

Building Systems Knowledge for Continuous Improvement: Early lessons from the CORE districts

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November 2017

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Executive Summary

In California, recent policy shifts have created a high degree of local control with the expectation that school districts will think differently about school and district improvement. However, many districts lack the individual expertise and organizational capacity to support these changes at scale.

In this policy report, we take a first step towards clarifying what continuous improvement activities can look like in school districts. More specifically, the lessons that we share focus on the early efforts of one network of California school districts—the CORE districts—that is collectively tackling a shared problem of practice by applying a particular continuous improvement model known as a Networked Improvement Community (NIC). The CORE districts are in the beginning stages of their work to close the math achievement gap in Grades 4–8 for their African American and Hispanic/Latino students. They spent their first year as a NIC building a complete understanding of their school systems, identifying a shared problem of practice, and then engaging in structured systems analysis activities that relied heavily on bringing together a wide range of district staff to collect and interpret a variety of data sources from different parts of the organization. The objective was to begin the process of continuous improvement by exploring their school systems holistically, considering all the possible causes of the math achievement gaps, and then eventually using their systems analysis data to identify specific change ideas to test over the coming years.

The first section of the report briefly explains the concept of continuous improvement and its application in Networked Improvement Communities. Next, we detail four lessons learned from the work of the CORE Improvement Community (CIC):

1. Effective systems analysis starts with creating an improvement team that is set up for success.
2. The systems analysis process enables district leaders to revise, refine, and expand their initial theories about the reasons behind their problem of practice.
3. Accessing and interpreting different types of data are critical to building a complete understanding of a problem of practice.
4. Teams getting started in continuous improvement benefit from expert facilitation and learn-by-doing activities.

We conclude with a description of challenges and roadblocks identified by CIC members and recommendations for educators looking to incorporate continuous improvement principles into their work. For all those educational leaders who are interested in accelerating system improvement and learning from the work of the CIC, we encourage reflection and investment in the systems analysis process. Our findings suggest that, while challenging, investing in building the capacity to implement continuous improvement strategies can lead to powerful insights and new ways of engaging in reform.

Introduction

When educators describe their district’s approach to improvement, they often tell a story of constant change, where instead of prioritizing a small number of improvement strategies over an extended period of time, leaders repeatedly introduce new solutions in response to perceived problems. Often, district leaders feel as though they do not have sufficient time to consider why a problem persists or why an existing set of policies and practices may not be producing the desired results for their students. Sometimes this is because system stakeholders, such as school boards and community activists, place political pressure on district leaders to change course when intended results are not immediately visible (Cuban, 1984, 2013). In other situations, shifts in federal or state education policies change the conditions associated with school improvement. For example, when state and federal accountability mechanisms change, so do the mandates and sanctions that accompany them (Rowan, 2002). These changes, coupled with the need to access any and all available financial resources, even if money is tied to prescribed school reform strategies, create added pressure to continue changing course rather than investing in a long-term, coherent model for improving school districts (Fullan & Quinn, 2015; Le Floch et al., 2016).

Changing this way of operating is more important now than ever before. In California, recent policy shifts have created a high degree of local control with the expectation that school districts will think differently about school and district improvement. These changes in policy aim to create an environment where local education leaders have more control over their long-term strategies for district improvement. Specifically, two new state policy structures, the Local Control Funding Formula (LCFF) and the California School Dashboard,¹ have given school districts more autonomy in how they allocate resources and how they choose to intervene when groups of students are not achieving (Humphrey & Koppich, 2014). Under these new approaches, district leaders create goals in each of the state’s eight priority areas,² then allocate resources strategically to ensure equitable outcomes for all students. All of this work is documented in a Local Control and Accountability Plan (LCAP).

Underlying California’s policy shift is an explicit focus on continuous improvement. A report released in 2016 by the State Superintendent’s Task Force on Accountability and Continuous Improvement explains the state’s vision for continuous improvement:

¹ California’s School Dashboard was launched during SY 2016–2017. The Dashboard is a website that shows how local educational agencies and schools are performing on the indicators included in California’s new school accountability system. To learn more about the indicators included on the dashboard, see <https://www.cde.ca.gov/ta/ac/cm/>

² California’s eight priority areas are (a) basic services, (b) implementation of state standards, (c) course access, (d) student achievement, (e) other student outcomes, (f) student engagement, (g) parent involvement, and (h) school climate. For more information on California’s eight priority areas, see <https://www.cde.ca.gov/Fg/aa/lc/statepriorityresources.asp>

We are equally committed to supporting and cultivating a system-wide culture of continuous improvement... that relies on multiple measures to provide the information necessary to engage in improvement efforts. This culture of continuous improvement must infuse all parts of the system, including continuous improvement for the system itself, through evaluative mechanisms that allow us to learn from local experience and revisit the indicators, tools, and systems of support we use to ensure they are working as intended. (Superintendent's Advisory Task Force, 2016)

This report sets the expectation that improvement is an ongoing learning process that requires repeated evaluation, reflection, and adaptation. Furthermore, the report emphasizes the importance of incorporating continuous improvement practices into the state's own work to ensure that the systems of support—the organizations, tools, and resources that help school districts understand and implement state policies—are effective. While many district leaders, county office of education staff, and other stakeholders who are directly responsible for interpreting and implementing these policies think they hold promise, most are still working towards a shared understanding of the processes and practices that California's policymakers have labeled *continuous improvement* (Hough, Willis, et al., 2017). This lack of understanding about what continuous improvement means in practice has resulted in slow progress towards the vision laid out by the Superintendent's Task Force (Humphrey et al., 2017).

In this policy report, we take a first step towards clarifying what continuous improvement activities can look like in school districts. More specifically, the lessons that we share focus on the early efforts of one network of California school districts—the CORE districts—that is collectively tackling a shared problem of practice by applying a particular continuous improvement model known as a Networked Improvement Community (NIC) (Bryk, Gomez, Grunow, & LeMahieu, 2015). The CORE districts are in the beginning stages of their work to close the math achievement gap in Grades 4–8 for their African American and Hispanic/Latino students. They spent their first year as a NIC building a deep understanding of their school systems, identifying a shared problem of practice, and then engaging in structured systems analysis activities that relied heavily on bringing together a wide range of district staff to collect and interpret a variety of data sources³ from different parts of the organization. The objective was to begin the process of continuous improvement by exploring their systems holistically, considering all the possible causes of the math achievement gaps, and then eventually using their systems analysis data to identify specific change ideas to test over the coming years. Before we describe the work of the CORE districts, we start with a short overview of continuous improvement and highlight what makes this strategy different from others applied in education

³ A primary data source for CORE's NIC was their School Quality Improvement System, which is the accountability system developed as part of their waiver from NCLB. This data system encompasses academic, social-emotional and culture–climate indicators. CORE's data examines proven as well as emerging indicators and is constantly evolving to better understand the elements that lead to college and career readiness. Detailed information about the School Quality Improvement System measures can be accessed at <http://coredistricts.org/our-data-research/improvement-measures>.

settings. Then, we share more information about the CORE districts, their path to becoming a NIC, and the work that they are currently engaging in together. Our report findings are organized around four early lessons from CORE’s NIC, which are followed by a discussion of some of the challenges the NIC has faced along with some recommendations for others in our field who are interested in adopting similar strategies.

Continuous Improvement and Networked Improvement Communities

Since continuous improvement is at the center of California’s strategy for school improvement,⁴ the term is being incorporated into education conversations in a wide variety of contexts. A recent brief published by PACE and WestEd (Hough, Willis, et al., 2017) that incorporated interview data from more than 40 leaders from policy and practice across the state found that the term continuous improvement has taken on many different meanings. To some, continuous improvement is a culture or “way of doing business” that contrasts other education reform paradigms such as accountability. Unlike continuous improvement, accountability paradigms impose sanctions when failure occurs, rather than viewing failure as an expected component of learning to improve. In organizations that have a continuous improvement culture, the emphasis is on collective responsibility for outcomes, learning from failure and transparency (Lucas & Nacer, 2015).

For others, continuous improvement extends beyond a set of cultural norms. For example, in the management and healthcare industries, leaders concentrate on building continuous improvement organizations (Masaaki, 1986; Rother, 2009; Senge, 2006). Staff in these types of organizations, sometimes labeled *learning organizations*, are able to:

- create a clear and consistent sense of purpose and shared responsibility;
- identify common evidence-based processes and practices that comprise the primary work of the organization;
- work across typical boundaries to create a system of aligned processes targeted at shared organizational goals and priorities;
- invest in capability-building across the organization to implement a common, shared improvement methodology;
- invest in a data infrastructure that provides feedback on daily work processes tied to organizational outcomes; and
- invest in leadership practices that build and sustain a continuous improvement culture.

⁴ Through such bodies as the State Superintendent’s Accountability and Continuous Improvement Task Force (<http://cdefoundation.org/what-we-do/accountability-and-continuous-improvement-task-force/>) and the California Collaborative for Educational Effectiveness (<http://ccee-ca.org/>), policymakers have signaled that continuous improvement is the recommended path to achieving better outcomes for California’s students.

Especially important from the list above is the adoption of a common, shared improvement methodology, which is the tools and processes that organizations use to understand problems, and test, evaluate and adapt change ideas. This practice separates a learning organization from one that lacks the coherence and discipline to concentrate on a sustained set of improvement priorities over time.

