Summary of a Literature Review on Implementation, Systems Change, and Continuous Improvement To Inform the District Level Systems Change Initiative

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This document describes and summarizes published material on three interrelated topics: implementation, systems change, and continuous improvement. Although it does not provide an exhaustive review of the literature, we explored a range of sources and provide information that is most relevant to the District-Level Systems Change initiative (DLSC). In particular, we include pertinent frameworks and strategies that grew out of multiple bodies of research. While the main role of Education Development Center, Inc. (EDC), is to work with districts to build a culture of continuous quality improvement, we begin this document with an exploration of research on implementation and systems change because they have begun to influence and will continue to intersect with continuous improvement approaches in education. Also included in this document is a set of implications for our DLSC work. Our synthesis of the literature on these three topics informs EDC’s integrated conceptual model for technical assistance and guides our design and plans for our work with DLSC school districts.

**Implementation**

**Background**

Implementation science is the study of methods to promote the integration of research findings and evidence into ... policy and practice. ... [The] intent of implementation science and related research is to investigate and address major bottlenecks (e.g., social, behavioral, economic, management) that impede effective implementation, test new approaches to improve ... programming, [and] determine a causal relationship between the intervention and its impact. (Fogarty International Center, n.d., ¶ 1–2)

Since the 1980s, a steady number of studies have explored quality implementation of educational programs and policies (e.g., Aarons et al., 2009; Abbott et al., 1998; Basch et al., 1985; DuBois et al., 2002; Durlak & DuPre, 2008; Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; Grimshaw & Russell, 1993; Smith et al., 2004; Tobler, 1986; Wilson et al., 2003). In addition, prominent research agencies, such as the Institute for Education Sciences, have intensified their role in the advancement of implementation science research. Although there is empirical evidence on the importance of implementation and a growing literature on the multiple contextual factors that can influence implementation, a number of scholars
(e.g., Aarons et al., 2011; Domitrovich et al., 2008) believe that there is still a need to know how to increase the likelihood of quality implementation.

Many early studies on implementation suggest that many programs, even when fully implemented, were not solving the problems for which they were created (Odden, 1991). Research has found common gaps and challenges that districts face when implementing new initiatives, which include poor program conceptualization, poor alignment of supporting infrastructures in the system, changes in district priorities, and a lack of buy-in and ownership (Datnow, 2005; Elmore, 1996; Supovitz & Weinbaum, 2008). In an effort to address implementation quality and impact, research on education policy implementation began to focus on how to get programs to work as they were intended to (Odden, 1991). Considerably more attention was paid to developing and validating prototypes than to delineating and testing scaling-up processes (Taylor, Nelson, & Adelman, 1999).

Subsequently, education reform initiatives broadened their focus on individual program and policy implementation by moving toward systemwide changes in curriculum and instruction. Studies during this period revealed that implementing programs and initiatives was a highly complex process, and whether the new program “worked” depended on the people and places involved (Honig, 2006). The key lesson from implementation research in education was that program implementation and effectiveness are the product of interactions between policies, people, and places or the local context in which the initiative is executed (Honig, 2006).

For many years, educational researchers have worked with program designers and implementers in pursuit of what is known as fidelity of implementation—the application of tools and procedures designed to ensure that implementers replicate programs as they were designed and intended. However, as Cohen-Vogel et al. (2015) noted, this focus on and analysis of “what works” in education represents a measure of impact that is not likely to be realized in any subsequent implementation in other contexts.

The real challenge of implementation . . . is to figure out how to thoughtfully accommodate local contexts while remaining true to the core ideas to ensure improvements in practice that carry the warrant of effectiveness. (LeMahieu, 2011, ¶ 5)
In recent years, scholars have focused less on fidelity of implementation and more on examining what works best while accommodating local needs and circumstances. More specifically, research has begun to focus on improvement science, looking at the context in which programs and policies are implemented to address what works, for whom, and under what conditions. Scholars have increasingly applied a cognitive framework—the system through which people process and interpret information—to the study of implementation and systems change in education (Ball, 1994; Cohen & Weiss, 1993; Jobert & Muller, 1987; Sabatier, 1998; Spillane, 2000; Surel, 2000).

Some explanations for the failure of implementation and systems change focus on the inability of principals to formulate clear policy outcomes or to adequately supervise the implementation of their goals. However, research on interpretation, cognition, learning, and sense-making reveals that the ideas that practitioners come to understand or interpret from policy are largely an unexplored component of the implementation process. Researchers have found that fundamental conceptual change that requires restructuring of existing knowledge is extremely difficult (Cobb, Jackson, Smith, Sorum, & Henrick, 2013; Strike & Posner, 1985) and that teachers’ and administrators’ prior knowledge and practice influence their ideas about new instructional practice (Cohen & Barnes, 1993; Guthrie, 1990; Jennings, 1992; Spillane, 1996, 1998a). When practitioners perceive a new instructional idea or practice, they are likely to interpret it as essentially the same belief or practice they already held. For example, in a study conducted by Cobb et al. (2013), mathematics teachers constructed new ideas to fit within their existing models for mathematics instruction rather than rethinking them.

