generating leadership structures that allow people to "routinely go beyond their job description" (p. 169). Similarly, Peurach et al. (n.d.). determined that managing member leadership is an important task of the hub and that improvement network leadership is often differentiated and distributed. They further recommended future researchers extend the understanding of network leadership by inquiring with member leaders. This case study has attempted to do so, not only to better understand the hub leadership role, but also to understand if and how hub leaders stretch their capacity among NIC members. As demonstrated in the findings, hub leaders stretch their own capabilities by expanding their skill sets, dispositions, and behaviors. Further, they attempt to build collective capacity for improvement by establishing a peer leadership structure to differentiate levels of expertise and distribute responsibilities among themselves and their participant member leaders. In delineating expectations for both hub *and* member leaders, designated member leaders hold important responsibilities for building their capability in both improvement science and effective instructional practices, so that they can provide professional learning and/or support to colleagues, locally. Rather than exercising mandates, the SEA

hub leaders use the NIC model to share responsibility and build collective capacity among themselves and local districts to spread, scale, and sustain best instructional practices, and improvement science processes for continuous improvement. Such shared responsibility has been found to contribute to educator capacity for organizational learning (Louis & Lee, 2016), and has been demonstrated by other educational improvement hub leaders (Peurach et al., n.d.), and network leaders in the public sector who prioritize distributed leadership over non-authoritative strategies (Eglene et al., 2007). Results from this case study expand upon existing and emergent hub leadership findings by providing specific, detailed information about how hub leaders are distributing leadership responsibilities among hub and member leaders.

SEA NIC Hub Leaders Act as Creative Agents of Change, Disrupting or Adapting Legacy Routines and Structures Related to Policy Development and Implementation

Adaptive change often requires organizations to disrupt the equilibrium—the status quo—and acquire, or co-construct, new knowledge and new methods for solving problems (Heifetz & Linsky, 2002). The choice to operate a NIC model, and exclusively operate its hub, brings challenges but also offers opportunities to innovate and improve educational experiences for both educators and students. Improvement network leadership requires managing environmental relationships including social, political, financial, and administrative dynamics (e.g., Duff et al., 2019; Peurach et al., n.d.). It requires state leaders to shift from traditional mental models and modes of operation. The data from this case suggest that the hub leaders are what Brown et al. (2011) refer to as *agents of change* in school reform, shifting the status quo by exercising discipline, creativity and moxie toward building agency capacity for innovation, and using their

political capital to circumvent or exploit existing policies to change the practices of the agency. As such, to manifest their shared vision, and underlying mental models, hub leaders needed to make shifts in collective mindsets and beliefs, as well as policies and practices. The behaviors highlighted here are uniquely specific to the current case, in which NIC hub leaders operate within a state educational agency.

First, SEA hub leaders in this case maximized policy window opportunities (Kingdon, 1984). Having learned of the benefits of research-practice partnerships with the Math-Science Partnership (U.S. Department of Education, 2015a), and being responsible for carrying out the provisions in the Every Student Succeeds Act (2015-16), the executive leader took advantage of the opportunity to build in the NIC model when revising the state's accountability plan for delivering on the Every Student Succeeds Act responsibilities, convincing cabinet leadership to reallocate funds and allow for a pilot of the NIC model. The caster of the original vision clearly possesses the persuasive power to bring the vision to life, as confirmed by the hub director in interviews. Such persuasive power and charisma is deemed an important quality for improvement leaders (e.g., Deming, 1994) and of public sector network leaders (e.g., Eglene et al., 2007).

In addition to taking advantage of policy windows to initiate the NICs model, another insight that emerged is that hub leaders employed strategies reflective of capacity building policy instruments, as opposed to mandate instruments (e.g., McDonnell & Elmore, 1991), which are often applied from state to local education agencies. The NIC model is one that reflects a partnership approach over a compliance-based relationship among SEA leaders and LEA practitioners. As hub leaders conveyed in the current case study, NIC membership is intended to be a voluntary undertaking and enrichment

opportunity for educator participants. Further, many of the statements made by hub leaders in this case purport that educators are the champions of this work and should be empowered. Therefore, in the NICs, the hub team chooses to prioritize strategies for building pedagogical and improvement capacity for joint problem solving, using improvement science methods, over more simple, traditional compliance methods and strategies of a punitive nature. Accordingly, hub leaders also highlighted the policy shifts and decisions they made to ensure that hub leaders' build expertise and credibility so that they can provide intense professional learning experiences within the context of the NICs. Shifting policies and practices has been demonstrated by other types of network leaders in the public sector (e.g., Provan & Lemaire, 2012), and may be reflective of findings from emergent studies of educational improvement network leaders, which surmise that a degree of organizational development may be a prerequisite to collaborative improvement activity (Peurach et al., n.d.).

Finally, the hub's commitment to building hub leaders' capabilities for engaging practitioners in high-quality professional development experiences, and the decision to dedicate an entire SEA hub leadership team to focus solely on this NIC model and vision, demonstrates that this agency hub is exploring ways in which they can be more involved in the implementation factors related to moving policy to practice. Rather than simply disseminating publications, guidance, or directives, they are developing detailed plans to execute the vision, engaging directly with practitioners in the improvement research, and providing strong systems of support as instructional practices are tested and refined in classrooms. Further, they are co-designing implementation supports, as they harness the collective knowledge and practice-based evidence (e.g., Bryk, 2015; Green, 2009) that

members generate during PDSA cycles, in the form of facilitated professional development materials, strategy briefs, and theme briefs.

Taken together, these behaviors demonstrate hub leaders' commitment to their shared vision, or what Swensen et al. (2013) describe as "relentless focus" in their high-impact leadership model, by which leaders prioritize the vision and plan in daily work, recruit and place effective leaders, and allocate resources to the effort. These findings also align with emerging network leadership research suggesting that hub leaders manage against clear visions, strategies, and operating agendas (Peruach et al., n.d.). Additionally, they are executing actions reflective of other school improvement leaders in adapting structures and supports to meet the shifting policy, political, or economic conditions (Duff et al., 2019). Further, SEA hub leaders are attempting to address the issues to which past failed improvement efforts have been attributed, including the typical reliance on outside reformers and non-system actors (e.g., LeFloch, 2008) and factors related to educator buy-in, sustained professional development, and implementation of changes (Glennan et al., 2004). Moreover, SEA hub leaders in this case are shifting the organizational culture from one of compliance to one of support and continuous improvement, cultivating relationships with educators and developing partnerships with other organizations committed to educational improvement, which have been suggested actions for SEA leaders to act as change agents in educational improvement (Brown et al., 2011). They seem to be taking initial steps to create the conditions suggested by improvement science advocates, in redesigning classrooms, schools, districts, and state offices as continuous improvement organizations (Bryk et al., 2016, p. 2).