In education, researchers have also emphasized the importance of transforming school districts into learning organizations (Bryk et al., 2015; Fullan & Quinn, 2015; O’Day & Smith, 2016; Resnick & Hall, 1998). While different conceptual frameworks for helping school systems become continuous improvement organizations exist, each embracing slightly different terminology, all frameworks include components similar to those listed above. In this report, we focus on one specific continuous improvement model, Networked Improvement Communities, because the CORE districts are applying this model to their continuous improvement work, and the networked approach to continuous improvement is one that is gaining in popularity across the state.⁵

Networked Improvement Communities

In the past, educators have used peer-based networks to facilitate learning across and within systems. (Dufour, 2004; Scanlan, Kim, Burns, & Vuilleumier, 2016; Stoll, Bolam, McMahon Wallace, & Thomas, 2006; Wenger, 2000). Network members frequently coalesce around a shared problem of practice, but rarely work together to improve it systematically and scientifically (Bryk et al., 2015). Membership in these peer networks is driven by what adults can learn from each other, instead of how they can collectively develop a common theory of improvement that they test and refine over time.

Anthony Bryk and his colleagues at the Carnegie Foundation for the Advancement of Teaching developed the NIC model as a way to combine the power of networks and the principles of continuous improvement (Bryk et al., 2015). They specifically separate NICs from other learning networks by attributing to them four essential characteristics. They explain that a NIC is:

- **focused** on a well-specified common aim;
- **guided** by a deep understanding of the problem, the system that produces it, and a shared working theory to improve it;
- **disciplined** by the methods of improvement research to develop, test, and refine interventions; and
- **organized** to accelerate the diffusion of these interventions out into the field and support their effective integration into varied educational contexts.

⁵ For example, the California Collaborative for Educational Excellence hosts Professional Learning Networks as a centerpiece of their approach to helping districts build capacity to improve. For more information, see <http://ccee-ca.org/>.

As is evident from this list, the NIC characteristics incorporate many of the characteristics associated with continuous improvement organizations, including a clear sense of purpose and the use of specified improvement methods. There are many different continuous improvement methods and tools, but the NIC model that the CORE districts are implementing incorporates a specific set adapted and aggregated from other industries by the Carnegie Foundation (LeMahieu, Grunow, Baker, Nordstrum, & Gomez, 2017). This set, which they often refer to as improvement science, borrows heavily from ideas on systems thinking and improvement first articulated by W. Edward Deming.⁶

Bryk and his colleagues have used Deming's ideas as the foundation for their own NIC model, but have also incorporated improvement tools from other industries, specifically healthcare (LeMahieu, Grunow, et al., 2017). During the testing phases, NICs use a tool called the Plan-Do-Study-Act (PDSA)⁷ cycle to guide members through iterative tests of change ideas in order to build knowledge. However, before reaching the PDSA testing phase, the NIC model requires that members spend a significant amount of time building "a deep understanding of the problem [and] the system that produces it" (Bryk et al., 2015).

In this report, we describe the continuous improvement work that precedes the PDSA testing process. This work, articulated in the first two characteristics of a NIC described above, places a clear focus on developing a common aim and understanding a problem of practice from a systems perspective. To this end, much of the early and ongoing work of CORE's NIC was directed towards building a complete understanding of the system that is producing undesirable outcomes, a process commonly referred to as *systems analysis*.

Systems analysis activities were heavily supported by what the NIC model calls a *network hub*. The network hub supports the work of the NIC in a number of ways (Russell et al., 2015). These include helping NIC members learn how to use continuous improvement methods in practice; providing data analysis support to help NIC members understand variation in performance across their systems; accelerating the spread of information and learning through documentation and dissemination; and acting as the convening, communicating, and organizing body for the NIC. In CORE's NIC, which we refer to as the CORE Improvement Community (CIC), the network hub is a team of staff members from the nonprofit organization, CORE Districts,

⁶ Deming's theory of systems improvement, termed *the system of profound knowledge*, was grounded in three principles: (a) all improvement comes from an appreciation for the whole system and how the parts interact, (b) it is important to understand how organizational processes are contributing to variation in system outcomes, and (c) interpersonal and social structures impact organizational performance (Deming, 1994).

⁷ LeMahieu, Grunow, et al. (2017) describe the four elements of the PDSA cycle as: (a) planning a change and a way to test it, (b) carrying out the change and testing on an appropriate scale, (c) studying the results, and (d) acting upon the knowledge gained. This last item could include adapting the change and running the cycle again, adopting the change and running another cycle (perhaps at a larger scale), or abandoning ideas that were learned to be ineffective. The quality improvement cycle is depicted as continuous, with learning from previous cycles incorporated into subsequent ones.

which was formed in 2010 to support the work of the member districts. The hub also includes a set of external partners with expertise in data analysis and continuous improvement: The Carnegie Foundation for the Advancement of Teaching provided expertise in continuous improvement methods and NIC formation, Education Analytics provided real-time data analysis, and Policy Analysis for California Education provided research support.

The CORE Improvement Community

The CORE districts are situated in Fresno, Garden Grove, Long Beach, Los Angeles, Oakland, Sacramento, San Francisco, and Santa Ana. Together, they serve over one million students across approximately 1,800 schools and educate 20 percent of California’s English language learners and 22 percent of the state’s students from low-income families. These districts also serve 27 percent of California’s African American students and 20 percent of its Hispanic/Latino students. The CORE Districts collaboration began in 2010, after leaders from the districts came together to design California’s Race to the Top proposal. Although it was unsuccessful, it led to continued collaboration among the districts and the formalization of CORE. The CORE Districts organization, a non-profit with a board of directors made up of the eight CORE districts superintendents, currently employs about ten staff. Their primary tasks are to facilitate the work of the CORE Districts (Knudson & Giribaldi, 2015; Marsh, Bush-Mecenas, & Hough, 2017).⁸

In 2013, a shared focus on innovation, collaboration, and local control helped the CORE Districts secure a No Child Left Behind (NCLB) waiver from the federal government to use multiple measures to evaluate strengths and weaknesses in schools and to identify those in need of improvement.⁹ The CORE Districts built and maintain a comprehensive school improvement and accountability system that provides educators a clear view of progress by including data on student-level academic growth, high school readiness, students’ social-emotional skills and schools’ culture–climate, along with traditional measures of test scores, graduation rates, and absenteeism (Hough, Kalogrides, & Loeb, 2017; West, Buckley, Krachman, & Bookman, 2017).

The waiver from No Child Left Behind (NCLB) provided district staff and superintendents across the CORE districts many different ways to collaborate, both formal and informal. An evaluation of the implementation of CORE’s waiver revealed that staff valued these opportunities to connect with cross-district peers, but that the waiver implementation process had yet to produce the “deep peer-to-peer learning” or “professional accountability to improve” that was originally intended (Marsh et al., 2017). The passage of the Every Student Succeeds Act (ESSA) in 2015 ended the waiver system and gave the CORE Districts an opportunity to reflect on their

⁸ For more information on the history and the current work of the CORE Districts organization, see <http://coredistricts.org/about-us/>

⁹ Only six out of the eight CORE districts were included in CORE’s waiver from No Child Left Behind. These were Fresno, Long Beach, Los Angeles, Oakland, San Francisco and Santa Ana.

collaborative work to date. All eight CORE superintendents agreed that the network had value and wanted to find a way to continue learning from one another. Beginning in 2016, they asked the staff from the CORE Districts organization to research potential next steps for collaboration and learning. A priority for the CORE Districts moving forward was to use their collective knowledge and shared data system to help each other address shared problems of practice, especially those focused on equity and access for all students (Knudson & Giribaldi, 2015). The waiver from NCLB had offered a similar opportunity for co-creation because it included the development of a new accountability system that was more equity-minded.

CORE Districts organization staff reached out to stakeholders who had been involved with CORE's waiver implementation to learn about the strengths and challenges of that process. They also researched different collaboration frameworks that would accommodate collective problem-solving and provide a structure to the improvement process. Ultimately, the CORE staff and superintendents decided that the NIC model held the most promise because of its focus on developing shared common aims and working to solve them using specific continuous improvement methods. Plus, the NIC structure fit nicely into CORE's existing structure, with their focus on collaboration and measurement. The CORE districts were already established as a collaborative network, and CORE Districts staff were already serving as conveners and facilitators. These staff were a natural fit to serve as the NIC's network hub. CORE Districts organization staff shared their research with the CORE superintendents, who expressed support for the idea and the model. During these early conversations, staff also brainstormed with the CORE superintendents to determine some possible areas of focus for the NIC. Some early ideas included improving math proficiency for African American students, improving English language arts proficiency for English language learners, and improving high school readiness for eighth graders.

As the process to determine CORE's next phase of work continued, educators engaged with CORE began discussing where the NIC should focus its first problem of practice. During this process, teams from each district reviewed data on student performance across CORE and within each district. These activities led them to focus on one problem of practice that felt like a high priority for many of the districts—the math achievement gap for African American and Hispanic/Latino students. The teams formed hypotheses about why this problem persisted, and discussed which areas of their systems could be perpetuating the problem. Ultimately, the CORE districts chose to focus on math achievement gaps in Grades 4–8. This was an area of persistent struggle across each of the districts, with a strong existing measurement infrastructure to support data analysis and evaluation. The CORE's NIC, known as the CORE Improvement Community (CIC), is comprised of district improvement teams from all eight CORE districts. These teams include six to eight district leaders from different departments who are at various levels of seniority. Each team includes at least one cabinet-level leader.

