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K-12 District Wide Implementation of Improvement Science and the Leadership Conditions that Support High Quality PDSA Cycles at Schools

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K-12 District Wide Implementation of Improvement Science and the Leadership Conditions that
Support High Quality PDSA Cycles at Schools

Process by

MATTHEW TURKIE

DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF EDUCATION

in

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in the

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of the

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DAVIS

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Abstract

There are many districts across the state of California which are implementing improvement science to improve student outcomes, however there is a scarcity of research on the wide scale implementation of improvement science at the K-12 level. This qualitative study used individual, semi-structured interviews to explore the district-wide implementation of improvement science at the school level to improve student outcomes across a large urban school district, Tree Unified School District, (TUSD). Moreover, this study explores the leadership conditions that support high quality, iterative PDSAs (Plan Do Study Act cycles) at school sites, as school teams towards improving student outcomes. Within this study, the conditions for change at both the district and school levels are explored using the four components of Fullan's Coherence Framework; focusing direction; cultivating collaborative cultures; deepening learning; and securing accountability.

A total of eleven (11) individual interviews were conducted as follows; principal supervisors (3); principals of schools which had experienced success with implementing high quality iterative PDSAs at their school sites (3); curriculum and instruction management who had supported the implementation of improvement science across the district in their respective areas of math, English language arts, and social and emotional learning (3); and training specialists who directly supported school based teams at schools which had experienced success with implementing high quality iterative PDSAs (2). A document analysis of schools' PDSA cycles between September 2019 and March 2020 was also conducted. It was through this document analysis that schools which conducted high quality, iterative PDSAs were identified. The principals of the identified schools formed the purposefully sampled principals for

individual interviews. The training specialists who supported these schools were also purposefully sampled.

There were several positive aspects of implementation: with adequate time and third party support, principal supervisors grew into their role as providers of improvement science professional learning; invested principals, and curriculum and instruction support staff built significant capacity in the implementation of improvement science; invested principals developed a shared sense of accountability to one another for implementing the work; and improvement teams at invested school sites developed a common set of effective practices to engage in continuous improvement.

There were also aspects which hindered implementation; many principals at TUSD did not engage authentically with the work of improvement science; the contentious relationship between the district and the teachers union stopped teachers from receiving high quality, professional learning from a third party, CORE Districts (CORE was originally called the California Office for Reform in Education, but is now known simply as CORE Districts) which resulted in teachers having less than adequate training to effectively engage in PDSA cycles; principal supervisors were not given the time to become proficient at improvement science before they were responsible for training principals; the district led with external accountability, mandating principal engagement in improvement science without first building the conditions for strong internal accountability; and very few schools, only 3 out of 77, engaged in high quality, iterative PDSA cycles.

Even though there were few schools which managed to engage in high quality, iterative PDSAs, the researcher managed to gather rich data from the schools which did. The leadership conditions which supported high quality, iterative PDSA cycles at schools included the

following; principals took an active role in the improvement team and championed the effort; principals were collaborative, and spent time coming with their improvement teams coming to consensus on a focused direction of what the student outcomes are that the team is trying to improve, and how the team will attempt to improve those outcomes; principals created a safe environment for teachers to take risks and to learn from failure; time and resources were invested in building teachers' collective capacity to improve; success was used as a catalyst to deepen and broaden the work; principals spent a lot of effort and resources on creating a collaborative culture, which strengthened the conditions for strong internal accountability, before further bolstering accountability with the use of external accountability, in the form of transparency and deliverables.

To effectively implement improvement science at schools, and to effectively engage school based teams in high quality, iterative PDSAs, the following recommendations should be taken into account:

- Size up the context for improvement to judge the scale of implementation. This is done by juxtaposing capacity to implement and willingness to engage. If in doubt, start small. Both capacity and will to scale up can be built during small scale implementation.
- Having expertise and support from a third party can help strengthen implementation. Adequate time and support should be provided to build internal capacity for all groups, including district leadership who are guiding the work, school based teams including teachers who are doing the work, and district capacity supporting teams, such as the curriculum and instruction department who support the work at school sites.