While it may seem surprising that the findings in this case study generally project NIC leaders' decisions and behaviors in a positive light, considering the often mixed perception and reception of SEA initiatives. One potential explanation for the generally positive responses exhibited by hub and member leaders could be related to the commitment by the hub to recruit and retain leaders that possess the necessary skills and dispositions for the leadership role. Further, this team has the luxury of devoting their fiscal and human resources solely to hub leadership. It is important to reiterate the surprise of the member leaders themselves, in describing their experience with the state hub leaders. As highlighted in the findings, member leaders noted their incredulity at the level of quality this program compared to other state offered programs and/or experiences with state agency representatives. One leader even suggested that other state teams and departments should consider operating as the hub leaders in this case demonstrate. Therefore, although this is but one team in a very large agency, there seems potential for building both capacity and relationships with similar innovations. That being said, even the hub leaders in this case face internal and external systems challenges related to spread, scale, and sustainability. These are explored next.

Adapting to Challenges

In addition to accelerating the diffusion of effective strategies, a major goal of NICs is to improve the capability and capacity to improve, that is, to help members be more effective at solving important problems within their organizations, and boosting its collective IQ by employing better and better tools and practices in innovative ways (Engelbart, n.d.), and get better at getting better (Bryk et al., 2015). To enable the conditions for this to occur, SEA hub leaders employ several capacity-building strategies

to empower members to spread improvement science and effective instructional practices, locally. Member leaders play an especially important role in both the success of the NICs organization, and for the hope in spreading improvement science and continuous improvement habits across the local organizations from which members come. Fittingly, managing membership is a considering factor in NICs initiation framework (e.g., Russell et al., 2017), and an essential task of hub leaders (Peurach et al., n.d.). While hub members do closely attend to securing and sustaining willing members, it has not come without challenges. Hub members set high expectations for membership, which are detailed in their initiation documents. Hub leaders reveal that the degree of organizational learning depends on a *coalition of the willing*, and that many members typically enter the NICs with existing high degrees of self-efficacy. However, as evident in the findings, hub leaders are experiencing difficulty with meeting individual needs of participants, based on varying degrees of capacity or readiness. Evidence clarified that the NICs are not operating a remedial, school support type of program, so, it may be the case that those considering implementing the NICs model in educational settings, should see it as *one* of a variety of ways in which to increase capacity for and scale of continuous improvement. Participation is not for everyone, but those who do choose to join also bear the responsibility of serving as a champion and leader in spreading and scaling practices and behaviors in their local systems.

Further, these challenges related to individual member expectations may be exacerbated (or mitigated) by the degree of involvement from administrators. Hub leaders note the lack of involvement from principals in many cases. Further, they claim that when administrators are involved, buy-in increases. Therefore, hub leaders are now considering

a more systemic approach to membership by inviting principals to join their educator teams both in service of support, but also to secure buy-in or motivation on part of the principals to help spread and scale the efforts of NIC members across their organizations. "Seeing the system" is one of the principles of improvement science (Bryk et al., 2015), which entails using systems thinking practices to involve key members within the system and investigate interdependent parts of the system when exploring problems of practice. Systems thinking is also a key discipline within learning organizations (Senge et al., 2012). Not surprisingly, SEA hub leaders are noticing the implications of the degree to which systemic actors are involved and the potential consequences of spread, scale, and sustainability of improvement efforts.

Since organizational learning is one goal for any NIC, it has been suggested that some degree of organizational development may be a prerequisite to for hub leaders engaging in this work (Peurach et al., n.d.). It may also follow that for some hub leaders to operate NICs, a degree of double loop learning (Argyris & Schön, 1996) must occur first among them. While evidence uncovered shifts in mental models and legacy structural routines for the hub leaders in the *NIC team* at the agency—other departments may be carrying legacy habits and beliefs. Hub leaders admit that the execution of their shared vision for a NICs model has been made possible by their current senior leadership. At least one leader voiced concern that a shift in administration could put their innovations at jeopardy. Turnover challenges present potential threats to sustaining efforts within many organizations. Considering the underlying political nature of the state education agency organization, turnover in senior leadership may be especially

concerning, potentially placing innovations such as the NICs model in a precarious position in terms of sustainability.

This unique case study both confirms and extends understanding regarding NIC hub leadership. Many results corroborate previous findings from network and improvement leadership in the public, education, and health care sectors, as well as emerging findings related to NIC hub leadership specifically. Moreover, many of the structures, dispositions, and behaviors of hub leaders in the current case align with the adaptive leadership (Heifetz et al., 2009) and high-impact leadership (Swensen et al., 2013) theories upon which the study is based. This study also offers unique contributions to the current empirical literature by applying these leadership frameworks to a new setting—the NIC leadership hub. Further, the study uses these models to explore a unique case in which SEA leaders exclusively operate the NIC leadership hub, which allows for implications related to this unique structure.

Limitations

Creswell and Plano-Clark (2018) describe several threats to validity specific to qualitative data collection and analysis, including failure to define and bound the case, or explain the rationale for selection; introducing bias during data collection; and failure to explain surprising or contradictory results. Although I attempted to mitigate these threats to validity, it is important to note the potential limitations related to this case study.

First, I explained my criteria for case selection, based on past research and the need for empirical data in specific areas related to NIC hub leadership. Further, I defined the boundaries of my case, and the rationale for choosing a unique case study worthy of investigation, as well as for the holistic decision over the embedded case design, based on

the justifications of Yin (2018). Finally, I explained the rationale for acquiring member leader perspectives, both based on the recommendation of past researchers (e.g., Peurach et al., n.d.), as well as to potentially uncover new or surprising perspectives.