The communication of abstract policy ideas presents a number of challenges, starting with the fact that these ideas represent a system of practices. Many concepts, such as rigor and personalization, may not be presented with clear definitions. Incoherence between different levels of the education system can also arise when leaders and administrators don’t have a deep understanding of how to support practitioners in enacting changes to instruction. Enactors may adopt components procedurally without fully understanding or embracing their foundational concepts. Spillane (1999) argues that teachers and school
leaders may not recognize disparities between surface-level adoption and deep incorporation of new ideas into existing practices based on how they interpret reform efforts. Similarly, administrators need to deeply understand the supports needed to facilitate enactment with depth (Shiffman, Riggan, Massell, Goldwasser, & Anderson, 2008).

*Implementation Frameworks*

In response to many of the implementation studies conducted, several frameworks and principles have been developed to describe and guide the complex nature of implementation processes (e.g., Damschroder et al., 2009; Greenberg et al., 2005). Below, we highlight several frameworks that have emerged in the past two decades.

According to Rogers’ (2003) classic model, implementation is one of five crucial stages in the wide-scale diffusion of innovations: (1) dissemination (conveying information about the existence of an innovation to potentially interested parties), (2) adoption (an explicit decision by a local unit or organization to try the innovation), (3) implementation (executing the innovation effectively when it is put in place), (4) evaluation (assessing how well the innovation achieved its intended goals), and (5) institutionalization (the unit incorporates the innovation into its continuing practices).

Several research studies indicate that it is likely that the desired outcomes of effective practices will be achieved when strong core implementation components are well-supported by strong organizational structures and cultures (Felner, 2005; Fixsen et al., 2005). For example, Felner et al. (2001) describe five dimensions of implementation that they observed in high-performing schools: (1) structural characteristics, such as teacher common planning time to support changes, (2) attitudes, beliefs, and norms that support collaboration, (3) a climate that supports and empowers buy-in, (4) the capacity and skills to support effective quality implementation, and (5) practice and procedural guidelines that allow for modification of interventions.

Meyers et al. (2012a) identify three key characteristics of implementation: (1) It is a specified set of activities designed to be put into practice, (2) it requires change, which may not occur simultaneously or evenly in all parts of the organization, and (3) it requires capacity building of new knowledge and skills, and shifts in organizational culture. They
define quality implementation as putting an innovation into practice so that it meets the necessary standards to achieve its desired outcomes. They pinpoint the importance of the what—the essential element of an innovation—and the how of implementation, as the nature and level of implementation can affect whether reforms achieve the desired outcomes. Hernandez and Hodges (2003) identify three levels of implementation:

- **Paper implementation**: Putting into place new policies and procedures with a theory of change to provide a rationale
- **Process implementation**: Putting new operating procedures in place to conduct trainings and provide supervision
- **Performance implementation**: Putting procedures and processes in place in such a way that the functional components of change are used with integrity and are integrated into daily practice

Based on their review of 25 implementation frameworks, including the interactive systems framework (Wandersman et al., 2008), Meyers et al. (2012a) developed a quality implementation tool (QIT). Components of the QIT include developing an implementation team, fostering a supportive organizational systemwide climate and conditions, developing an implementation plan, providing training and technical assistance, engaging in collaboration between practitioners and other experts, and evaluating the effectiveness of the implementation. An important aspect of the QIT is that it’s based on the premise that implementation is not about programs or innovation components, but rather a set of features, characteristics, and principles of services or products. It defines innovations more broadly to include ideas, practices, programs, and structures.

Clearly, efforts to improve the science and practice of implementation have evolved and improved. Some scholars believe that what is needed is an implementation perspective on innovation that focuses on the actions of those who transfer innovations into practice, including the processes used to secure and manage the cooperation of individuals, departments, and groups within a system.

One dimension of implementation that warrants greater exploration is the notion of scale. A review of the literature reveals different definitions related to the concept of scale,
including replication, spread, and adaptation of practices, which might refer to adopting policies, practices, and programs or increasing the reach of interventions. Various terminology is also used, such as scaling up, scaling out, or going to scale (Burns, 2013).

The literature on scale suggests that scaling up can be achieved through transfer of experience, which requires changes in human and institutional behavior (Burns, 2012). Linn and Hartmann (2009) identify three basic institutional approaches for scaling up innovations or practices—hierarchical, individualistic, and relational—and three organizational paths—expansion, replication, and spontaneous diffusion.