The CIC is just beginning its improvement journey, and members have spent their first year deeply engaged in the process of systems analysis. After getting more specific with their shared problem of practice, the CIC committed to learning about how and why their systems were perpetuating this math achievement gap. As we describe in the next section of this report, CIC district improvement teams conducted their systems analysis by analyzing many kinds of data, including school and district data on student outcomes in math, student growth in math, and results from student surveys that measured social-emotional indicators. They also challenged their preconceived understanding of how students and teachers experience math instruction on a daily basis by talking to students and teachers, and learning about how existing district structures and processes were functioning in practice. The goals of the systems analysis included developing a theory around why achievement gaps persist within and across the CORE districts, and identifying areas of the system that could provide high-leverage opportunities to test out ideas for improvement. Moving into the 2017-2018 school year, CIC district improvement teams are focused on identifying specific schools, school leaders and teachers who can join their teams. Currently, these school-level team members are learning about the systems analysis work that has already taken place and developing the knowledge, skills and routines to use the PDSA tool to conduct rapid tests of change and drive continuous improvement in classrooms.

To help carry out their systems analysis, the CIC leveraged a set of resources and supports provided by the network's hub. Again, the network hub consisted of staff members from the nonprofit organization CORE Districts that was created in 2010 to support the work of the eight member districts, as well as a set of external partners from the Carnegie Foundation for the Advancement of Teaching that provided expertise in continuous improvement and NIC formation. The network hub helped CIC teams investigate their systems by: (a) scaffolding the systems analysis work into action periods with specified outcomes; (b) providing many different types of opportunities for district teams to share progress and troubleshoot challenges; and (c) building member knowledge and skills along the way. Lesson four (pp. 23) details these activities and provides specific examples.

For the CIC, conducting a thorough systems analysis proved a pivotal first step in the process of continuous improvement. CIC members had long recognized that their school systems produced differential achievement for students of different backgrounds and social classes. Therefore, advancing equity required a hard look at the systems that produced these inequities (O'Day & Smith, 2016). Their time spent building system understanding allowed the improvement teams to begin to shift mindsets away from starting with predetermined solutions that get tested across the entire system at once and towards a prolonged, thoughtful exploration of (a) existing district practices and processes and (b) the individuals within the systems that could be bringing implicit bias into their daily work (Staats, 2016). Engaging in the process of systems analysis influenced each district's decisions about where to begin focusing change efforts in important ways. For that reason, we have identified the aspects of the systems analysis process that proved most beneficial for the CIC, as well as the associated

challenges that district improvement teams faced in the first stage of their work together. Our hope is that sharing the key insights gleaned from the CIC's early efforts, providing rich descriptions of how this work was carried out, and highlighting the challenges that the CIC encountered will help district leaders, county offices of education, and other technical support organizations support continuous improvement in California better.

Building Systems Knowledge for Continuous Improvement: Key Lessons

The next section of this policy report is organized around four lessons that were identified as important for the CIC during their systems analysis work in the first year of NIC implementation. Each lesson is described in depth and includes examples from the CORE districts to provide detail and clarity:

1. Effective systems analysis starts with creating an improvement team that is set up for success.
2. The systems analysis process enables district leaders to revise, refine, and expand their initial theories about the reasons behind their problem of practice.
3. Accessing and interpreting different types of data are critical to building a complete understanding of a problem of practice.
4. Teams getting started in continuous improvement benefit from expert facilitation and learn-by-doing activities.

This policy report draws from data collected and analyzed between September 2016 and August 2017. Included in the data analysis were three CIC member surveys, field notes from 23 CIC convenings (in-person and virtual), and 16 interviews with CIC improvement team leaders and network hub staff. A wide range of CIC artifacts, which included meeting agendas, presentations, and continuous improvement tools and resources used to guide the CIC work, were also catalogued and included in this analysis. All qualitative data were analyzed thematically and triangulated with member survey data to confirm emerging lessons learned.

Lesson 1: Effective systems analysis starts with creating an improvement team that is set up for success.

Building systems knowledge requires that improvement teams truly understand all the components of their existing system—everything from curriculum and instruction to human resource practices to professional development activities that could be influencing student outcomes around a specific problem of practice, and how all of those initiatives fit together. Individuals within a central office often have a specific and partial view of how their system does or does not work, and nobody is ever capable of seeing the whole system at once (Fullan & Quinn, 2015). This can create divergent priorities or a system where there are many different areas of focus, rather than one unified vision. When changes are made in one area of the

system, educators in other areas often complain that one department or team is unaware of the consequences that their decisions have on others because colleagues tend to work within departments, rather than across them.

In order to lessen this effect, the CIC's network hub encouraged each of the CORE districts to assemble cross-functional improvement teams that were made up of district leaders from all parts of their system. That way, when they began to explore their math problem of practice, they could develop a holistic view that reflected the whole breadth of policies, programs, processes, and resources that might be influencing or perpetuating the achievement gap for their African American and Hispanic/Latino students. To this end, each of the eight CORE districts formed an improvement team, consisting of eight to ten members. These teams included a wide variety of district leaders, but typically involved a cabinet member, curriculum and instruction leads, a director of research and evaluation, someone who was part of school improvement efforts more broadly, math program specialists, and human resources personnel.

District superintendents and senior district leaders made deliberate choices about who would participate on the improvement teams. These choices were influenced by suggestions provided by network hub staff, some of whom had worked with other NICs and could provide insights into the types of teams that were most effective in carrying out the work. One district described this team-creation process as a joint decision whereby senior administrators looked at the description of different roles provided by the hub and discussed who in their district would be essential for the work. An important deviation from the hub's suggestions was that all eight districts initially formed their teams without representation from school-based personnel (e.g., principals or teachers). This was a conscious choice made largely by the superintendents, but supported by other founding team members. CIC team leads explained that they first needed time to figure out how to coordinate their work and build their own skills. After the central office team solidified, each district planned to incorporate local level staff. This decision has led to some anticipated challenges, which are documented in the "challenges" section of this brief (see pp. 27).

Creating cross-functional teams helped districts develop a more complete portrait of their local system and how parts worked together to create the whole. Through structured learning time facilitated by the network hub, within-district team members had the opportunity to learn from and with one another. The conversations in these collaborative sessions helped districts see their challenges in a new light. For example, in one district, team members ultimately decided that their math achievement gaps were persisting largely because of their failure to effectively recruit, retain, and support teachers working in their most challenging school environments. However, before beginning work in the CIC, this team had more narrowly defined the problem of practice. Prior to forming their CIC cross-functional team, the district had focused on the question, "How do we get more experienced people to [a school with high staff turnover]?" Engaging in discussion as a newly formed cross-functional team surfaced new sets of questions that would have been unlikely to emerge if each department continued to think about the

processes around teacher hiring, support, and evaluation in isolation. Through discussions, team members recognized that getting experienced educators into high needs schools was a great goal, but the reality was that their district would always have new people in the system and that this in itself was not a bad outcome. Rather than focus all of their efforts on figuring out how to recruit teachers into high needs schools, they shifted their inquiry and asked, “How can we differentiate professional development and attend to the needs of teachers at various stages of their careers? How can the professional development team work with the data team and human resources staff to align their efforts?” This line of inquiry was aimed at more effectively retaining the new teachers that were entering these high needs schools, but were leaving after short periods for school assignments perceived as less challenging.

Setting this new direction allowed the team to be more comprehensive and focused in the systems analysis activities that followed. From here, they collaboratively decided on which data and future measures would be critical for all of them to examine and track over time. This was a change from previous practice, where the human resources department and the academic services department were tracking different metrics. System-wide, there had never been agreement on what “progress” or “improvement” would look like with respect to teacher retention. One CIC team member from this district explained:

I feel like there's more potential for us to be able to solve a problem, identify redundancies, and be more efficient. I feel like it gives us better leverage. We're not working on six different things. We're actually working on one thing together.... I think it builds confidence in us, organizationally.

Finding time and space to work together as cross-functional teams was not easy, but it was considered essential to ensuring forward momentum. The network hub helped bring teams together by organizing structured meeting time where teams worked directly with a continuous improvement coach from the Carnegie Foundation. These sessions enabled team members to get advice about next steps and challenges that they were encountering, including strategizing about how the different areas of their systems could work together.

CIC team members also highlighted how participation in cross-functional teams broadened their knowledge base about their systems. They valued having multiple vantage points and sought ways to ensure that team members’ differing perspectives informed their systems analysis efforts. Often, this meant assigning systems analysis tasks strategically to allow team members to gain exposure to parts of the system that traditionally remained hidden to them. For example, when the improvement teams began interviewing students and school staff to better understand their perspective, one district made sure that leaders from departments with little exposure to students and teachers engaged in these interviews to build more understanding of their day-to-day experiences. Speaking about the power of the cross-functional team model, one CIC member explained:

When we can work well together and utilize each other's strengths and make those weaknesses disappear because of the meshing of the teams and the expertise, it becomes a really powerful thing.