- The climate for change is key. If the change-climate is low, organizations can expect to be met with either inertia or resistance. Taking the time and effort to garner consensus on a focused direction is paramount to ensure participants engage authentically in the work.

- Organizations should create the conditions for strong internal accountability (trust, collaboration, non-judgmentalism, safe environment to question and make mistakes) before increasing external accountability (transparency, mandated deliverables).

- Organizations should make use of a change management framework, such as Fullan's Coherence Framework to guide the organizational change process. Taking time to build a focused direction which is shared and owned by stakeholders and at the same time creating a culture of collaboration is the best starting place. The change climate can be monitored and adjustments can be made as appropriate. Indeed, the implementation of change could be an aspect that the organization applies the tenets of improvement science to.

ACKNOWLEDGEMENTS

I am grateful for the time I spent in the CANDEL program, which was so very valuable because of my classmates and because of our instructors. The contributions of all helped to challenge me and helped me grow academically, professionally and personally. I am especially grateful for the help and assistance of Dr. Tony Albano, who has served as my advisor through the dissertation process. I would also like to thank Dr. Kevin Gee and Dr. Alix Gallagher for serving on my committee and providing me with invaluable feedback.

DEDICATION

This dissertation is dedicated to my forever loving wife, Amanda, and to our two children, Ella and Salvador. Without their love and support, I would not have been able to complete this dissertation.

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Chapter 1

INTRODUCTION

Introduction and Problem Statement

In 1983, the US Government released a seminal report titled *A Nation at Risk: The Imperative for Educational Reform*, within which the authors famously claimed "The educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a nation and as a people," (United States, 1983). Since the release of this report, the nation has been through several waves of educational reform in the attempt to improve educational outcomes for students (Sharrock, 2018). In 2015 the *Every Student Succeeds Act* (ESSA), shifted the responsibility of creating an accountability framework away from the federal government towards the state level and gave local school districts unprecedented levels of local control and accountability to address student needs (Darling-Hammond, 2016). Despite, or perhaps because of the emphasis placed on accountability, large achievement gaps have persisted for low income, English learner, African American and Latinx students (Loeb et al., 2018).

This confluence of increased transparency, persistent underachievement of African American, Latinx, homeless/foster students, English learners, students with disabilities and low income students combined with unprecedented levels of local control has the aspiration to prompt school districts across the state to focus their efforts on improving outcomes for all students, as well as specific student groups within the California School Dashboard (Gallagher et al. 2019). Within this context of local control, increased transparency, and persistent opportunity gaps for students, both ESSA and the State Superintendents Accountability and Continuous Improvement Task Force have explicitly called out continuous improvement as a priority for

schools and school districts to improve student outcomes (Gallagher et al, 2019). Grunow et al (2018) defined continuous improvement as "an ongoing effort in pursuit of consistently higher levels of performance".

California's System of Support is built upon the tenets of continuous improvement, and specifically utilizes improvement science as a method to help schools and districts get better results (Javius, 2018). According to Bryk et al (2015), improvement science is defined as "The methodology that disciplines inquiries to improve practice. Undergirding it is an epistemology of what we need to know to improve practice and how we may come to know it." Continuous improvement has certain distinguishing characteristics which set it apart from other methods of improving outcomes. Importantly, there is a focus on "seeing the system", and a belief that it is the system that produces results. As such, poor performance is not seen as the fault of individual practitioners, but rather the fault of the system itself. Consequently, attention is focused on system design and operation, so that practitioners can identify, understand and improve key processes in order to improve outcomes. Failure is seen as an opportunity to learn more about how the system actually works in reality, which can give practitioners insights into how to improve. The workhorse of improvement science are disciplined Plan, Do, Study, Act (PDSA) inquiry cycles, which are engaged in to learn fast, improve quickly and implement well (Bryk et al, 2015).