**Targeted Strategies**

Coburn (2003) conceptualizes scale as a process involving four dimensions:

- **Depth:** To be at scale, reforms must effect deep and consequential change that goes beyond surface structures and procedures.
- **Spread:** Spread refers to the extent to which large numbers of people adopt the innovation, which reflects a more traditional definition of scale. It involves disseminating materials and structures as well as beliefs, norms, and pedagogical principles.
- **Shift:** Shift requires the creation of conditions that allow a shift of authority and knowledge of the reform from external actors to district, school, and classroom practitioners.
- **Sustainability:** The distribution and adoption of an innovation or set of practices is only significant if can be sustained in the original and even subsequent schools. (Note: While the idea of sustainability is fundamental to scale, few conceptualizations address it.)

This framework is compelling in that it emphasizes the change and spread of norms, beliefs, and pedagogical principles both between and within district central office, schools, and classrooms.

It’s important to note that Dede (2005) adds a fifth element to Coburn’s framework that he calls evolution. According to Dede, evolution involves the adopters of an innovation in testing, revising, and adapting it in such a way that modifications are influential in
reshaping the thinking of the original design. He recommends that this process be supported by communities of practice among multiple stakeholders in different levels of the educational system. The element of evolution in the context of scale speaks to the need for an inquiry orientation that undergirds a continuous improvement process.

**Implications**
The DLSC initiative includes six districts that have already tested or implemented student-centered practices and initiatives in the past two to three years. Building on implementation research and frameworks, we will work with districts as they reflect on or assess the nature and level of implementation of existing innovations to date, as well as the level of central office-school-classroom alignment. This process can inform how districts might continue to improve these practices to promote rigor, quality, and deeper learning in the context of depth and breadth of scale. In addition, each district is developing new innovations to further advance student-centered teaching and learning. We will work to identify areas of focus to test and refine new ideas with early adopters.

**Systems Change**

**Background**

There seems to be little doubt of the importance of organizational and system influences on implementation. It is not our aim to provide a brief history or theoretical foundations of system or organizational change in this document. We are working under the premise that education leaders increasingly recognize that reform initiatives require systems change in order to significantly enhance their ability to meet all students’ needs. However, there is little evidence of sophisticated strategic planning for how schools and districts move from where they are to where they want to go (Adelman & Taylor, 2007). Hence, this section focuses on the challenges to systems change gleaned from research studies. It also includes strategies and frameworks that emerged from research findings.

Research shows that many education reform initiatives do not support organizational and system interaction (Fixsen et al., 2005). More specifically, research has found common gaps and challenges faced by districts when implementing new initiatives systemwide,
including poor program conceptualization, poor alignment of supporting infrastructures in the system, changes in district priorities, and lack of buy-in and ownership (Datnow, 2005; Elmore, 1996; Supovitz & Weinbaum, 2008). Furthermore, district central offices have been found to be key impediments to school improvement initiatives in terms of lack of support or shifting priorities (Berends, Bodilly, & Kirby, 2002; Bryk, Sebring, Kerbow, Rollow, & Easton, 1998).

Most personnel who are tasked with serving as change agents have little specific training in facilitating systemic change (Adelman & Taylor, 2007). Leadership training for policymakers and administrators has given short shrift to the topic of scale-up processes (Duffy, 2005; Elmore, 2003; Fullan, 2005) or system thinking. Fullan (2006) argues that to transform an organization, system thinking should be linked with sustainability. He calls for a new kind of leader: system thinkers in action.

The task of aligning system and organizational structures with practices would require engagement between policymakers, school administrators, and classroom practitioners. Yet, efforts to achieve district-wide alignment of goals and strategies fall short in many districts because there are no concurrent efforts to build the capacity of central office administrators to change how they work with schools to support improvement (Corcoran, Fuhrman, & Belcher, 2001). Fixsen et al. (2005) emphasize the need for organizational efforts to elicit feedback and listen to early adopters and implementers of programs and practices. This kind feedback loop across different levels of the system can guide policy development and change.