I attempted to uncover surprising and contradictory results by way of a couple of design strategies. First, I explicitly designed the data collection questions to probe into surprises, contradictory evidence, and challenges (Creswell & Plano-Clark, 2018). While the challenges were well documented, the only contradictory results were in relation to the adaptations of the NIC model, which, after review of the literature, do not seem to contradict the integrity of the model. Another method I employed to uncover potential contradictory or surprising findings was to expand the participant perspective by reaching out to member leaders, and by purposefully requesting interviews with current or past skeptics of the model. However, while some member leaders agreed to be interviewed, I was not able to attain participation from those past or current skeptics. It is also worthy to note that the member leaders who were interviewed voiced their surprise in being a part of a positive, quality experience coming from the SEA. So, it could be the case that their impressions of other SEA leaders (i.e., beyond the NIC hub and the scope of this case) may yield very different findings.

The case study results may be interpreted as acritical, or positively skewed, as with any qualitative research effort relying on purposive, snowball sampling and self-reporting lies the potential for biased perspectives and findings. It may be the case that the sample of participants choosing to participate and volunteer information for this study hold very similar opinions and perspectives. It also may be the case that participants may have been responding to perceived expectations of the researcher, or in ways that

projected leadership in a positive light, potentially demonstrating social desirability bias, or a tendency to respond in a social desirable manner (Fisher, 1993). This may be especially prevalent due to the legacy power structures that have existed between state and local education agencies, as well as even within the state agency itself. It is worthy to reiterate that the hub director self-proclaimed feeling "lucky" about their efforts to date, and that they are in the early emergent state of development, still learning. Findings may reflect a very different story if this case were examined years down the road.

I attempted to mitigate the danger of skewed perspectives and biases by attaining multiple perspectives from current and past hub leaders, as well as from member leaders from the local education agencies. I attempted to seek out diverse perspectives during snowball sampling requests, including healthy skeptics of the work. However, I was not able to secure participation from as diverse a sample as I had hoped. Further, I explicitly probed participants to discuss the inherent challenges they witnessed and/or experienced as partners in the NIC. They were very candid about both the successes and barriers they face while innovating the NIC model in the SEA. Despite these efforts to maintain the validity of the study, the potential for results to be biased remains a limitation.

Moreover, as mentioned previously, my researcher identity presents another potential area for bias to emerge, as I *am* a state agency leader (although in a different state than the one under study), and a scholar and practitioner of improvement science and NICs. While I was not examining *impact or outcomes* of either the change ideas tested, or leadership efforts within this NIC model, result may be perceived as acritical of the processes under study. I made serious attempts to mitigate any perceptions by maintaining reflexivity notes, soliciting feedback from participants through member

checking, and having a peer colleague examine my methods and results (Creswell & Poth, 2018). Further, I intentionally presented the purpose of the study in examining both the processes and challenges, explicitly questioned participants about the challenges, and encouraged their transparency in order to serve the practical purpose of assisting other prospective NIC leaders.

Empirical research on instructionally focused NIC hub leadership, although emerging, is still under examined. Further, scant empirical research existed on hubs operated exclusively by state-education agencies, at the time of the current case study. Recruitment and participation was further hindered by the COVID-19 pandemic, which persisted for the duration of all phases of this study. Therefore, the candidate pool of cases was extremely limited. Additionally, the case study is of an exploratory nature, although built upon a foundation of general leadership theory and literature from various disciplines upon which propositions were based, results should be considered provisional. Further, the case, at the time of study, was still in the emergent phase of development, so any confidence in NIC efficacy or student outcomes is reserved for further research. Finally, since this is just one, unique case, results are limited to analytic generalizations (Yin, 2018). That is, rather than attempting to draw inferences from my sample data to a population, the current study is limited to generalizations to the provisional theoretical generalizations about the phenomenon of study—SEA hub leadership as it relates to adaptive and high-impact leadership models. The provisional results generated in this case study will depend on further replication studies to uncover feasibility on a wider scale, tighten operational definitions of NIC leadership, and to expand upon additional adaptations or strategies as they relate to SEA hub leaders.

Significance of Study and Implications for Research, Policy and Practice

Despite the previously cited limitations, the current conditions presented an opportunity to examine a unique case, from which much can be learned. While inferences and generalizations cannot be drawn toward a particular population, it is hoped that the results may have potential for wider applicability beyond the case in contributing to strengthening the theoretical knowledge base and to help contribute to, and elaborate upon, emergent attempts to operationalize key leadership structures and behaviors exhibited in hub leadership. The results demonstrate connections and consistencies with previous research findings and emerging leadership theories, extending the understanding of adaptive and high-impact leadership in the context of NIC leadership. Moreover, this unique case study expands upon previous empirical works by investigating how these theories and past NIC leadership findings related to structures, behaviors, and mental models apply to NICs governed by a hub operated exclusively by SEA leaders, which, to date, has not been examined empirically. Results from this investigation also uncover unique political, policy, and practice considerations experienced by leaders operating within a state agency. Most importantly, the practical results may benefit current or prospective SEA change agents who may be considering initiating or implementing a similar model, or to those conducting exploratory needs assessments in preparation for future evaluations of their implementation efforts.

Implications for Research

Since the NIC model is still emerging within the field of education, future research studies are warranted of both the implementation and outcome variety. It is recommended that educational researchers in the field of improvement science and

networked improvement community leadership build upon these results by attempting to replicate this case study and/or expand upon these findings as SEA-led NIC models proliferate. Further, research should expand upon single case studies to include qualitative and mixed methods comparative case studies examining leadership strategies in multiple contexts. Echoing implications cited in other network leadership studies, operationally defining leadership constructs is an emergent effort. This challenge underscores the need for additional, more representative, empirical studies--possibly of the mixed method sort—to build more confidence in the operational definitions of leadership constructs, and in their wide application in practice. Although outcomes are beyond the scope of this case study, additional studies will be needed to assess the efficacy, feasibility, and sustainability of the NIC model, especially when the hub is operated by an SEA, as these cases have not proliferated, to date, and considering the inherent political factors in such organizations, as well as the potential challenges related to leadership turnover, to which participants alluded in this case. It is recommended that formative, summative, and developmental program evaluation studies examine NIC leadership directly in relation to outputs and outcomes, attending to the various implementation factors that enable successful outcomes related to member capacity building and student performance. This work will be especially important as NICs multiply and leaders, participants, funders, and other stakeholders potentially lean toward requesting program evaluation studies based on NIC efforts. The exploratory findings from this study could potentially serve as a foundational reference in future SEA-led NIC initiations, especially related to establishing the organizational theory of action, needs assessments and program evaluations of the model (e.g., Wholey, 2015).