Iterative PDSA cycles are a scientific method of testing changes within a complex system and making necessary adjustments to the change idea being tested as the results are collected and analyzed. Each PDSA cycle is an experiment in which outcomes are predicted based on practitioners' knowledge of how they think the system operates. Actual outcomes are then compared with predictions and the discrepancy between the two provides insight into how the

system is actually working. This new learning allows practitioners to better understand how their theory of improvement works in reality and to make informed modifications to the change being tested. Testing and modifications then continue in an iterative fashion, with the learning from one cycle fueling the next.

Rohanna (2017), asserted that many improvement initiatives within education reform follow the cycle of "adopt, attack and abandon", wherein schools and districts adopt a research-based initiative but fail to implement the initiative with fidelity because of constraints within their local context. This leads to the initiative failing and being abandoned in favor of the next big thing to improve student outcomes. Rather than simply having practitioners trying to follow research-based practices with fidelity, and failing because of local contextual issues, improvement science offers an alternative approach with its iterative PDSA cycles, wherein adjustments are continually being made so that the reform can be successful within the local context.

TUSD has been attempting to use the tenets of continuous improvement as a wholesale change in how the organization operates by "seeing the system", and improving processes. PDSAs are the culminating facet of continuous improvement, where the rubber hits the road and actual change ideas are put into practice and studied, with the aim of improving student outcomes. It is within PDSA cycles that practitioners at TUSD schools made changes to classroom or school practices that impacted the lives of students. PDSA cycles at schools are key artifacts of the most systematic attempt at TUSD of putting continuous improvement into practice.

There are many districts across the state of California which are implementing improvement science to improve student outcomes, and there are studies on the application of

improvement science in education suggesting that it may well be a promising practice (Haxton & O'Day, 2015; Daley, 2017; MacConnell & Caillier, 2016; Huang, 2018; Jansen, 2018; Hannan et al., 2015; Gomez et al., 2015; Edwards et al, 2015; Gary & Gobstein, 2015; Sharrock, 2018, Tichnor-Wagner, 2017; Aguilar et al, 2018). However, there is limited research on the district-wide implementation of improvement science at the school site level, across a large urban school district to improve student outcomes. Nor do scholars fully understand what conditions support high quality, iterative PDSAs at the school and classroom level, which are the engine of improvement.

The scarcity of research on district-wide implementation of improvement science at the school site level is a regrettable gap, as the implications of such a study in a large urban school district with competing demands and a lack of resources, would be invaluable to those in the field of education whose focus is continuous improvement. This would be particularly informative for educational practitioners in school districts, county offices of education, state departments of education, and third party organizations that support the implementation of improvement science such as the Carnegie Foundation for Teaching and Learning and The CORE Districts.

This qualitative study explores the district-wide implementation of improvement science at the school level to improve student outcomes across a large urban school district (TUSD). Moreover, this study explores the leadership conditions that support high quality, iterative PDSAs at school sites. To explore the implementation of improvement science and the leadership conditions that support high quality, iterative PDSA cycles at schools, purposefully sampled participants including district level senior leaders, principals, and curriculum and instruction coordinators and coaches were interviewed. The senior leaders were interviewed

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individually and the principals, and curriculum and instruction staff were interviewed in job-alike focus groups. A document analysis of schools' PDSA cycles between September 2019 and March 2020 was also conducted. It was through this document analysis that schools which conducted high quality, iterative PDSAs were identified. The principals of the identified schools formed the purposeful sample for focus group interviews. Moreover, this study explores how improvement science was implemented as a change in practice from the district level to principals, and from principals to teachers and other staff.

Michael Fullan has become a leading voice in change leadership theory from working directly with K-12 school districts and systems and developing change leadership theory since 1998 (Fullan, 2016). Fullan has described the process of change leadership as "how we help people through the change process and get greater coherence while we are at it" (2016). According to Fullan (2016), the United States has led with the wrong drivers in place since 2001 and No Child Left Behind, followed by the Race to the Top. Both of these nationally imposed solutions take a punitive approach to accountability and demotivate the very people who are leading the work. The wrong drivers are punitive accountability, individualistic strategies, technology and ad hoc policies.