One of the arguments that has been made in recent years in the literature on educational change is that systemic improvement is only possible when instruments of change (i.e., policies and programs) cohere or align . . . To get substantial gains in learner achievement across an entire education system, it is essential to align policies and programs such as teacher development, curriculum frameworks, assessment procedures, and [leadership development] toward a specific target.” (Cohen and Spillane, 1993) In order to achieve systems change, districts should pay attention to both vertical and horizontal alignment of key elements of an education system.
Frameworks for Systems Change

In the literature, the following elements are often described as key to organizational change (Neufeld & Roper, 2003):

- Commitment of leadership to the change process (setting and communicating clear goals, creating processes to operationalize big ideas, inspiring and guiding stakeholders) (Corrigan & Boyle, 2003; Hodges et al., 2002; Klinger, Ahwee, Pilonieta, & Menendez, 2003; Schofield, 2004)
- Creating a collaborative culture with multiple stakeholders (Joyce & Showers, 2002)
- Allocating appropriate resources to support the innovation (Fixsen et al., 1978; Fleuren, Wiefferink, & Paulussen, 2004)
- Aligning organizational structures to support implementation components (Blase, Fixsen, & Phillips, 1984; Fixsen & Blase, 1993; Huber et al., 2003)
- Achieving horizontal and vertical integration within the system (Unger et al., 2000)
- Commitment to sustain change through supports and structures (Joyce & Showers, 2002)

Burke (2002) describes systemic change as involving district and school organization and operations and the networks that shape decision making about implementation and fundamental changes, including reforms that amount to a cultural shift in values (i.e., re-culturation). He points to the importance of starting with the process of changing behavior that will likely lead to culture change or a change in beliefs, attitudes, and values.

Adelman and Taylor (2007) identified four phases to systemic change: creating readiness, initial implementation, institutionalization, and ongoing evolution. They also noted three strategies that are key in the early stages of preparation for adopting changes or innovations systemwide: (1) Develop an understanding of the local big picture (logic model), (2) mobilize interest and consensus among key stakeholders (particularly early adopter types), and (3) clarify feasibility in the context of district priorities (Adelman &
Taylor, 2003). Denton, Vaughn, and Fletcher (2003) highlighted a number of factors that support adoption and sustainability of innovations within a system, including teacher empowerment, the perception that the changes are feasible and practical, and the presence of administrative support and leadership.

The frameworks described above illustrate the importance of developing and operationalizing processes to support and manage system change. They also reveal the importance of aligning organizational structures across the system to support effective implementation of innovations.

Select Case Studies
The following cases illustrate recent systemic reform efforts that took place in various school districts across the nation. They illustrate the importance of capacity building and the multi-level engagement of key stakeholders in systems change. In addition, continuous improvement process were used to strengthen the day-to-day work practices of central office administrators to support schools and classroom instruction. Their experiences may shed light on DLSC’s work.

- In *Investing in Teacher Learning*, Elmore and Burney (1997) describe the systemwide investment in instructional improvement in San Diego School District #2, which focused on capacity building of central office administrators to engage in new work practices and deepen their knowledge of high-quality instruction.

- In *Learning About System Renewal* (2008), Levin and Fullan focus on large-scale system reform, in particular the Education Reform Act (ERA) implemented in England in 1988. They highlight a number of key strategies that contributed to the ERA’S success, including the small number of ambitious, achievable goals; a focus on motivation; multi-level engagement with strong leadership; a focus on key strategies while managing other issues and interests; the effective use of resources; and an emphasis on capacity building.

- In *The Case for District-Based Reform*, Supovitz (2006) analyzes how the Duval County (Florida) school district engaged in organizational learning and the use of multiple types of data to address problems. In particular, the district used evidence
(improvement data) to strengthen the delivery of instructional services and school-level support.

- In *Learning for Equity*, Childress, Doyle, and Thomas (2009) tell the compelling story of the Montgomery County (Maryland) Public Schools, where they created a new set of systems and structures that facilitated and reinforced the new behaviors among school and central office staff that were necessary to improve student performance.

- In *Central Office Transformation for District-wide Teaching and Learning Improvement*, Honig, Copland, Rainey, Lorton, & Newton (2010) investigated three school districts who sought to improve both learning and leadership: Atlanta Public Schools, New York City Empower Schools, and Oakland Unified School District. The researchers identified five common dimensions of central office transformation: (1) learning-focused partnerships, (2) assistance to the central office-principal partnership, (3) re-organizing and re-culturing each central office unit, (4) stewardship of the overall central office change process, and (5) the use of evidence throughout the central office to support continuous improvement of work practices.

**Targeted Strategies**

Building on the literature, we highlight and elaborate on a number of targeted strategies to support systems change. In the context of DLSC, we will apply these ideas more specifically to help build a culture of continuous improvement and a results-oriented integrated system.