Implications for Policy & Practice

SEA hub leaders in the current case operate as agents of change, exercising innovation, creativity, and persuasion. Other state leaders considering innovating with a NIC model may choose to take practical learning from the mental models, focus priorities, and related structures and behaviors demonstrated by the leaders in this case, including the following strategies:

- taking advantage of policy windows within the organization to pilot or initiate the model and connect it with other state and federal priorities, incentives, and strategic plans;
- shifting to prioritize policy instruments that apply capacity building approaches, to complement more traditional mandate and incentive approaches;
- prioritizing and allocating human and fiscal resources within the agency to maximize the supports provided to LEAs in continuous improvement efforts;
- prioritizing recruitment and training efforts to ensure essential skills in agency hub leaders to effectively support the improvement teams within the NICs, including subject matter content *and* improvement science expertise, as well as skills in coaching and delivering professional learning;
- engaging in a bi-directional, co-learning and support experience with schools, involving and empowering educational professionals as partners in problem-solving and continuous improvement, especially when attending to the factors that affect the effective implementation of programs and practices; and
- looking beyond high-stakes state assessments as the sole indicator of performance and expanding what qualifies as measurement and data for the purpose of

continuous improvement.

Conclusion

Leading NICs is a complex and daunting endeavor entailing adaptive leadership skills and dispositions. Adaptive leadership is an "improvisational art" (Heifetz & Linsky, 2002) and the work of network leaders cannot be scripted. Similarly, NIC hub leadership is complex and does not fall into the hands of any one individual. There may be no playbook detailing strict roles, responsibilities, and routines, nor a one-size-fits-all approach to how hub leaders choose to operate. Moreover, it may not adhere to one particular leadership theory, but rather, resemble more of a mosaic quality. However, the current case demonstrates themes and evidence that support past findings, and dovetail with the two prominent leadership models on which it is based. Hub leaders in this case study demonstrate qualities congruent with adaptive leadership theory and the high-impact leadership models set forth in the original proposition and conceptual framework. Further, they demonstrate a value in a distributed leadership approach to sustain and scale their vision. Moreover, expanding on these leadership models and approaches, hub leaders in this case demonstrate additional behaviors related to their position in a state education agency and the unique political, policy, and practice implementation responsibilities inherent in their role.

Three major insights emerged from the data gleaned in this case study, which may inform future research, policy, and practice. Hub leaders exhibit adaptive and high-leadership dispositions and behaviors. They treat members as equal partners, directly involving them in the work, while demonstrating their own vulnerabilities and co-learning stance as they immerse themselves in the co-learning experience with members.

Hub leaders maintain an experimental mindset and a relentless focus on their shared vision and the related strategic plan to carry it out. They adopt a continuous improvement mindset in their own work, adapting to ongoing challenges and making necessary course corrections, as the network model evolves.

SEA hub leaders establish adaptive structures with tight and loose elements to focus on building member capacity as local leaders. The highly centralized hub focuses on meticulous planning, and intensive, job-embedded professional development, while also allowing room for continuous improvement and adaptations, based on established feedback loops and member needs. High expectations from members are balanced with needs-based coaching and adjustments to professional learning and support. While exercising some degree of top-down, more centralized leadership, in terms of planning and management of change ideas and professional learning, hub leaders make abundant room for sharing and distributed responsibilities, differentiating expertise and building capabilities to empower educator members as champions and leaders of the work in their local contexts.

Finally, SEA hub leaders in this case act as agents of change. They demonstrate political savvy, creativity, and discipline to disrupt the equilibrium. They innovate in policy and practices, establish and execute a shared vision, and persuade others to join them on the journey. SEA hub leaders are establishing structures in which SEA leaders work with school practitioners as equal partners and co-learners, breaking down silos, providing deep support to empower local systems to problem solve and get better at getting better. Rather than fixing the schools from the outside, SEA hub leaders are building networks and relationships *with* LEA partners, creating the conditions and

motivating factors for collaboration, collective problem solving and capacity building for continuous improvement. In essence, they are attempting to create an improvement community environment to which members *want* to return, and bring others along with them.

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Appendix A

Case Study Protocol

SECTION A: OVERVIEW OF CASE STUDY PROJECT

- **Purpose:** The purpose of this exploratory, unique case study (Yin, 2003) is to examine SEA hub leadership structures and behaviors in the context of a networked improvement community model. This in-depth study is intended to shed light on how SEA hub leaders strive to build capacity in improvement science for organizational learning and continuous improvement.
- **Research Questions:**
    - How do SEA hub leaders use a NIC model to enable the conditions for building member will and capacity for inter-organizational learning and continuous improvement?
    - How do NIC hub leaders build collaborative cultures and relationships with and among members?
    - How do hub leaders strengthen or shift mental models to facilitate this work?
    - How are they adapting to leadership challenges inherent in the work?
- **Constructs:**
    - Improvement Science
    - Networked Improvement Communities
    - Capacity Building
    - Organizational Learning
    - Group Dynamics & Trust
    - Adaptive Leadership
    - High-Impact Leadership
- **Propositions & Hypotheses:** Adaptive and distributed leadership is necessary to cultivate a legacy of leaders who build collective capacity for inter-organizational learning and continuous improvement. Leaders apply improvement science principles and processes, organizational learning theory, and adaptive, high-impact leadership structures and behaviors to facilitate this work. Based on the hypothesized conceptual framework, and underlying leadership theories it is hypothesized that leaders operate from certain mental models, and exhibit adaptive dispositions and behaviors to facilitate the work. A-priori codes are based on these hypotheses (Final coding scheme is embedded in Appendix D).
- **Substantive Issues under Investigation**
    - How SEA hub leaders are building collaborative cultures and relationships for organizational learning
        - Leadership Structures within the NIC
        - Leadership Behaviors and Practices
        - Leader Mental Models
    - Leadership challenges & how they are addressed
    - Leadership lessons learned