Ultimately, building system understanding is difficult without an improvement team that is representative of the system that it is trying to improve. While not all CIC district teams had the same amount of cross-functionality, they all brought together a team of leaders who did not regularly collaborate on improvement efforts. One district team member who talked about the benefit of cross-functional teams explained, "I think what's going well is that there is a shared urgency of the importance of the focus. There is a shared urgency about using this process to break down these silos." In other words, cross-functionality has to be deliberately created around a shared purpose and an explicit problem of practice. This shared purpose helped district leaders focus on creating a singular holistic view of their system as it related to a specific problem to be solved. It also helped shift team members' mindsets towards viewing their system as a web of partnerships with interconnections rather than departments in silos.

Lesson 2: The systems analysis process enables district leaders to revise, refine, and expand their initial hypotheses about the reasons behind their problem of practice.

For the CIC, systems analysis led to deeper learning because it was not a one-day event but an extended inquiry process that incorporated different types of data, student and teacher perspectives, and cycles of analysis and reflection. Throughout the process, CIC teams revisited questions such as:

- What do we think we already know about our system?
- In which areas do we need to learn more?
- How does data support, challenge, or expand our understanding?

Through this iterative process, district teams engaged in systems analysis activities that were designed to build a clear understanding about the different system components and the way they interact. This approach helped district leaders develop better understanding about their problem of practice with the goal of making more informed decisions about the execution of improvement strategies.

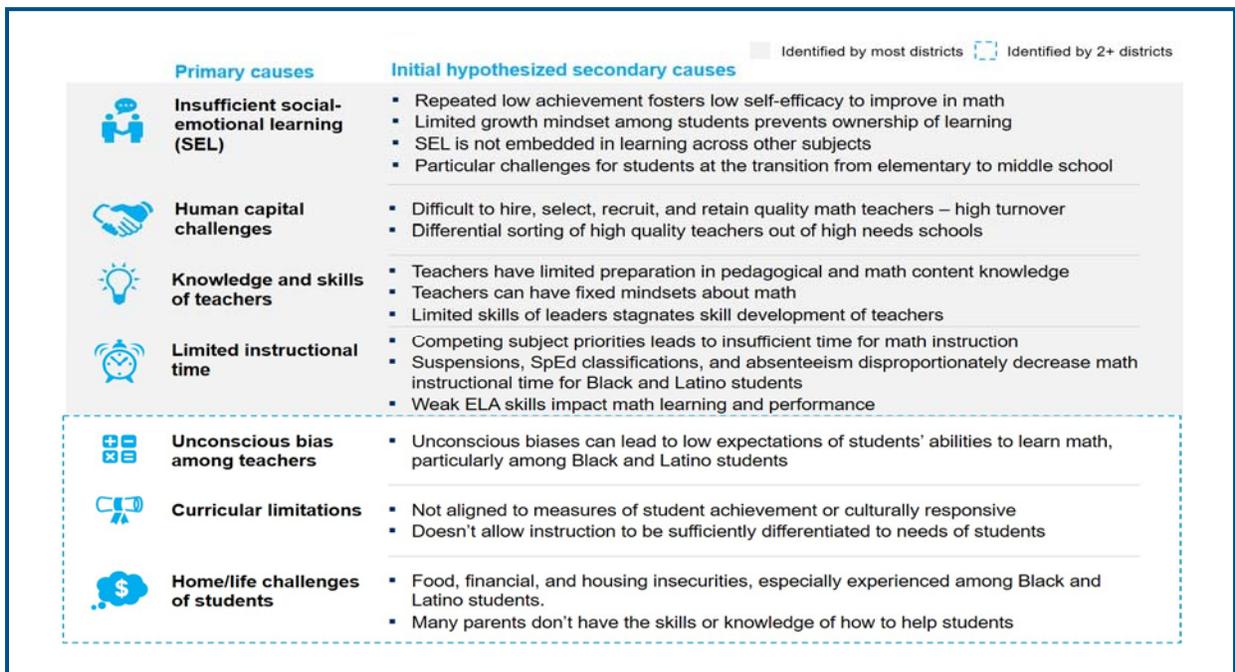
The process of systems analysis began when the CORE board made the decision to reorganize as a NIC. This decision was catalyzed by a one-day meeting, Design Day, in September 2016, when district leaders convened as a network to brainstorm possible causes for the middle school math achievement gap that has persisted within their districts for African American and Hispanic/Latino students. To support this process, the network hub used a tool, a fishbone diagram, to facilitate a more structured approach to the task.

The fishbone in Figure 1 is from one CIC team’s initial brainstorming. It illustrates initial ideas about causes for the gap, identified in the rectangles, with more specific conditions described along the skeleton, so to speak.

Most districts hypothesized that current outcomes were the result of four primary causes: students’ social-emotional learning needs; teacher recruitment, development, and retention challenges; knowledge and skills of teachers; and limited instructional time. Figure 2, developed by the CORE Districts, gives more detail about these preliminary hypotheses. After identifying some early theories, CIC teams had to learn more about the specific system structures and processes related to these causes that might be contributing to the math achievement gap.

At two subsequent CIC network-wide convenings in February and March 2017, CIC teams began the process of building system knowledge by examining student outcome data in math in relation to existing district structures and processes. As a first step, each district was asked to focus on one or two causes from the September list and commit to exploring them more deeply. Structured discussions led by hub staff and external partners helped CIC improvement teams determine these areas of focus based on their local contexts. Next, teams examined the data most relevant to their chosen areas of focus (e.g., grade-level math performance data, student growth data by school and by teacher). Then, teams considered what additional data and information they would need to test their initial assumptions about math performance in their districts. As part of this exploration phase, districts not only examined student outcome data but also conducted teacher and student interviews and observed classrooms with the goal of “seeing the problem from the user’s perspective and experiences.” The value of exploring many different types of data during the systems analysis process is discussed in more detail as part of Lesson 3 (see page 22).

Figure 2. CIC preliminary hypotheses regarding the causes of low math scores among Black and Hispanic/Latino middle school students (CORE Improvement Community Charter, June 2017).



The next phase of systems analysis synthesized what the CIC teams had learned from their school-level interviews and secondary data analysis, and layered on information about district processes and initiatives that could also be influencing students' math performance. The network hub played a critical role here because hub staff leveraged data from the CORE districts' shared data system, the School Quality Improvement System, to help CIC teams narrow their focus.

One CIC team felt that the knowledge and skills of its teachers was likely the most significant cause contributing to current student outcomes in math. However, the team members were not sure which dimension of this cause was most significant in their context. Did teachers need more professional development because their own content knowledge was lacking? Maybe teachers knew the math content, but did not know how to deliver instruction effectively? What existing resources and processes were influencing what teachers were doing in the classroom? The team's initial hypotheses were linked to teachers' own content knowledge, but they kept an open mind as they began to build system understanding. The improvement team looked at its local data and conducted teacher interviews and observations. They uncovered that teacher lesson planning was contributing to the math performance and instructional quality gap; rather than incorporating activities and pedagogy that helped students build conceptual math skills, it was mostly procedural math skills that were being emphasized:

As we did our process deep dive, we were discovering what seemed to be missing. It's like we caught on right away that teachers were really just doing old style planning of picking a couple of problems to take kids through procedurally, and that's how they're doing their lessons.

Without deeply engaging in the systems analysis process, the improvement team would have likely focused their change efforts on increasing teachers' content knowledge because this was where their initial assumptions lived. After two in-depth phases of systems analysis, the team revised its hypothesis and is now focusing on how teachers plan and implement day-to-day lessons. The team's next step is to map out at a very detailed level the process that individual teachers use to develop their lesson plans, an approach called "process mapping."¹⁰ The team then intends to compare these process maps to those developed by their math coaches as well as by experts in the field. The hope is to identify specific practices to test out with teachers and to improve lesson planning. Eventually, the team hopes to confirm its predictions that lesson plans that include conceptual tasks will be implemented with fidelity so that more students are exposed to these types of activities.¹¹

¹⁰ A description of how to create a process map and samples of process maps are included in the book, *Learning to Improve* (Bryk et al., 2015).

¹¹ A more detailed description of how this district team's systems analysis process changed their perspective on what was contributing to the middle school math achievement gap can be found in the case study on page 22.

In another example, a different district CIC team was also focused on teacher knowledge and skills as a potential area to be improved over time. This CIC team's initial hypothesis was that single-subject math credentialed teachers were more likely to produce higher math outcomes for sixth-grade students because they had more content expertise than those sixth-grade math teachers that held multiple-subject credentials. This improvement team started building system understanding by reviewing a combination of district data from CORE's measurement system and their own district research team's analytics. They discovered that their high-growth sixth-grade classrooms were predominantly at elementary schools with multiple-subject credentialed teachers. With this new knowledge about their system, the CIC team moved into a second phase of data collection and analysis to help them understand how sixth-grade teachers and students experienced math. If the team members had not committed time to deeply understanding their system, they likely would have moved forward with change ideas that were grounded in false assumptions about their students and teachers, perhaps focusing on the wrong group of sixth-grade educators. Describing how they shifted from a general focus to a more specific one, a district team member reflected:

I think it's a combination of identifying where we're really struggling, specifically schools and grade levels, and then having a better map of what performance looks like across the district. I think that there's an increasing appetite for really specific interventions.