**Champions.** Rogers (2002) makes the case for the development of champions or teams of champions who can advocate for and encourage change, and who agree to steer the change process and improve system infrastructure. Champions can ensure that the big picture is implemented in ways that are true to the vision and that respect local culture, while making changes to existing norms, structures, and processes. Joseph and Reigeluth (2010) suggest that the major work of teams of champions can be to (1) develop a deep understanding of the systemic/paradigm change process, (2) evolve their own mindsets and help the school community members evolve their mindsets about education through dialogue, and (3) envision, design, and implement an ideal educational system with the active involvement of as many stakeholders as possible (p. 106).
Readiness. Scholars point to the need for measuring the readiness of practitioners at all levels of the system. A number of such tools have emerged in the past decade, including the evidence-based practice attitude scale (Aarons, 204), the organizational readiness to change scale (Lehman, Greener, & Simpson, 2002), and the community readiness model to support districts in implementing innovations or new practices and policies (Tri-Ethnic Center, n.d.). Readiness findings can inform strategies for stakeholder involvement and buy-in. Unless stakeholders in a system accept the idea that change is needed and that it does not conflict with existing priorities, new and innovative practices will not take hold or sustain (Petersilia, 1990).

Capacity building. Capacity building involves helping to develop individual and collective knowledge, competencies, resources, and motivation. Most change efforts are weak on capacity building, and that is a key reason that they fall short. Fullan (2006) suggests that there is no point in advocating for new policies if you are not at the same time promoting the capacity to implement them. He calls for a results-oriented capacity-building strategy, and distinguishes between an emphasis on accountability vs. positive pressure, which motivates and is accompanied by resources for capacity building. Both Fullan (2006a) and Elmore (2004) highlight the need for capacity building that is focused on sustainable improvement, where school and central office personnel learn from one another. Notes Elmore, “Improvement is more a function of learning to do the right things in the setting where you work” (p. 73).

Systems thinking. Fullan (2006b) responds to the need to train school and central office leaders on systems thinking by putting forth the idea of leaders taking on dual roles: One role is to make system coherence more evidenced and accessible, while the other is to foster interactions, both horizontally and vertically, that promote systems thinking in others. He acknowledges that this requires a balancing act:

On the one hand, there needs to be strategies and practices devoted to the exploration of solutions (innovations) to adaptive challenges. This is a challenge for central office because it requires a process with no clear answers in the beginning. On the other hand, they must regularly focus on solutions. This is a challenge for practitioners, as it seems like solutions are being imposed on them. (p. 81)
As early as 1973, Schon also advocated for systems thinking:

> We must become able not only to transform our institutions in response to changing situations and requirements; we must invest and develop institutions which act as “learning systems,” that is to say, systems capable of bringing about their own continuing transformation. (p. 28)

One of the key elements of sustainability and systems change that Fullan (2005) identified is deep learning, which is needed to create systems capable of bringing about their own continuing transformation. Real reform requires sustained attention from many people at all levels of the education system (Levin & Fullan, 2008). Changing systems means changing the entire context in which people work—school, district, and community—and increasing the number of purposeful interactions (Fullan, 2005). Fullan refers to the pursuit of strategies that promote mutual interaction and influence within and across all levels of the system as permeable connectivity. His notion of deep learning includes evaluating systemic change with respect to the processes being used to “get from here to there,” which he suggests is as important as evaluating the long-term outcomes. Gathering data on short-term and intermediate outcomes, allowing for formative evaluation of both processes and progress, and paying attention to unintended outcomes—these are all consistent with a continuous improvement approach.

**Continuous improvement**

*Background*

Continuous improvement is an applied science that emphasizes innovation, rapid-cycle testing in the field, and scaling in order to generate learning about what changes produce improvements in particular contexts (Institute for Healthcare Improvement, 2015). Improvement science seeks to discern what works for addressing a particular problem, for whom, and under what specific conditions (Berwick, 2008; Bryk, Gomez, & Grunow, 2010).

Deep learning for systems change among educators and administrators requires the development of collaborative cultures of inquiry, which can lead to a shift in organizational culture toward problem solving (Kegan & Lahey, 2001). The process of continuous improvement can support disciplined inquiry and facilitate the transfer of ideas generated
from the inquiry to innovative solutions that can be integrated and operationalized in an organization.

Organizations, particularly those in the health care field, have engaged in continuous improvement for decades. Among the most widely used methods for continuous improvement is a four-step framework: the Plan/Do/Study/Act (PDSA) cycle. As described in the literature, the PDSA framework uses the scientific method to answer the question, “How will we know that a change is an improvement?” The framework advocates the following stages:

• **Plan:** The formation of a hypothesis for improvement.
  o This step clarifies the problem, identifies the overall goal as well as drivers or innovations for continuous improvement, and describes the bundle or suite of change practices (or innovation components).
  o This step also involves the completion of a PDSA cycle plan, based on the change practices prioritized. This entails creating an Aim for a cycle, brainstorming questions and predictions, identifying desired measures, and developing a data collection plan.

• **Do:** This step is where the implementation of the innovation components takes place. Challenges or changes in implementing the innovation components are observed and noted. It also involves data collection. Some initial data analyses may also take place during the “Do” phase.