- **Theoretical Framework & Relevant Readings:**
    - SEA as Change Agents (Brown et al. 2011)
    - Organizational Learning (Argyris & Schon, 1996; Senge et al., 2012)
    - Networked Learning/Networked Improvement Communities (e,g., Bryk, 2015; Bryk, Gomez, Grunow & LeMahieu, 2015; Engelbart, 2004)
    - Improvement Science (Bryk, 2015; Bryk, Gomez, Grunow & LeMahieu, 2015; Langley et al., 2009; Lewis, 2015)
    - Adaptive Leadership (Heifetz, Grashow, & Linsky, 2009)
    - High-Impact Leadership (Swensen, Pugh, McMullan, & Kabcenell, 2013)
- **Role of Protocol:** This protocol is used to guide the research of the current case study and to aid in possible future research efforts to examine other emerging cases.
- **Rationale for Site Selection:** Unique case employing NIC model with a leadership hub comprised exclusively of State Education Agency Leaders

SECTION B: DATA COLLECTION PROCEDURES

- **Data Collection Plan:**
    - Protocols for soliciting participants
        - Information Sheet explaining study and participant expectations
        - Interview Protocols included in Appendix B
    - Administration of interviews and requests for interviewee referrals
    - Systematic search and review of relevant documents, and request for additional documentation during/following each interview
    - Request for follow-up interviews following initial analysis, if required
    - Storage of files & database tracking
        - All files were stored in folders on the researcher's password protected computer.
        - Database
- **Data Base** (organized set of records/evidence)
    - Original interview transcripts
    - table indicating record of dates, links to each interview protocol, original transcripts, and memos for each individual interview; memos, and reflexivity notes to attend to biases and to note concerns about the process and data collected
    - aggregated codes
    - final codebook
- **Analytic Procedures:**
    - Deductive analysis based on conceptual framework and theoretical propositions
    - Inductive analysis based on emerging ideas/concepts that elaborate upon original conceptual framework and theoretical propositions
    - Attention to rival theories and explanations
    - Descriptive framework to outline possible themes, relation to logic model, and tentative report outline

SECTION C: PROTOCOL QUESTIONS

Research Questions:

1. How do SEA hub leaders use a NIC model to enable the conditions for building member capacity for inter-organizational learning and continuous improvement?
2. How do NIC hub leaders build collaborative cultures and relationships with and among members?
3. How do hub leaders strengthen or shift mental models to facilitate this work?
4. How are they adapting to leadership challenges inherent in the work?

Case Study Questions (Level 2):

How do leaders establish the conditions, culture, capabilities, and relationships for organizational learning and continuous improvement?

Structures

How do they build expertise?

- Individual capacity (honing leadership skills, knowledge, behaviors/practices)
- Collective capacity (fostering skills, knowledge, behavior/practices in others)

How do they establish the conditions for partnership work?
How are leadership roles and responsibilities assigned, shared and/or distributed?

Behaviors

How is team learning and collaboration facilitated?

- Build trust
- Interactions
- Use tools and routines

How is systems thinking employed?
How do mental models guide the work?
How do they keep the work user-centered?
How do they build the will to engage?
How do they remain focused on shared vision?
How is adaptive, distributed, and high-impact leadership evident from the data?
Are other theories applicable?
How have relationships developed or changed?
How do they adapt to challenges?
What are the most important lessons learned?

Level 1 Questions for Interview Protocols

(see interview protocol guides in Appendix B)

SECTION D: TENTATIVE OUTLINE OF REPORT & AUDIENCE

- **Audience:** Practitioners in SEA and LEAs; Educational Researchers (especially related to leadership and policy)
- **Descriptive Framework**
    - Case Background
        - Description of Case
        - History of program development
    - Case leaders contributions to understanding the case contributing to case themes
        - Vision and Conditions for Partnership
        - Mental Models
        - Building Collaborative Structures for Organizational Learning
        - Honing and Fostering Essential Behaviors
        - Shifts in Leadership Practices, Knowledge
        - Major Challenges and Lessons Learned
    - Proposition/theory building--connecting case to adaptive and high-impact leadership (in context of logic model)
    - Implications for Policy and Practice
    - Limitations and Significance of Current Study
    - Prospects for Future Study
    - Conclusion

Appendix B

Interview Protocols

Semi-Structured, Responsive Interview Guide [Hub Director]

SECTION A: OPENING/INTRODUCTIONS/PURPOSE
Thank you for taking the time to engage in this discussion with me today. Before we begin, I would like to take a minute to remind you of the purpose of this study. This study is intended to glean important information from network leaders about their experiences, unique skills, challenges, successes, and lessons learned, as they relate to building capacity for improvement in a network setting. Your unique experiences are expected to be valuable contributions to future research and to fellow practitioner leaders as instructionally focused improvement networks emerge and evolve in PK-12 educational contexts. I appreciate your participation and contributions to this study.

I will begin by telling you briefly about my experiences and knowledge in the NIC realm….
Would you mind sharing about yourself and how you came to be involved in NIC leadership?

SECTION B: ESTABLISHING CONTEXT (10 min.)
I would like to now learn more about the network context in which you work. Could you please tell me about your network, your purpose, and membership?
Potential probes:

- *How long has it been in operation?*
- *How long have you served as a network leader in this organization?*
- *Please describe the configuration of this network. Who else is part of the organization?*

ORGANIZATIONAL STRUCTURES
Could you please describe the overarching roles and responsibilities among network leaders?
Potential probes:

- *Who is part of the hub? What are the hub leaders' primary roles and responsibilities?*
- *What are member leaders' primary roles and responsibilities?*
- *What are your primary responsibilities?*
- *How would you describe/conceptualize/define network leadership in your NIC?*

SECTION C: LEADER EXPERIENCES
Next, let's discuss your leadership role and responsibilities in more depth.
ORGANIZATIONAL BEHAVIORS

In your role as a network leader, could you please describe and explain how you facilitate member capacity to use improvement science processes to conduct improvement research? So, if I were to follow you during a typical day with the network, what would I see you doing?