To help guide schools and districts to bring about system change within a reasonable timeline, Fullan (2016) developed the Coherence Framework, based on the right drivers of positive change; focusing direction; cultivating collaborative cultures; deepening learning; and securing accountability. School districts are encouraged to use the coherence framework to reflect on organizational coherence while leading complex change. Within this study, the conditions for change at both the district and school levels are explored using the four components of Fullan's Coherence Framework.

Research Questions

1. How is improvement science being implemented at TUSD, from the district level to schools?

2. What are the leadership conditions at the school level that support high quality, iterative PDSA cycles at schools?

Chapter 2

THEORETICAL FRAMEWORKS

Background and Context

In July 2017, TUSD hired a new Superintendent, who came to TUSD with a focus on equity, access and social justice and a guiding principle that stated "All students are given an equal opportunity to graduate with the greatest number of postsecondary choices from the widest array of options". To achieve the guiding principle, the Superintendent wanted those who work in the district and at TUSD schools to change the manner in which they operate, utilizing improvement science as a method to get better results and by developing an improvement mindset - seeking to improve rather than to prove. To systematize this wholesale change of practice, it was decided at the start of the 2018/19 school year that each of the schools in TUSD would chose a goal within their 2019/20 School Plan for Student Achievement (SPSA), to take through the TUSD Cycle of Continuous Improvement (CCI), which is based on the principles of improvement science. It is hard to overstate what a large change in practice this was at TUSD. School principals had been used to very little oversight or direction in the development and implementation of goals within their SPSA as the main method of school improvement. Indeed, the development and implementation of goals to drive school improvement up until the 2018/19 school year lacked any type of systematic approach or rigor. As such, during the 2018/19 school year principals engaged in professional learning focused on improvement science and the TUSD cycle of continuous improvement, to plan one goal within their 2019/20 SPSA. During the 2019/20 school year, principals received professional learning on the implementation of PDSA cycles, and each school engaged in PDSA improvement cycles as a method to achieve the goal they had set in their SPSA. PDSA cycles are the culmination of the CCI, where changes to

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classroom or school practices that impact the lives of students are put into place and tested. All of the planning of the goal in the 2018/19 school year was put into practice during the 2019/20 school year with the implementation of PDSA cycles. Indeed, PDSA cycles at schools are key artifacts of the most systematic attempt at TUSD of putting continuous improvement into practice. This study explores how improvement science was implemented as a change in practice from the district level to principals, and from principals to teachers and other staff.

Conceptual Frameworks

Continuous Improvement

According to Peden and Rooney (2009), W. E. Deming (1900 - 1983) is often regarded as the founding father of continuous improvement. Deming worked to improve production in industry in the US during World War II and post-war Japan. Deming's ideas were used in Healthcare since around the late 1980's, and then were adapted for use in the field of education in 2008 (Bryk et al. 2015). Deming (1993), developed the system of profound knowledge to describe how organizations work and how they can improve. The system of profound knowledge includes four overlapping components; appreciation of the system, knowledge about variation, knowledge of psychology (what motivates people) and theory of knowledge (how knowledge is built, for example the scientific method). The system of profound knowledge, which is needed to enact improvement across an organization provides the undergirdings of continuous improvement. Lewis, (2015) asserted that the implementation of improvement science requires two different types of knowledge; knowledge of the content that practitioners want to improve (math pedagogy for example), and the system of profound knowledge described above.