• **Study:** This step requires a collaborative study protocol of the collection of improvement data. Participants organize and examine the data, analyze and interpret the results, compare the data to the hypotheses, and consider if there are signs of progress toward the aim.

• **Act:** In this phase, lessons learned are translated into next steps, which can include making refinements to the innovation component or change practice, formulating new theories or predictions, or changing any tools, supports, or processes. You may decide that the change practice requires another test or it’s possible that the change practice can be implemented more broadly. Then... start the cycle again.
The PDSA approach and tool was popularized in the 1980s by William Edward Deming, an engineer and professor, to carry out continuous improvement in the workplace, particularly in manufacturing, health care, and technology. Since then, several continuous improvement methodologies have emerged, including Six Sigma, Lean, and Innovation Design. These methods have been used by different industry sectors to improve quality output, maximize customer value, minimize waste, promote growth, and foster a culture of innovation.

Educational institutions have also adopted continuous improvement as an approach to support school and district reform. A number of improvement processes have been used to improve curricular, instructional, and organizational practice, for example:

- **Lesson study.** Lesson study has been widely used in Japan to help teachers improve their effectiveness. In this process, small groups of teachers systematically examine their practice by selecting a research question and goal and then planning, teaching, observing, and critiquing one another’s lessons. Notes Armstrong (2011), “Because the focus is on the effectiveness of a lesson itself and what students learn, rather than on an individual teacher’s performance, the method helps reduce [teachers’] anxiety and resistance to being observed” (p. 1).

- **Practitioner action research.** In this process, which gained momentum in the 1970s, individuals identify a problem and engage in reflective inquiry for the purpose of addressing the problem and improving one’s practice. Action research usually involves collaboration between a researcher and a practitioner. As with lesson study, action research can generate a sense of empowerment for practitioners who guide their own professional growth (Winter & Munn-Giddings, 2001).

- **Results-oriented cycle of inquiry (ROCI).** Spearheaded by Partners in School Innovation (n.d.), ROCI has been used primarily in school transformation efforts in underserved communities. It is a set of steps designed to foster habits of
continuous improvement and promote organizational learning among education leaders.

(See Appendix C.)

What these methods have in common is that they explore three essential questions:

- **What problem are we trying to solve?**
  In order for a school, district, or any organization to improve, the key participants must set clear and firm intentions. These intentions are derived from clearly articulating a problem or issue that requires attention. In defining the problem, the participants hone in on the aim, or objective, they intend to accomplish through the continuous improvement process. The aim should target a specific population, be time-specific, and measurable.

- **What changes might we introduce and why?**
  Continuous improvement requires key participants to develop, test, and implement changes. Selecting, testing, and implementing these changes, such as trying out new protocols or processes, is at the core of continuous improvement.

- **How will we know that a change is actually an improvement?**
  An essential part of the work of continuous improvement is to clearly examine how the change has, in fact, addressed the problem and made some meaningful improvement. Therefore, clear and specific measures to capture both the processes and outcomes are at heart of continuous improvement. As quality improvement experts often say, “some is not a number, and soon is not a time.” (Gauthier, 2014).

The work of the Carnegie Foundation for the Advancement of Teaching builds on the health care quality improvement model promoted by the U.S. Department of Health and Human Services (n.d.). In the past few years, the Foundation has sought to test and refine the PDSA model in colleges and schools (Bryk et al., 2015). Today, the Foundation is expanding its efforts by working with educational institutions to facilitate the six core principles of improvement: (1) make the work problem specific, (2) consider variation in performance, (3) see the system, (4) embed measures of key outcomes and processes, (5)
focus on disciplined inquiry, and (6) embrace networked improvement communities. The Foundation encourages 90-day cycles of structured inquiry with the aim of prototyping an innovation. The Foundation also emphasizes the creation of networked improvement communities as a strategy for organizational learning.

Two key ideas from the Carnegie Foundation’s work are worth highlighting:

- Its efforts to transform researchers into continuous improvement scientists who work directly with schools and districts. In this vision, researchers and educators work together and structure the work around developing, testing, and refining innovations.
- The focus on helping educators and organizations understand the differences between improvement research and academic research or research for accountability. According to Bryk et al. (2015), many educational institutions assume that data are data, but the data that serve to meet accountability goals may come up short for informing improvement or change efforts. Improvement measures help to change school and district processes for implementing new practices.

At the same time, it is important to recognize that improvement research connects with both accountability and research measures, for example, when framing the overall targets that organize improvement. Driver diagrams, which are used by many institutions, including the Foundation, can illustrate these connections.

(See Appendices A and B.)