KNOWLEDGE SKILLS AND DISPOSITIONS
What types of leadership qualities (knowledge, skills, practices and dispositions) do you believe are essential for NIC leaders to hone and why?

How do these compare to those you have traditionally needed in your role as a SEA/jurisdictional/LEA leader?
Potential probe:

- What unique capacities do/would potential SEA/LEA/School district leaders need to develop in order to undertake this work effectively?

CHALLENGES AND SUCCESSES
What salient challenges do you encounter in your role as a NIC leader? How do you attempt to overcome these challenges? What successes have you accomplished so far?

SECTION D: FINAL THOUGHTS AND CLOSING
What important lessons have you learned in your role as a NIC hub leader?

Is there anything else that we haven't discussed and you would like to share?

Thank you for taking the time to share in this dialogue today. I appreciate your candid responses and I look forward to reviewing the information you have provided. If I have clarifications or follow up questions, would you be amenable to a follow-up conversation, at a mutually convenient time? If you have questions in the meantime, or if you think of additional information you would like to share with me, please contact me at: lori.dolezal@uvm.edu.
Thanks again for your valuable participation in this study.

Semi-Structured, Responsive Interview Protocol [Hub Leadership]

SECTION A: OPENING/INTRODUCTIONS/PURPOSE

Thank you for taking the time to engage in this discussion with me today. Before we begin, I would like to take a minute to remind you of the purpose of this study. This study is intended to glean important information from network leaders about their experiences, unique skills, challenges, successes, and lessons learned, as they relate to building capacity for improvement in a network setting. Your unique experiences are expected to be valuable contributions to future research and to fellow practitioner leaders as instructionally focused improvement networks emerge and evolve in PK-12 educational contexts. I appreciate your participation and contributions to this study.

SECTION B: ESTABLISHING THE COLLABORATIVE STRUCTURES AND BEHAVIORS/PRACTICES FOR ORGANIZATIONAL LEARNING AND IMPROVEMENT

STRUCTURES

Now, let's discuss your leadership role and responsibilities in more depth. In this section, I would like to learn more about how you establish collaborative structures for organizational learning and improvement in a network context.

What are your primary roles and responsibilities?

How do you share responsibility for leadership across the network?

BEHAVIORS/PRACTICES

Next, I would like to learn more about how you build an adaptive culture for organizational learning and continuous improvement

In your role as a network leader, could you please describe and explain how you apply improvement science processes and facilitate member capacity to conduct improvement research?

Potential probes:

- Facilitate PDSA cycles
- Attend to variation and use practical measures

How do you build the will for members to engage in this work?

How do you facilitate collegial collaboration and team learning across the network, both during network convenings and during action periods?

Potential Probes: Specifically, how do you:

- Build relational trust
- Use tools and routines

- Work systemically
- How do you enable and support educators to do this work?

How do you model and foster essential behaviors/practices to facilitate the work?

How do you build your own capacity as a leader?

How do you cultivate leaders across the network?

SECTION C: SHIFTS IN SKILLS, KNOWLEDGE, DISPOSITIONS & RELATIONSHIPS

Next, I would like to learn about how your organizational structures, behaviors/practices, knowledge, and mindsets shifted to facilitate this work?

What unique skills, practices and mindsets have you needed to build to do this work and how did you develop them?

How does this experience compare to your traditional leadership roles?

How have you changed as a leader and what have you learned about yourself as a result of this work?

How have your relationships changed? (SEA & LEA)

SECTION D: CHALLENGES AND LESSONS LEARNED

What were your biggest leadership challenges so far and how did you address them?

What important lessons have you learned in your role as a NIC hub leader?

SECTION E: FINAL THOUGHTS AND CLOSING

Is there anything we haven't discussed that you would like to share?

Do you have recommendations regarding specific individuals from whom I should request an interview? Do you have specific documentation that you would like me to explore to elaborate upon anything you have shared today?

Thank you for taking the time to share in this dialogue today. I appreciate your candid responses and I look forward to reviewing the information you have provided. If I have clarifications or follow up questions, would you be amenable to a follow-up conversation, at a mutually convenient time? If you have questions in the meantime, or if you think of additional information you would like to share with me, please contact me at: lori.dolezal@uvm.edu.

Thanks again for your valuable participation in this study.

Semi-Structured, Responsive Interview Protocol [Member Leader]

SECTION A: OPENING/INTRODUCTIONS/PURPOSE
Thank you for taking the time to engage in this discussion with me today. Before we begin, I would like to take a minute to remind you of the purpose of this study. This study is intended to glean important information from network leaders about their experiences, unique skills, challenges, successes, and lessons learned, as they relate to building capacity for improvement in a network setting. Your unique experiences are expected to be valuable contributions to future research and to fellow practitioner leaders as instructionally focused improvement networks emerge and evolve in PK-12 educational contexts. I appreciate your participation and contributions to this study.

SECTION B: ESTABLISHING THE COLLABORATIVE STRUCTURES AND BEHAVIORS/PRACTICES FOR ORGANIZATIONAL LEARNING AND IMPROVEMENT

STRUCTURES
In this section, I would like to learn more about how you establish collaborative structures for organizational learning and improvement in a network context.

What are your primary roles and responsibilities?

How do you share responsibility for leadership across the network?

BEHAVIORS/PRACTICES
Next, I would like to learn more about how hub leaders build culture for organizational learning and continuous improvement

How do leaders facilitate member engagement with improvement science processes?

How do leaders facilitate collegial collaboration and team learning across the network, both during network convenings and during action periods?

In what other ways do hub leaders support you in this work?
In what other ways do you support your colleagues in this work?

How do you hub leaders build the necessary relationships with you to engage in this partnership?

How do you build the will for colleagues to engage in this work?

SECTION C: SHIFTS IN SKILLS, KNOWLEDGE, DISPOSITIONS & RELATIONSHIPS

Next, I would like to learn about how your organizational structures, behaviors/practices, knowledge, and mindsets shifted to facilitate this work?

What unique skills, practices and mindsets have you needed to build to do this work and how are they developed among network leaders and members?