For all the CIC improvement teams, engaging in systems analysis activities enabled them to diagnose the correct causes of the problem rather than acting on data-free assumptions. By “digging deeper,” the teams were able to test their hypotheses about the causes of current math outcomes and identify possible improvement strategies that could improve these outcomes over time. As we have mentioned, this type of work goes against the typical norm of quick assessment of problems of practice followed by large-scale implementation of solutions.

Lesson 3: Accessing and interpreting different types of data are critical to building a complete understanding of a problem of practice.

For many years, the CORE districts, both individually and as a collective, have analyzed district-level data to make important programmatic and organizational decisions. Under No Child Left Behind (NCLB), understanding student outcomes data was a critical first step in identifying and supporting low-performing schools. Additionally, individual district departments regularly examine a variety of indicators of student success (Marsh et al., 2016), but often in the absence of the kinds of data that capture the district structures and processes that influence students and teachers on a daily basis. As previously mentioned, much of the data also stay isolated within specific departments or with certain educators who use it to make decisions without always thinking about their entire system. Rarely do agreed upon sets of process measures get identified and monitored by all departments across a district.

In searching for understanding about its systems, the CIC had a specific focus on middle school mathematics outcomes and the gaps in learning for its African American and Hispanic/Latino students. Reviewing systems data was a powerful first step in each team's efforts to build understanding around math instruction. For all of the districts, analysis began by examining a set of data reports provided by the network hub. The analysis for these reports was conducted using the CORE Districts' unique shared data system, which includes student achievement, academic growth, high school readiness, chronic absenteeism, suspension/expulsion, students' social-emotional skills, and schools' culture and climate.¹²

The data provided to all eight CIC district teams in the early stages of systems analysis included CORE-wide trends in math performance disaggregated by subgroup and socio-economic status. CIC improvement teams also studied reports highlighting which schools and grade levels within their districts were doing well or poorly for African American and Hispanic/Latino students on a variety of measures, including academic achievement, academic growth, and social-emotional skills. These findings were connected with data on student growth by classroom, so that CIC teams could identify which teachers were having the most success with specific subgroups of students. Student achievement and growth data were also linked to district data on social-emotional skills and school culture and climate.

Studying these reports created pathways for further exploration for each CIC team. Once teams identified bright spots where African American and Hispanic/Latino students were thriving, they were able to think more critically about the next set of activities that would help deepen their team's understanding of the problem of practice. With encouragement from the network hub, improvement teams spent a significant amount of time interviewing teachers and students, as well as observing classrooms, to clarify some of the trends that surfaced in the system-wide data. Observation and interview data, especially of classroom practice and student engagement, were a pivotal part of understanding how math was being taught and why math instruction and achievement disparities persisted. On member surveys, 69 percent of respondents reported learning something in student interviews that caused them to think differently about the problem of practice. Similarly, 60 percent of CIC survey respondents said that teacher interviews caused them to think differently about the problem of practice.¹³ One district improvement lead explained:

We have a lot of great data we use on a regular basis, but some of the things we need to measure we don't have a way of measuring unless we go and talk with the kids and hear their stories. That's a complicated and time-consuming process, but it might be the most effective to figure out how to solve the problems we are encountering.

¹² Policy Analysis for California Education (PACE), as CORE's research partner, has conducted a wide range of analyses using this unique data system to support policy and practice. All publications can be found at <http://www.edpolicyinca.org/projects/core-pace-research-partnership>.

¹³ These survey results were from the March 2017 CIC member survey. The total number of responses was 33, which represents a 63 percent response rate.

Team members across districts reinforced the importance of the qualitative data that they gathered, which they acknowledged sometimes does not get viewed or valued by district leaders.

I think that the CORE process legitimized the qualitative [data] in important ways and raised some voices that often don't make it to the executive suite so to speak. I really appreciated that and I hope that spirit continues forward. We're trying to hold on to that spirit and it's hard when you get into the intervention space because it's just easy to snap back into programs and initiatives and implementation and lose sight of that connectedness and that importance of personalizing the experience, whether it's from students or teachers or parents.

Ultimately, CIC improvement teams learned that the systems analysis was not a linear process. Often one round of quantitative data analysis would generate the need to dig deeper by visiting schools and talking to teachers and students. That activity would then create learning that generated additional questions or uncovered a new facet of the problem of practice that needed to be explored. Sometimes this required teams to review new system-level data; other times teams initiated more or different conversations with their stakeholders. In this way, CIC teams went back and forth between examining data, exploring what it meant, and collecting additional information. One district lead reflected that initially the team thought the systems analysis process “would be linear, but it was way more complex than we imagined. So often we see ourselves at the very beginning or the very end, but we’re really in the middle.” In the case study on page 23, we highlight how important the iterative approach to data collection and analysis was for one of the CIC’s improvement teams as they worked to build system understanding related to their problem of practice.

Systems analysis in action: Exploring root causes using multiple sources of data

One particular CIC team used many different types of data to develop system understanding around a specific aspect of its math performance problem: teacher lesson planning. This team's preliminary use of district-level outcomes data was supplemented with other types of student- and teacher-level data as the team reflected on each set of data that it collected.

The CIC team members started with the network's broad problem of practice rooted in middle school math achievement gaps for African American and Hispanic/Latino students. First, they used their district's student-outcomes data to explore math performance differences by race and gender. Their goal was to identify where they had the biggest disparities. Next, they took a deeper look at their students' performance on each topic (or "claim") area that gets reported on the Smarter Balanced Assessment Consortium (SBAC) exam. The team discovered that its student subgroups had larger gaps in performance on claims focusing on math concepts and procedures than on claims focusing on math communicating and reasoning. Gender differences were evident as well, especially around claims in math communicating and reasoning. Here, girls were outperforming boys within subgroups.

The network hub encouraged the team to dig deeper into this finding by learning more about which math skills were proving most difficult for students to master and why. SBAC data was not detailed enough to facilitate this deeper inquiry, so the team shifted its focus to an analysis of district interim assessment results. The team examined interim assessment data disaggregated by math skills and confirmed that math standards with a conceptual focus were a critical gap.

After homing in on this specific math standards gap, the CIC needed to understand why conceptual mathematics skills were proving so difficult for its middle school students to master. CIC team members conducted interviews with African American and Hispanic/Latino students, deliberately selecting some students who experienced success in math and others who did not. As they analyzed the student interview data in conjunction with students' math assessment scores and course grades, they discovered that kids who were not successful also exhibited a low sense of self-efficacy in math, meaning that they did not have confidence in their own math abilities or believe that they could get better if they worked hard.

After coming to this realization, the team interviewed and observed a teacher at one of the district's high-performing schools. This educator was known for having a well-managed classroom and positive relationships with students. The site visitors recorded their observation using a protocol that they later shared with the rest of their CIC team. During one lesson about parallelograms, students seemed confused about which formula they should use to figure out the area of the shape. After considering this observation data along with the information learned from interviewing this teacher, the improvement team determined that students were not feeling successful in the lesson because they were looking at the parallelogram math problems in a procedural way, rather than conceptually. This reinforced the team's earlier analysis suggesting that students are struggling to think conceptually about math.

Because district leaders on the CIC team knew that all teachers had access to curricular resources that supported conceptual math instruction, they began to wonder whether teachers were incorporating those resources into their lesson plans. Team members returned to the data that they had gathered from teachers. What emerged was a hypothesis around how teachers were creating lesson plans. The CIC team now believes that teachers are not incorporating rich conceptual math tasks into their lesson plans, despite the fact that they have curricular materials available to them that include such tasks. The next steps for the team are (a) to better understand how middle school math teachers are planning their lessons and (b) to seek expert advice from their district math coaches about what change strategies might produce more effective lesson planning behaviors.

At the center of the systems analysis process is the iterative examination of different types of data. The goal is to gain a fuller portrait of the student experience and build a clear understanding around why districts are getting specific results. Therefore, having access to a robust set of district-level data and the resources to conduct targeted analysis to help explore theories about a problem of practice proved critical to the CIC. The system-level data and analysis that the network hub supplied to each CIC team via CORE's measurement system provided information about patterns and trends in math outcomes by subgroups, as well as student growth over time. It also helped CIC improvement teams identify high-growth schools and teachers. CIC teams were able to supplement the analysis provided by the hub with complementary data provided by their own district research teams. When system-level analysis could not explain why specific patterns persisted, teams conducted student and teacher interviews in conjunction with classroom observations to flesh out the "why." One CIC team leader explained that these interviews had "real power" because they were "personal stories that connected the way they were leading the system to real human beings." The interplay between district-level data and qualitative information is what led CIC teams to understand how students experienced math instruction and assessment and how other hypothesized root causes, such as teacher knowledge and skills, could be influencing these outcomes.

Lesson 4: Teams getting started in continuous improvement benefit from expert facilitation and learn-by-doing activities.

When the CIC improvement teams were asked to devote time and resources to build systems knowledge, they discovered that developing a complete picture of all the dimensions that influenced math teaching and learning required new skills that were less familiar to them. Leaders from these large urban districts were accustomed to reviewing quantitative data provided by their research departments, a luxury far less common in smaller school districts across California (Farrell, 2015). However, they were not accustomed to personally collecting and analyzing different types of data, nor mapping out the details of their existing district processes.