Before exploring the characteristics of continuous improvement, it is important to distinguish continuous improvement approaches from other strategies designed to improve

educational outcomes. Grunow et al (2018) and Liebman (2012) both compared continuous improvement with two other approaches; (1) types of managerialist strategies, such as accountability and performance management and (2) professionalism strategies, such as professional learning communities. Managerialist strategies expect schools to succeed by setting goals for educators, and promoting those that reach those goals and firing those who do not (Liebman, 2012). According to Grunow et al (2018), continuous improvement like managerialist strategies clearly defines measures and outcomes, however, while managerialist strategies simply apply pressure and/or motivation to achieve better outcomes, continuous improvement methodologies assume that the main cause of poor results is the design of the system, rather than the lack of will of workers. While managerialist strategies do not encourage practitioners to delve into the actual work and processes engaged in to produce the outcomes, continuous improvement relies on continued experimentation of the people doing the work to improve processes to get better results. The second strategy explored is professionalism, which relies on gifted, well paid educators to address the varied needs of students (Liebman, 2012). According to Grunow et al (2018), both professional learning and continuous improvement assume that the people who are doing the work need to learn about the work to get better results. Within education most professional learning strategies however limit this approach to those involved in instruction, whereas continuous improvement does not. Moreover, as in the managerialist approach, professionalism strategies do not address how success is meant to be accomplished, nor do they address how to find, or train these high performing managers and professionals (Liebman, 2012). It is interesting to note that both managerialist strategies and professionalism strategies are commonly used in the field of education. From a managerialist perspective, districts, schools, principals and teachers have all at some point been expected to set goals, and

to reach those goals, without a clear strategy of how to actually achieve the goals set. Professionalism is also incredibly common in education, especially with the proliferation of professional learning communities popularised by the Dufours (Dufour, Dufour and Eaker, 2012). Even with the rise of continuous improvement as a method to improve outcomes, I feel that all three approaches will continue within education, with varying degrees of blending, fidelity and quality of implementation.

A health care paper from 2011 also identified terms which are most often used to represent improvement science in order of frequency: implementation science, science of improvement, improvement science, translational research, translational science, measurement for improvement, quality improvement methods, quality improvement science, science of quality improvement, evidence-based practice, knowledge translation, research utilisation (Health Foundation, 2011). Within the various terms used, two overlapping definitions of improvement science emerged; firstly, how to effectively implement improvements at scale and secondly, how to narrow the gap between research and practice. Overall, improvement science was defined as "a body of knowledge that describes how to improve safely and consistently. Improvement science is not the same as research. Research is designed to find out what is possible. Improvement science is not the same as audit. Audit is designed to find out what is actual. Improvement science describes how to reduce the gap between what is actual and what is possible" (Health Foundation, 2011: 6).

Scholars and institutions have developed a variety of models for improvement which are based on the tenets of continuous improvement. LeMahieu et al (2017) compared seven improvement science approaches, (1) Networked Improvement Communities; (2) Design-Based Implementation Research; (3) Deliverology; (4) Implementation Science; (5) Lean for

Education; (6) Six Sigma; and (7) Positive Deviance. All of the approaches have several features in common. First, and most importantly, each of the approaches are driven by a common and well articulated inquiry goal. Second, they all involve making explicit hypotheses about how to improve, and test these hypotheses using empirical data. Third, they are all inquiry based, and involve the use of transparent, commonly understood methods to garner input and feedback and to allow others to replicate the learning. Enacted well, all of these approaches should be genuinely scientific in their application. Each of the seven approaches also have distinctive features which make them better suited for different purposes. Deliverology and Implementation Science are best suited to implementing and scaling planned interventions that are very specific, and centrally, rather than locally managed. Networked Improvement Communities, Positive Deviance and Design-Based Implementation Research however are better at improvement that gives front line workers such as teachers more autonomy to adjust as necessary to make the improvement work best in their local context. Lean for Education and Six Sigma on the other hand are most attuned to optimizing processes that work within a larger system.