How have your relationships changed?

- What is different about the way your organizations work together?
- How have you engaged with SEAs/LEAs in new ways as a result of these partnerships?

How have you changed as a leader and what have you learned about yourself as a result of this work?

How do you build your own capacity as a leader and the capacity of your colleagues in leading this work?

- How are you supported [by hub] in this work?

SECTION D: CHALLENGES AND LESSONS LEARNED

What were the biggest leadership challenges so far and how were they addressed?

What important lessons have you learned in your role as a member leader?

SECTION E: FINAL THOUGHTS AND CLOSING

Is there anything we haven't discussed that you would like to share?

Do you have recommendations regarding specific individuals from whom I should request an interview? Do you have specific documentation that you would like me to explore to elaborate upon anything you have shared today?

Thank you for taking the time to share in this dialogue today. I appreciate your candid responses and I look forward to reviewing the information you have provided. If I have clarifications or follow up questions, would you be amenable to a follow-up conversation, at a mutually convenient time? If you have questions in the meantime, or if you think of additional information you would like to share with me, please contact me at: lori.dolezal@uvm.edu.

Thanks again for your valuable participation in this study.

Semi-Structured, Responsive Interview Protocol [SEA Executive Leadership]

SECTION A: OPENING/INTRODUCTIONS/PURPOSE

Thank you for taking the time to engage in this discussion with me today. Before we begin, I would like to take a minute to remind you of the purpose of this study. This study is intended to glean important information from network leaders about their experiences, unique skills, challenges, successes, and lessons learned, as they relate to building capacity for improvement in a network setting. Your unique experiences are expected to be valuable contributions to future research and to fellow practitioner leaders as instructionally focused improvement networks emerge and evolve in PK-12 educational contexts. I appreciate your participation and contributions to this study.

SECTION B: ESTABLISHING CONDITIONS FOR PARTNERSHIP WORK

Initiation

- How did you decide to adopt this model? How did you initiate the effort?
- How did leaders shift organizational policies and practices to support this work?
- How do you develop partnerships with researchers and LEAs?

SECTION C: STRUCTURES AND BEHAVIORS

- How is leadership structured in the hub? Across the NIC?
- How do you **build capacity for Improvement Science** among members?
- How do you cultivate leaders within the NIC?
- How do you build and sustain members' will and commitment to do this work?

SECTION D: SHIFTS

- What **unique skills, practices and mindsets** have you needed to build to do this work and how did you develop them? (developing capacity)
- How have you changed as a leader and what have you learned about yourself as a result of this work?
- How have your relationships changed? (SEA & LEA)

SECTION D: CHALLENGES AND LESSONS LEARNED

- What were your biggest leadership challenges so far and how did you address them?
- How might you see yourself improving in this work?
- How sustainable, feasible, viable is this model for SEA and LEAs?
- What important lessons have you learned in your role as a NIC hub leader?

SECTION E: FINAL THOUGHTS AND CLOSING

- Is there anything we haven't discussed that you would like to share?

- Do you have recommendations regarding specific individuals from whom I should request an interview? Do you have specific documentation that you would like me to explore to elaborate upon anything you have shared today?

Thank you for taking the time to share in this dialogue today. I appreciate your candid responses and I look forward to reviewing the information you have provided. If I have clarifications or follow up questions, would you be amenable to a follow-up conversation, at a mutually convenient time? If you have questions in the meantime, or if you think of additional information you would like to share with me, please contact me at: lori.dolezal@uvm.edu.

Thanks again for your valuable participation in this study.

Appendix C

Consent to Participate in Research

Title of Research Project: Networked Improvement Community Leadership
Principal Investigator: Lori Dolezal
Faculty Advisor: Bernice Garnett
Sponsor: University of Vermont

Introduction
You are being invited to participate in this study because you are a Networked improvement Community hub leader who also reserves as a leader in a state/regional government education agency. Since research about NIC leadership is limited, the field is in need of rich descriptions of how NIC hub leaders, like yourself, lead, manage, coordinate, facilitate, and foster key processes within the NIC. Your contributions to developing this understanding can be valuable toward helping current and future NIC leaders develop, improve, and sustain the work within Networked Improvement Communities.

Why is This Research Study Being Conducted?
The purpose of this qualitative interview study is to examine NIC hub leadership from the perspectives of hub leaders who also serve as leaders in state/regional government agencies. The intention of this applied research design is to explore and contribute to emerging theories related to problem-solving, programs and intervention in education; in this case the NIC model. Specifically, the intention is to glean detailed, practical information about the complexities related to leadership role structures, behaviors, skills, dispositions, and challenges inherent in facilitating essential processes within the network, for the purpose of building on emerging theories, as well as contributing practical information for educational practitioners considering applying this model. Additionally, a major goal of this study is to explore leaders' perspectives on how their NIC hub leadership role structures, skills, and dispositions may diverge or differ from those in their traditional leadership experiences in state/regional government agencies.

How Many People Will Take Part in The Study?
About 4-6 individuals will participate in this study.

What Is Involved in The Study?
Study participation will take a total of approximately 3 hours to include multiple interviews and potential interim communication related to questions or clarification about submitted NIC artifacts for study. Interviews will be recorded for later transcription but participants' identities will remain anonymous for the course of the study and in all final published reports.
Sample interview questions include the following:

- What are some specific strategies you employ to foster shared knowledge building and relational trust among members?
- How do you build collaborative learning environments in which members can experiment and problem solve, using improvement science methods?
- What challenges do you encounter in your role as a SEA level NIC hub leader? How do you overcome these challenges?
- What important lessons have you learned in your role as a NIC hub leader?

All study procedures will take place at a location convenient to participants or via zoom or similar technology. Written reports will be freely available to participants and participants will be asked to review them prior to publication.

What Are the Benefits of Participating in The Study?
The benefits of participating in this study include the contribution of a collection of practical information that can be used by colleagues in similar roles for the purpose of learning about NIC leadership and potentially improving the quality of NIC leadership.

What Are the Risks and Discomforts of The Study?
There are no inherent physical, emotional, or mental risks involved with study participation.

Are There Any Costs?
There are no participant costs associated with this study.