Helping the CIC improvement teams develop these skills was one of the primary tasks of the network hub. Some of the facilitation activities that the hub supported have already been described in prior sections of this report. We have discussed how hub staff supported district improvement teams by providing access to CORE's data and analytics, as well as how the hub encouraged the formation of cross-functional teams. In this section, we focus specifically on how the hub guided the CIC through the systems analysis process and helped them troubleshoot challenges that surfaced along the way, with the ultimate goal of building district capacity for continuous improvement.

Early in the planning process, hub staff recognized that they would need additional expertise and support in order to lead the CORE Improvement Community. Through their prior work managing the implementation of CORE's waiver from NCLB, the hub staff had established

strong connections with district leaders. However, this work had not incorporated any specific continuous improvement methodologies such as improvement science. The hub realized that the success of the CIC relied heavily on all members being able to understand and apply the principles of improvement science. To do so, hub leaders decided to formally partner with an external organization, the Carnegie Foundation for the Advancement of Teaching, because it specialized in forming and managing improvement networks and helping individuals learn how to apply the principles of improvement science.

Together, the network hub and its Carnegie partners helped CIC teams navigate the systems analysis process in a number of ways. First, they organized the work into action periods with specified outcomes. Second, they provided a variety of opportunities for district teams to discuss progress and surface challenges. Finally, they concentrated on creating learning opportunities for CIC teams to build knowledge and skills along the way.

One support that the CIC hub provided for district improvement teams during systems analysis was to structure different components of the work into distinct action periods, which occupied the time between each network-wide CIC convening. These action periods were anchored around: (a) analyzing system-level data, conducting teacher and student interviews, and observing classroom practice; (b) mapping district processes and initiatives that could be influencing students' math performance; and (c) theory-building around potential change ideas for improvement. The hub set objectives for each action period that included specific work products that each CIC team would share with the rest of the network. Examples included diagrams to help CIC improvement teams visualize the dimensions of the problem of practice and presentations that synthesized major themes from interviews with teachers and students. CIC team members frequently described how the network hub's action period structure forced their districts to stop, reflect upon their learnings, and move forward through the work. One team lead explained:

While the team is in the throes of the learning, [the action period] work is helpful and has been important. There is facilitation that happens [indirectly through] the way that the learning and collaboration is structured in the convenings [into] tasks that were asked of us and the resources that were provided. It was the accountability of being there that kept the momentum going. It's so easy to fall off track because we're all managing so many different work streams.

In addition to setting a guiding structure, the network hub provided templates to facilitate conversations within CIC teams as they worked on action period tasks. For example, at one CIC network convening, the hub provided a set of guiding questions to facilitate each team's discussions about student growth data in math. Hub staff sat with CIC teams and together they used these guiding questions to determine which schools across their systems had the highest growth in student outcomes, as well as at which grade levels. The hub structured similar data conversations around districts' human capital data, showing CIC teams which teachers were

producing the highest growth in student outcomes in math across schools and grades. The objective of these guided discussions was to help CIC teams understand the variation in math performance across their systems and identify next steps, often teacher and student interviews, to be able to better understand why this variation might exist.

The hub also provided many opportunities for CIC teams to share their progress and troubleshoot challenges. At three in-person CIC network convenings, hub staff gathered the eight improvement teams together to talk about their systems analysis work, give and receive feedback on common roadblocks, and prepare for the next phase of their journey as a network. During these sessions, CIC teams worked together to understand the next action period in relation to the work within their districts, then received feedback on plans from expert coaches and peer-to-peer sharing with other improvement teams.

CIC convening activities also focused on developing knowledge and skills around improvement science. For example, via a case study on chronic absenteeism, hub staff facilitated a simulation activity that guided each CIC improvement team through the first stages of the improvement process. All eight teams studied the case study data presented to them and developed hypotheses about what was causing the problem. Then, teams developed and tested change ideas so that they could experience the stages of their own continuous improvement process that were just ahead of them. The network hub provided protocols, enacted scenarios, and fielded questions around each stage of the improvement process. This learning-by-doing activity helped CIC teams build a more practical understanding of improvement science and reinforced shifts towards improvement science thinking and mindsets. Throughout the simulation, hub staff stressed the importance of learning from a continual process of trial-and-error to prepare CIC teams for developing their own change ideas (scheduled for Fall 2017). Commenting on this activity, one CIC team lead explained, “It opened my eyes to the possibilities and that we could make a mistake, do the wrong thing, and fail.”

The action periods fell between CIC convenings and offered timely opportunities for troubleshooting as CIC teams worked remotely. The hub scheduled monthly phone conferences with team leads from each district to share updates on their work and discuss strategies for moving forward, recording their thinking into cloud-based note templates. Additionally, hub staff organized webinars to allow CIC improvement teams the opportunity to present their progress and get feedback from other CIC teams, as well as outside experts who had experience with systems analysis using improvement science. CIC teams varied in their level of engagement during these remote interactions; some teams reported valuing the calls as collaborative platforms, while others criticized them for a compliance-driven feel. As one team lead stated simply, “Coaching over the phone [is] not as effective as the face-to-face meetings.” The network hub had to balance the expediency of “virtual” check-ins with more authentic opportunities to troubleshoot with CIC teams in person. This is a distinct challenge in managing networks of schools that are not physically located in the same area; with network hub staff

and improvement teams all over the state, getting together in person is much harder, even though it is most valuable.

CORE's partnership with Carnegie allowed the network to connect CIC teams directly with experts in improvement science. Carnegie's expert coaches guided CIC team discussions around the wide range of data that they were collecting and helped them to synthesize what they were learning into actionable next steps. Coaches did this by facilitating structured discussions around data at CIC in-person convenings, visiting districts for extended conversations about progress on action period items, and providing one-on-one coaching calls (one coach to a district). One team lead explained, "The one-on-one conversations really helped. [Our expert coach] took a critical friend's perspective and was willing to push us in our thinking. It felt authentic." Interacting with expert coaches helped district teams build confidence around their developing theories of improvement and work through the challenges that were surfacing. In the words of another team lead, "We need time to marinate and struggle and talk to each other. Just seeing the process of dialogue and discourse with [an expert coach] produces the real ah-ha."

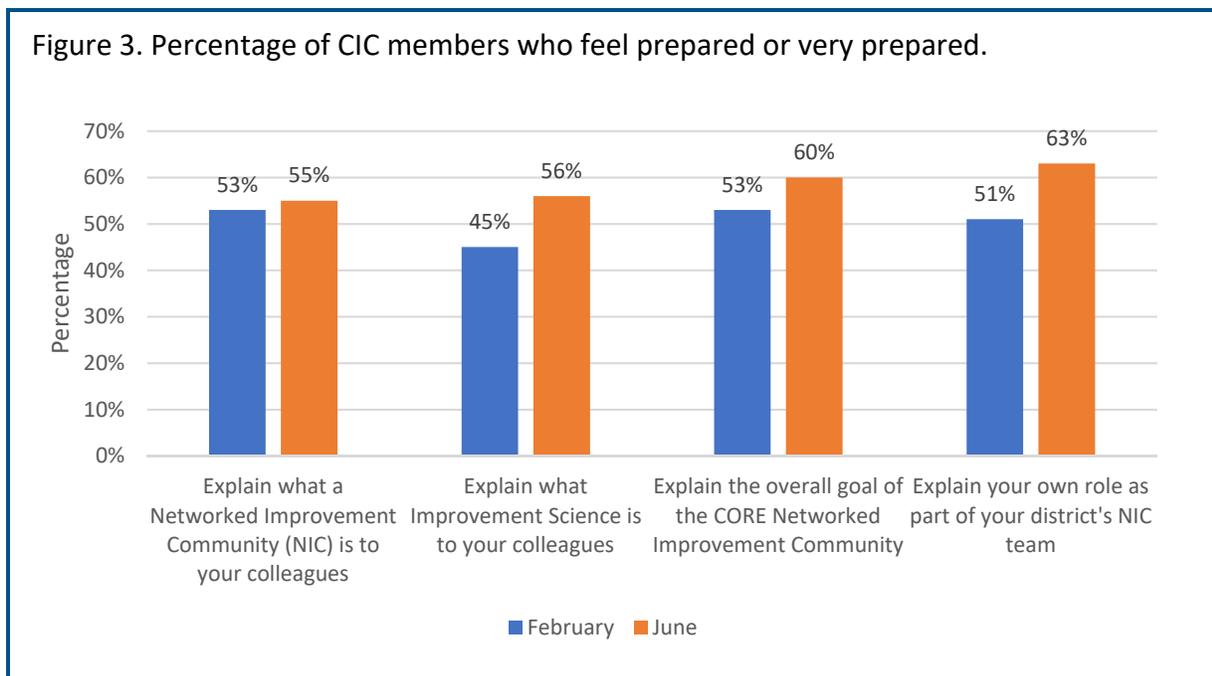
The CIC learned that the presence of expert coaches did not provide added value in and of itself. Effective coaching required improvement science expertise, consistent communication to build trust with CIC teams, and opportunities to connect with teams in person to discuss progress and troubleshoot challenges. One CIC lead explained,

We've appreciated the structure of being able to come together with the other [CIC teams]. Having experienced coaches has been really beneficial by providing the encouragement to move forward despite the urge to continue to analyze and think. It has been helpful to have the messaging and support in large group settings, phone calls, [and] site visits.