In health care, a large body of literature has established the efficacy of improvement models for depression care among veterans, for diabetes care, and for stroke care (e.g., Benedetti, Flock, Pedersen, & Ahern, 2004; Power et al., 2014). The education field has a smaller but growing evidence base—though, according to Grayson (2009, 2010),
improvement science has not been adopted with fervor or integrity in the field of education. There has been some recent research on schools and districts that have used continuous improvement at either the classroom-instructional level, the school level, or systemwide (Flumerfelt & Green, 2013; Park, Hironaka, Carver, & Nordstrom, 2013; Wilka & Cohen, 2013). The experiences and outcomes of districts that have pursued such a path need further investigation and consideration in order to inform policymakers and practitioners.

Select Case Studies

Many aspects of the educational system favor the status quo by diverting resources and attention to maintenance activities at the expense of continuous improvement (Levin, 2007). The following case examples point to the importance of both educators and school and central office administrators working on continuous improvement. These examples illustrate the value of integrating a continuous improvement approach with frameworks from implementation and systems change literature:

- In *Middle School Mathematics and the Institutional Setting of Teaching*, the district’s improvement approach led not only to new decision-making routines in the districts, but also to robust instructional improvements in mathematics teaching and learning (Cobb, Gibbons, & Garrison, 2011; Smith et al., 2012). Improvement strategies (e.g., providing teachers with access to a coach with instructional expertise in mathematics) were co-designed and then refined in response to timely data about how the strategies were playing out in schools.

- In *Central Office Transformation for District-wide Teaching and Learning Improvement*, Honig et al. (2010) investigated three school districts that sought to improve both learning and leadership: Atlanta Public Schools, New York City Empower Schools, and Oakland Unified School District. The researchers illustrated how administrators from each unit in the central office interacted with and directly supported school administrators and teachers, and how the districts used improvement data to enhance day-to-day work practices and relationships across the system.
• The National Center for Scaling Up Effective Schools, based at Vanderbilt University, worked with the Fort Worth Independent School District on innovations tied to increasing students’ ownership of and responsibility for their learning. Researchers and developers collaborated with school and district leadership teams to build their capacity for implementation and scale through the use of the innovation design process, the PDSA approach, and Coburn’s framework for scale (King, Fabillar, Haferd, Avery, & Fuxman, 2013).

• From their work with organizations that implemented formal continuous improvement processes, Park et al. (2013) identified six overarching themes: leadership and strategy, community and engagement, organizational infrastructure, methodology, data collection and analysis, and capacity building. One noteworthy case example, Montgomery County (Maryland) Public Schools, prioritized improvement at the system level. To facilitate system change, the district used the PDSA approach in conjunction with the Baldrige education criteria for performance excellence (National Institute of Standards and Technology, 2015).

Conclusion
Continuous improvement focuses on the specific tasks people do, the processes and tools they use and how prevailing policies, organizational structures, and norms affect this. (Bryk et al, 2015) Improvement is more a function of learning to do the right things in the setting where you work. (Elmore, 2004) We must invest and develop institutions that act as “learning systems,” that is to say, systems capable of bringing about their own continuing transformation. (Schon, 1973)

Continuous improvement in educational settings requires active engagement of educators, administrators, and other personnel, ideally across different levels of the system. As such, it challenges prevailing norms and encourages leaders to facilitate and foster new habits and structures to support a collaborative culture for learning and improvement. Research shows that effective changes will be achieved if supported by shifts in organizational cultures that include attitudes, beliefs, knowledge, and norms (Felner, 2005; Fixsen et al., 2005). The literature also shows that efforts to improve practices require
capacity building of new knowledge and skills tied to subject matter knowledge and profound knowledge, which can result in culture and mindset shifts. Burke (2002) points to the importance of starting with the process of changing behavior that will likely lead to culture change or a change in beliefs, attitudes, and values.

Unless stakeholders in a system accept the idea that change is needed and that it does not conflict with existing priorities, new and innovative practices will not take hold or be sustained (Petersilia, 1990). Scholars point to the need for assessing district culture and the readiness of practitioners at all levels of the system to participate in continuous improvement. Engaging multiple stakeholders in the continuous improvement process can generate buy-in and ownership.

Districts can implement or adapt a district self-assessment tool for building a culture of continuous improvement initially to gather baseline data from multiple stakeholders, including teachers, school administrators, and central office personnel. Subsequently, districts can implement the survey periodically to gauge progress toward culture and paradigm shifts that support district level systems change.

Fixen, Blase, Horner, and Sugai (2009) indicate that intensive technical assistance is required when new knowledge and skills are called for and when changes need to occur at all levels of the system to sustain the work. Godfrey et al. (2002) highlight the need for multi-level intensive technical assistance work in order to build capacity to identify, solve, and sustain solutions.