What Is the Compensation?
Participants will not be paid for their involvement in this study.

Can You Withdraw or Be Withdrawn from This Study?
You may discontinue your participation in this study at any time, at which point all records will be deleted and no information gleaned from the participant will be included in the analysis or final reports. The researcher may discontinue your participation in this study at any time, at which point all records will be deleted and no information gleaned from the participant will be included in the analysis or final reports.

What About Confidentiality?
To minimize the risks to confidentiality, the researcher will employ the following strategies:

- All audio and written records will be stored on a password protected and internet encrypted computer. Records will be destroyed or transferred if/when the researcher relinquishes possession of the original computer on which records are stored.
- The University of Vermont Institutional Review Board will have access to original records only for the purpose of verification of research procedures.

- The researcher is the only individual who will have access to these identifiable records.
- All files will indicate the pseudonym for each participant
- Pseudonyms will be used for all participants in the final reports.
- All communication via email cannot be guaranteed to be private or secure.
- When the research is completed, the researcher may save the notes, samples, transcripts, or related documents for use in future research for up to 10 years following the study.

We will keep your study data as confidential as possible, with the exception of certain information that we must report for legal or ethical reasons, such as child abuse, elder abuse, or intent to harm yourself or others.

Contact Information

You may contact Lori Dolezal, the Investigator in charge of this study, at lori.dolezal@uvm.edu for more information about this study. If you have any questions about your rights as a participant in a research project or for more information on how to proceed should you believe that you have been harmed as a result of your participation in this study you should contact the Director of the Research Protections Office at the University of Vermont at 802-656-5040.

Statement of Consent

You have been given and have read or have had read to you a summary of this research study. Should you have any further questions about the research, you may contact the person conducting the study at the address and telephone number given below. Your participation is voluntary and you may refuse to participate or withdraw at any time without penalty or prejudice.

You agree to participate in this study and you understand that you will receive a signed copy of this form.

_____ _____

Signature of Subject (18 yrs. of age or older) *Date*

_____

Name of Subject Printed

This form is valid only if the Committees on Human Research's current stamp of approval is present below.

Researcher Signature

_____ _____

Signature of Principal Investigator or Designee *Date*

_____

Name of Principal Investigator or Designee Printed

Name of Principal Investigator:
Address:
Telephone Number:

Name of Faculty Sponsor:
Address:
Telephone Number:

Appendix D

Final Coding Scheme

Mental Models that Guide the Vision
Related Codes and Descriptions
***Mental Models (MM):** Evidence related to: values and beliefs that guide the work (emergent from the data) **Partnership Stance over Compliance (PSoC)** **Empower of Educators (EOC)** **Evidence-based Culture/Internal Accountability (IA)**: Evidence related to: leaders assisting with the development and administration of practical measures to focus on classroom results
Theme: Commit to Vision
Related Codes and Description
Relentless Focus on Vision & Strategy (RFVS): Evidence related to: Establishing a strategic vision for the organization and translating that vision into an operational plan; designating resources to priority efforts; building organizational infrastructure and strategies; shifting policies, and setting expectations
Theme: Build Capacity and Efficacy
Sub Theme: Develop Hub and Member Leader Capabilities with Strong Systems of Support
Related Codes and Description
Develop Capability/Expertise/Personal Mastery (PM): Evidence related to: Developing their own individual and group capabilities in improvement practices and instructional related practices; learning on the job; and devoting resources to building leaders within subsystems
Establish Feedback Loops (FL): Evidence related to: Establishing formal and informal, bi-directional communication among members, including surveys, observations, coaching, visitations, or other methods
Sub Theme: Distribute and Differentiate Responsibilities using a Peer Leadership Model
Related Codes and Descriptions

Distribute and Differentiate Leadership (DDL): Evidence related to: roles & responsibilities, and how leadership is distributed, differentiated or shared

Theme: Build Relational Trust and Motivation

Sub Theme: Empower Members as Partners and Foster Co-Learner Orientations

Related Codes and Description

Person-Centered Practices (PCP): Evidence related to:

- directly engaging the people closest to the work in the improvement research and problem solving, focusing on the issues that matter most *to them*.
- demonstrating empathy and active listening, and treating members as equals and honoring their professionalism
- sharing responsibilities for decision-making
- providing needs-based supports

Front-line Engagement (FLE): Evidence related to:
modeling a *learn by doing* orientation, demonstrating improvement behaviors and using tools, routines, and processes consistent with improvement science to co-conduct disciplined scientific inquiry; modeling improvement behaviors; and promoting a partnership culture in which they are accessible for questions and support

Foster Collaboration/Team Learning (TL): Evidence related to:

- organizing and facilitating formal structures and opportunities for collaboration
- prioritize building trusting relationships and sense of community among members
- Engaging teams in dialogue & sustained collective inquiry; working toward shared solutions

Exercise Adaptive Dispositions (AD): Evidence related to:

- leaders' flexibility, humility, vulnerability, persuasive power, and ability to tolerate ambiguity; disrupting equilibrium
- **Demonstrate Transparency (T):** Evidence related to leaders' freely sharing information; accepting ideas and fostering a culture of openness and honesty; and modeling transparent behavior that creates safety for acceptable failure

Sub Theme: Make Evidence Visible with a Learn-by-Doing Approach

Related Codes and Descriptions

Evidence-based Culture (EBC): Evidence related to: leaders assisting with the development and administration of practical measures to focus on classroom results; focusing on delivering results; and using evidence from research about effective practices

Learn-by-Doing (LBD): Understanding group culture to assess aspects that hinder or facilitate change and adapt structures and supports to meet context of members
Sub Theme: Spread Results and Enthusiasm
Related Codes and Descriptions
***Belief and Enthusiasm (B&E):** Evidence related to: leaders spreading enthusiasm for the NIC model, being visible champions of improvement and building will and motivation among members.
Spread and Scale Ideas (S&S): Evidence related to: leaders sharing resources, codifying the co-constructed knowledge of members to develop resources for spread of ideas; and helping sustain strong networks so that members can build capacity *for* adaptation
Adapt to Ongoing Challenges
Challenges: Evidence related to: any specified challenges with which hub leaders are currently grappling or challenges to which they have adapted.