Overall, CIC improvement teams valued the structure and facilitation provided by the network hub. When asked via survey, 72 percent of CIC members responded that they were receiving "just the right amount" of support. Members also agreed that good facilitation and regular check-ins were instrumental in driving the work forward. Without it, teams that were new to improvement science easily lost the momentum as they got distracted by their many other roles and responsibilities. Teams also benefitted from a variety of supports, including carefully structured timelines, tasks, and conversations, to help them learn to build system knowledge and tackle roadblocks along the way.

Anticipating Challenges and Troubleshooting Roadblocks

The CIC network has made important strides in building the collective knowledge of its members. After the first year of engagement with the CIC, members are more familiar with the NIC model and the improvement science methods embedded within it. They also have a more complete understanding about what continuous improvement looks like in practice. Figure 3 shows CIC members' increased perception of their own knowledge and skills from February 2017 to June 2017. Over the course of only four months, the percentage of members who reported feeling "prepared" or "very prepared" to explain key aspects of a NIC, improvement science, and the goal of the CIC increased.



After taking the better part of a year to explore their individual systems, the CIC teams also more fully understand how students and teachers in their middle schools are experiencing math instruction, as well as the district processes that influence those experiences. Since CIC teams are still in the early stages of their continuous improvement processes, they continue to wrestle with how they will incorporate key lessons and practices from their systems analysis work into existing district structures or at school sites. While teams acknowledge the progress they have made thus far, CIC members would also be the first to recognize that there is still much more to be learned. In their next phase of work together, they will be shifting from a period of intense learning—the systems analysis process—to one of active doing, in which CIC district teams will be rapidly testing specific improvement ideas. This transition is not clearly defined and will likely require many teams to revisit their systems analysis work, or even begin new explorations of different facets of their organizations.

Currently, the CIC district teams are grappling with issues of time and readiness, knowing how to narrow their focus, developing shared routines to coordinate the work, and organizational constraints such as budget cuts and leadership turnover. We are mindful in sharing the lessons learned from the CIC network, that these challenges are acknowledged and that educational leaders who are interested in this work will have to confront the dilemmas of practice that will inevitably come when they invest in building system knowledge in a systematic way. We raise some of the key challenge areas experienced by the teams as they went through their own systems analysis processes. For educational leaders, anticipating these challenges and working through emerging dilemmas will be critical to sustaining and persisting in continuous improvement efforts.

Time and Readiness

Given the many demands on district leaders, it is no surprise that they frequently cited time to do the work associated with the CIC as a challenge. Members were asked, first in February 2017 and again in June 2017, the extent to which they agreed with the statement, “I have the time that I need to complete the NIC tasks that are being asked of me.” Only 40 percent of February’s respondents and 29 percent of June’s respondents agreed with this statement. In interviews, CIC team leads shared that time constraints were not always a direct result of their abilities to manage their own time successfully. In some districts, especially those with new superintendents, CIC leads felt pressured to focus a majority of their attention on other initiatives or convince senior staff of the importance of CORE’s continuous improvement work. However, one limitation of this research study is that we could not triangulate these CIC leads’ perspectives because we were unable to include interviews with the CORE superintendents into this period of data collection.

Another ongoing challenge was knowing when to continue to seek out more system information as opposed to moving forward with developing change ideas. While the teams appreciated the opportunity and time to explore their data and engage in systems analysis, some teams also felt internal pressure to implement interventions and solutions. They wondered when and how long they needed to take the time to explore root causes versus narrowing in on a specific set of improvement ideas to test. One team lead expressed this concern:

We're still trying to choose a problem of practice. I feel like we're moving really slow and just the whole thing, one week turns into two weeks turns into a month.... It seems like we should have already said, “Here's where our problem is. Here's where we're going to try something. Let's do it.”

Alternatively, there were other CIC teams that felt the pace of the work was too fast. Many wanted more time to explore their systems and were anxious about the pacing and timelines that the network hub had put in place. A lot of this anxiety stemmed from the desire to confirm

ideas that surfaced throughout school-level interviews across larger samples of teachers and students. Knowing when to “put a stake in the ground” and narrow the focus on a problem of practice was a question raised by most CIC teams. New data raised new questions, and it was unclear when it was time to move from the exploration stage to the planning phase. One CIC team that was examining teacher collaboration data questioned whether its inquiry was leading to “definitive levers” for improvement, and whether its small set of data was enough to justify its next steps:

I know that those teachers at the school feel very empowered by their principal, and I know they have a culture of collaboration there that seems to be making a difference in how students are growing from year to year. But the data side of me says I need to go to every school, and if this combination that I find at [an elementary school] holds true in every other school, and what are the things that make a difference?

This team raised important questions about how to narrow its focus and whether it needed to compare teacher collaboration practice between schools, across grade levels within a school, or across grade levels in multiple schools. Data collected throughout the systems analysis process often provided information and guidance for further exploration into the potential causes of the math achievement gap, but they did not always lead CIC teams to a clear direction for improvement strategies. As one CIC lead noted,

If you have an initial hypothesis, and you start to investigate, and you get lots of variability, or you find out "Wow, this really isn't where we want to press," you probably need to circle back and do it some more.

Because the inquiry process was often nonlinear, it also meant that teams had to be flexible and willing to abandon some of their initial hypotheses or biases.

Network hub staff also felt conflicted about setting the right pace for the systems analysis process. They wanted to encourage forward momentum, but also recognized that many of the CIC team members were engaging in this type of continuous improvement work for the first time and needed to digest and reflect upon how the CIC work complimented other work that they were already involved with in their districts. Recognizing this tension, one hub staff member noted, “...there's a delicate balance of how hard to push without pushing too hard.” Time, timing, and readiness will likely remain ongoing dilemmas for the CIC and other newly formed NICs.

Recruiting and On-Boarding School-Based Improvement Team Members

As the work pivots from learning to action, it will be critical to engage school-site staff in the improvement process so that they feel a sense of ownership over the work and are able to build up their own understanding of their systems prior to testing change ideas. Adding this

layer to the districts' collaborative work is a challenge, because many teams are still figuring out how to work together across departments in the central office. There are lessons about working with schools to be gleaned from this type of cross-functional collaboration. For example, all CIC teams believed that working in cross-functional teams was beneficial, but it also raised unique challenges that are important for others to anticipate. As noted by one CIC team member, "I know that, like a lot of teams, we're struggling because we are a cross-department—we're struggling to figure out how the coordination works." This involved figuring out how often they were going to meet, when they were going to meet, and how frequently they would communicate beyond the structured meetings provided by the network hub. If individuals were not accustomed to working together, they needed to develop the structures and relationships essential for collaboration.

Currently, CIC teams are figuring out how to involve school-level staff and spread the ownership of the work beyond the original members of the CIC team. The decision to form CIC teams without school-level personnel has created some challenges now that the work of the CIC is moving to the school level. School leaders and teachers have not been privy to the professional development and systems analysis activities in which their district-level CIC teammates have participated, making it is hard to now engage them in the process mid-stream. As one team member explained:

It's hard to have a district team come up with an intervention outside of the local folks who will execute that intervention. We're feeling tension around that. The local teams didn't go through what we went through for six or eight months and they don't have the background of knowledge. Now we find ourselves having to slow down a little bit. Give all our principals some improvement science and then have some of them join a smaller team. Then we can go system-wide again.

District leaders are realizing that they need a comprehensive strategy for building the capacity of new staff who become engaged in the CIC's improvement work. This is true for school-level participants, but also for central office staff. While the challenges exist, it is clear that hub staff were pivotal in facilitating the progress made by CIC teams in learning how to build system knowledge and in carrying out the work itself. CIC improvement teams, on the whole, valued the structure and facilitation provided by the network hub and Carnegie partners. At the same time, for many CIC teams, webinars and virtual network activities felt compliance-oriented and less meaningful to their team's progress. The more tailored capacity-building activities were to each CIC's systems analysis activities, the more useful they were perceived to be. As a result, hub staff are trying to balance structured learning opportunities with differentiation for the districts in the CIC. The next phase of the continuous improvement journey—identifying and testing specific change ideas—will require both differentiation and a shared structure for learning and practicing.

Conclusion

Too often in education, any change is treated as an improvement. Further, when good ideas work in one context, the reform is transported wholesale without examining why it worked and what conditions made it work. The CORE districts are attempting to go against this counterproductive norm of education change by digging deeper into their systems via their CORE Improvement Community. Their ultimate goal is to work together systemically toward a common aim of closing the achievement gap in middle school mathematics for their African American and Hispanic/Latino students. The work that they are doing as a network—learning what continuous improvement looks like in practice and attempting to integrate strategies such as systems analysis into the daily fabric of their school systems—does not come neatly packaged with straightforward technical tools and resources. Instead, what is required is repeated practice using disciplined processes of inquiry. In this case, the CIC’s work is rooted in Carnegie’s NIC model which incorporates improvement science methods.