Our research on implementation, systems change, and continuous improvement has a number of implications for EDC’s technical assistance plan. At the heart of our plan is the goal of building system capacity to develop individual and collective knowledge, competencies, resources, and motivation, while at the same time recognizing the expertise among the districts. The conceptual framework for our plan describes in detail how we transfer lessons learned from research on the three topics into an integrated model for DLSC. See EDC Technical Assistance Conceptual Framework and Plan.
## Appendices

### Appendix A: Difference in measurement for improvement, accountability, and academic research

<table>
<thead>
<tr>
<th></th>
<th>Measurement for Improvement</th>
<th>Measurement for Accountability</th>
<th>Measurement for Research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Determining whether an educational change is an improvement.</td>
<td>Identifying exemplary or problematic individual teachers, schools, or districts.</td>
<td>Test or develop a theory regarding the relations among two or more conceptual variables.</td>
</tr>
<tr>
<td><strong>What do you measure?</strong></td>
<td>Work processes that are the object of change.</td>
<td>End of the line outcomes.</td>
<td>Latent variables.</td>
</tr>
<tr>
<td><strong>How often do you measure it?</strong></td>
<td>Frequently</td>
<td>Typically reported out once a year (at the end).</td>
<td>Typically once or twice per study.</td>
</tr>
<tr>
<td><strong>Key technical considerations</strong></td>
<td>Sensitivity to change, predictive validity easily embedded in day-to-day work.</td>
<td>Inter-rater reliability and temporal stability. Instruments designed so that raters can be easily trained.</td>
<td>Careful, detailed representation of latent construct; instrument reliability.</td>
</tr>
<tr>
<td><strong>Most important qualities</strong></td>
<td>Formative value; signals actionable changes.</td>
<td>Summative, global measures of performance applicable to all.</td>
<td>Construct validity</td>
</tr>
<tr>
<td><strong>Social conditions for use</strong></td>
<td>Data shared in low stakes, safe environment conducive to change.</td>
<td>Process formality to assure appearances of neutrality and objectivity, school and district leaders are primary users.</td>
<td>Meets scientific standards in the discipline; usefulness to study participants is generally not a key concern.</td>
</tr>
<tr>
<td><strong>Limitation for improving practice</strong></td>
<td>Premium on practicality poses challenges for the efficient collection and rapidly reporting on data.</td>
<td>Causes of any observed differences are opaque as data are not tied to specific practices. Limited formative value.</td>
<td>Impractical to administer as a part of standard practice in classrooms; not specifically designed to detect the effect of changes in practice, and so less informative for iterative improvement efforts.</td>
</tr>
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Appendix B: A System of Measures for Improvement

<table>
<thead>
<tr>
<th><strong>Three Types of Measures</strong></th>
<th>Use a balanced set of measures for all improvement efforts: process measures, and balancing measures, outcomes measures.</th>
</tr>
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<tbody>
<tr>
<td><strong>Process Measures</strong></td>
<td>Are the parts/steps in the system performing as planned? Are we on track in our efforts to improve the system? Process measures describe the extent to which practitioners (in different levels of the system) perform according to key principles of innovation (s). Help determine if you are on track for quality implementation. Help identify effective changes.</td>
</tr>
<tr>
<td><strong>Balancing Measures</strong></td>
<td>(looking at a system from different directions/dimensions) Are changes designed to improve one part of the system causing new problems in other parts of the system? Balancing measures describe any unanticipated consequences that result from changes to the system as we make improvements to process and outcome measures.</td>
</tr>
<tr>
<td><strong>Outcome Measures</strong></td>
<td>How is the system performing? What are the results? How does the system impact the practitioners? What are impacts on other stakeholders? Outcome measures describe changes in conditions or behaviors following the implementation of an innovation. Assess the impact of the innovation on students or practitioners.</td>
</tr>
</tbody>
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Appendix C: Examples of Continuous Improvement Methods

Lean Six Sigma: DMAIC

Define
Measure
Analyze
Improve
Control

Define the problem.
Map out the current process.
Identify the cause of the problem.
Implement and verify the solution.
Maintain the solution.

https://goleansixsigma.com/what-is-lean-six-sigma/

http://www.blendmylearning.com/2014/05/28/using-design-thinking-to-develop-personalized-learning-pilots/

http://professionallyspeaking.oct.ca/march_2010/features/lesson_study
Results-Oriented Cycle of Inquiry

http://www.slideshare.net/PartnersSI/partners-43911204

Plan-Do-Study-Act Method

<table>
<thead>
<tr>
<th>Question</th>
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<tbody>
<tr>
<td>What problem are we trying to solve?</td>
</tr>
<tr>
<td>What changes might we introduce and why?</td>
</tr>
<tr>
<td>How will we know that a change is actually an improvement?</td>
</tr>
</tbody>
</table>

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http://www.westga.edu/~dturner/PDCA.pdf