For all those district leaders, county office of education staff, and other technical assistance providers who are trying to understand what continuous improvement can look like in practice, we encourage reflection and investment in the systems analysis process. Spending time engaged in this work gives districts the potential to improve their LCAP goals, as well as the strategies that they develop to meet these goals. To start, we raise some important questions to consider before engaging in the systems analysis process:

- Who would we need as part of an improvement team to ensure that we have a full picture of our system?
- How would we coordinate our team’s work?
- What routines and structures would support the sustainability of a cross-functional team?
- What capacity already exists to collect and analyze system-level data? What about our capacity to gather and analyze other kinds of data that will help us understand the perspectives of our parents, students, teachers, and school leaders?
- In what areas do we need more resources or professional development? With whom could we partner to strengthen our own capacity?
- Which existing district structures or processes would facilitate our inquiry and which would create barriers or challenges to our success? How would we overcome these roadblocks?

Ultimately, the goal of any continuous improvement strategy is to ensure equitable learning opportunities and outcomes for all students, and especially for those who are historically underserved by our school systems. Existing systems reform practices have not found broad-based success, therefore building new practices, mindsets, and norms is necessary. As new

state education policies shepherd in a different approach to support low-performing schools and districts,¹⁴ the work of the CORE Improvement Community provides important insights. Our findings suggest that, while challenging, investing in building the capacity to implement continuous improvement strategies can lead to powerful insights and new ways of engaging in reform.

¹⁴ The Every Student Succeeds Act (ESSA) replaced the No Child Left Behind Act in 2015 as the guiding federal education policy in the United States. Under ESSA, states must identify for comprehensive support schools in the bottom 5 percent of all schools, any high school with a graduation rate below 67 percent, and schools with persistently large achievement gaps. Districts with comprehensive support schools must draft a plan to improve student outcomes. Additionally, states must also identify another category of schools called “targeted support” schools, which have large achievement gaps and need more tailored interventions. Upon identification, targeted support schools must craft their own improvement plan.

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References

- Bryk, A., Gomez, L., Grunow, A., & LeMahieu, P. (2015). *Learning to Improve: How America's Schools Can Get Better at Getting Better*. Cambridge, MA: Harvard Education Press.
- Cuban, L. (1984). Transforming the Frog into a Prince: Effective Schools Research, Policy, and Practice at the District Level. *Harvard Educational Review*, 54(2), 129–152.
- Cuban, L. (2013). Why so many structural changes in schools and so little reform in teaching practice?. *Journal of Educational Administration*, 51(2), 109–125.
- Deming, W. E. (1994). *The New Economics for Industry, Government, Education*. 2nd ed. Boston, MA: MIT Press.
- DuFour, R. (2004). What is a "professional learning community?" *Educational Leadership*, 61(8), 6–11.
- Farrell, C. C. (2015). Designing school systems to encourage data use and instructional improvement: A comparison of school districts and charter management organizations. *Educational Administration Quarterly*, 51(3), 438–471.
- Fullan, M., & Quinn, J. (2015). *Coherence: The right drivers in action for schools, districts, and systems*. Thousands Oaks, CA: Corwin Press, Inc.
- Hough, H., Kalogrides, D., & Loeb, S. (2017). *Using Surveys of Students' Social-Emotional Learning and School Climate for Accountability and Continuous Improvement*. Policy Analysis for California Education. Retrieved from: http://edpolicyinca.org/sites/default/files/SEL-CC_report.pdf
- Hough, H., Willis, J., Grunow, A., Krausen, K., Kwon, S., Mulfinger, L., & Park, S. (2017). *Continuous Improvement in Practice*. Policy Analysis for California Education. Retrieved from: <http://www.edpolicyinca.org/publications/continuous-improvement-in-practice>
- Humphrey, D., & Koppich, J. (2014). *Towards a grand vision: Early implementation of California's Local Control Funding Formula*. The Local Control Funding Formula Research Collaborative. Retrieved from: <http://edpolicyinca.org/publications/toward-grand-vision-early-implementation-californias-local-control-funding-formula>
- Humphrey, D., Koppich, J., Lavadenz, M., Marsh, J., O'Day, J., Plank, D., Stokes, L., Hall, M. (2017). *Paving the way to equity and coherence? The Local Control Funding Formula in year 3*. The Local Control Funding Formula Research Collaborative. Retrieved from: http://edpolicyinca.org/sites/default/files/LCFFRC_04_2017.pdf

- Knudson, J., Garibaldi, M. (2015). None of us are as good as all of us: Early lessons from the CORE districts. San Mateo, CA: American Institutes for Research. Retrieved from: <http://coredistricts.org/wp-content/uploads/2017/08/AIR-Report-August-2015.pdf>
- Le Floch, K. C., O’Day, J., Birman, B., Hurlburt, S., Nayfack, M., Halloran, C., Boyle, A., Brown, S., Mercado-Garcia, D., Goff, R., Rosenberg, L., and Hulseley, L. (2016). Case Studies of Schools Receiving School Improvement Grants: Final Report (NCEE 2016-4002). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- LeMahieu, P. G., Bryk, A. S., Grunow, A., & Gomez, L. M. (2017). Working to improve: Seven approaches to improvement science in education. *Quality Assurance in Education*, 25(1), 2–4. doi:10.1108/QAE-122016-0086
- LeMahieu, P. G., Grunow, A., Baker, L., Nordstrum, L. E., & Gomez, L. M. (2017). Networked Improvement Communities: The discipline of improvement science meets the power of networks. *Quality Assurance In Education*, 25(1).
- Lucas, B., & Nacer, H. (2015). *The habits of an improver: Thinking about learning for improvement in health care*. London: Health Foundation. Retrieved from <http://www.health.org.uk/publication/habits-improver>
- Masaaki, I. (1986). *Kaizen: The key to Japan’s competitive success*. New York: McGraw-Hill.
- Marsh, J. A., Bush-Mecenas, S., & Hough, H. (2017). Learning From Early Adopters in the New Accountability Era: Insights From California’s CORE Waiver Districts. *Educational Administration Quarterly*, doi:0013161X16688064.
- Marsh, J. A., Bush-Mecenas, S., Hough, H., Park, V., Allbright, T., Hall, M., & Glover, H. (2016). At the Forefront of the New Accountability Era: Early Implementation Findings from the CORE Waiver Districts.
- O’Day, J. A., & Smith, M. S. (2016). Quality and Equality in American Education: Systemic Problems, Systemic Solutions. In I. Kirsch, H. Braun (Eds.). *The Dynamics of Opportunity in America*. New York: Springer, Cham.
- Resnick, L. B., & Hall, M. W. (1998). Learning organizations for sustainable education reform. *Daedalus*, 127(4), 89–118.

- Rother, M. (2009). *Toyota Kata: Managing people for improvement, adaptiveness and superior results*. New York: McGraw Hill.
- Rowan, B. (2002). The ecology of school improvement: Notes on the school improvement industry in the United States. *Journal of Educational Change*, 3, 283–314.
- Russell, J. L., Bryk, A. S., Dolle, J., Gomez, L. M., LeMahieu, P., & Grunow, A. (2015). A framework for the initiation of networked improvement communities. *Teachers College Record*, 119(7).
- Scanlan, M., Kim, M., Burns, M. B., & Vuilleumier, C. (2016). Poco a Poco: Leadership practices supporting productive communities of practice in schools serving the new mainstream. *Educational Administration Quarterly*, 52(1), 3–44.
- Senge, P. M. (2006). *The fifth discipline: The art and practice of the learning organization*. Broadway Business.
- Staats, C. (2016). Understanding implicit bias: What educators should know. *American Educator*, 39(4), 29.
- Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change*, 7(4), 221–258.
- Superintendent’s Advisory Task Force on Accountability and Continuous Improvement. (2016). *Preparing all students for college, career, life, and leadership in the 21st century* (p. 3). Retrieved from <http://cdefoundation.org/staging/wp-content/uploads/Final-ACITF-Report-May-05-2016.pdf>
- Wenger, E. (2000). *Communities of practice: The structure of knowledge stewardship*. In C. Despres & D. Chauvel (Eds.), *Knowledge horizons: The present and the promise of knowledge management* (pp. 205–224). Woburn, MA: Butterworth-Heinemann.
- West, M. R., Buckley, K., Krachman, S. B., & Bookman, N. (2017). Development and implementation of student social-emotional surveys in the CORE Districts. *Journal of Applied Developmental Psychology*.

Acknowledgements

In October 2015, Policy Analysis for California Education (PACE) launched a research partnership with the CORE Districts in California. The CORE-PACE Research Partnership is focused on producing research that informs continuous improvement in the CORE districts and policy and practice in California and beyond.

We would like to thank the many individuals who contributed to this report. First, we are grateful to the generous sponsors of this research, the Stuart Foundation, the Bill & Melinda Gates Foundation, and the S. D. Bechtel, Jr. Foundation. We also thank all of the leaders and administrators in the CORE districts for their support throughout this project, along with the many school leaders and educators who participated in the research activities and shared their valuable time and insights with us. This project would not have been completed without the assistance of many colleagues at the Stanford Graduate School of Education.

About the CORE-PACE Research Partnership

In October 2015, Policy Analysis for California Education (PACE) and the CORE Districts launched the CORE-PACE Research Partnership. This research partnership is focused on producing research that informs continuous improvement in the CORE districts and policy and practice in California and beyond. The CORE districts (Fresno, Garden Grove, Long Beach, Los Angeles, Oakland, Sacramento City, San Francisco, and Santa Ana Unified School Districts) together serve nearly one million students and utilize a unique multiple-measures data system to work together to improve student outcomes. Our research aims to deepen their learning, while sharing lessons more broadly to accelerate improvement across the state.



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