Langley (2014), came up with a useful model for improvement in which three central questions of improvement science are paired with the PDSA improvement cycle. The three central questions of improvement science are (1) What are we trying to accomplish? (2) How will we know that a change is an improvement? (3) What change can we make that will result in improvement? Practitioners answer these three questions and then engage in rapid, experimental cycles of improvement known as PDSA cycles that drive the improvement work and any adjustments that are made along the way. While the three questions are prerequisites to engaging in the PDSA cycle, they are not static. Learning which comes from engaging in PDSA improvement cycles may well inform and change the answers to the three questions, and as such

the model for improvement is iterative. Using the interplay between "How will we know if a change is an improvement?", "What changes can we make which will result in improvement?" and PDSA cycles, Langley's model is an attempt at systematically narrowing the gap between research and practice, noted by the Health Foundation in 2011 as part of the definition of improvement science. Moreover, it is clear that Langley's model has the common features of improvement science uncovered by LeMahieu et al (2017): Improvement is driven by a common and well articulated inquiry goal (Langley's question 1); It involves making explicit hypotheses about how to improve (Langley's question 3); it tests these hypotheses using empirical data (Langley's question 2); and it involves an inquiry cycle (The PDSA improvement cycle).

Langley's model for improvement is shown below in figure 2.1.

Figure 2.1 Model for Improvement (Langley, 2014)
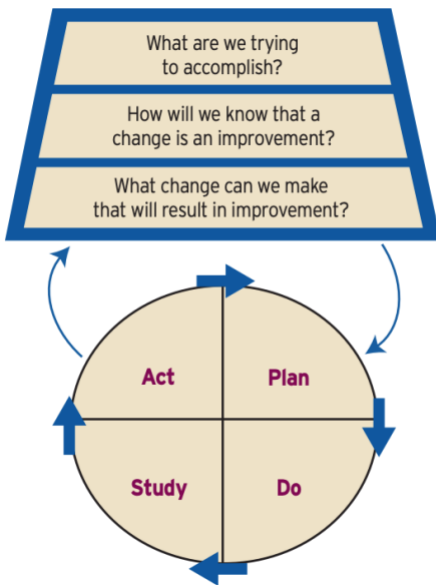
Bryk et al (2015) defined the six core principles of improvement science which are described below. It is important to note that the six core principles of improvement science described by Bryk et al in 2015, and the model for improvement described by Langley in 2014

are complementary ways of defining improvement science. Bryk embedded Langley's model within his own, and while Langley's model is perhaps less comprehensive than Bryk's six core principles, it does give a more streamlined approach to improvement science. Bryk's six core principles are below:

1. Focused and user-centered: Improvement science engages key participants on the front line of the change, to answer the question, "What specifically are we trying to achieve?". The improvement work must be problem-specific and user-centered.

2. Attend to variability: Improvement science encourages participants to focus on variation in performance, to work out what works, for whom, under what conditions. Practitioners then learn from positive outliers to help those struggling with performance, and hence the variability is reduced.

3. See the system: Dr. Paul Batalden, of the Institute for Healthcare Improvement pronounced that "Every system is perfectly designed to get the results it gets". Before improvements to a system are attempted, it is of vital importance for participants to understand how the processes within a system function in reality to produce the current results. Improvement science makes use of many tools to help participants see the system, such as fishbone diagrams, process maps and empathy interviews. These tools aid in identifying the root causes of a specific problem. Another tool, called a driver diagram is used to design and make explicit a working theory of action that is used to guide the improvement work, and answer the question "What changes might we try and why?"

4. Embrace measurement: Bryk et al asserted that "We cannot improve at scale what we cannot measure" (2015). Improvement science involves measuring both key processes

and outcomes, so we can know if changes in processes are having the desired effect. This answers the question, "How do we know if a change is an improvement?"

5. Learn through disciplined inquiry: Improvement science engages practitioners in rapid improvement cycles, known as PDSA cycles to learn fast and improve quickly.

6. Organize as networks: Practitioners can accelerate progress by learning from one another in networked improvement communities (NIC's). A NIC is a group of organizations that come together to accelerate the refinement and dissemination of solutions towards a common improvement goal.

Bryk's six core principles draw on both Deming's system of profound knowledge, and Langley's model for improvement. Three of the four components of the system of profound knowledge defined by Deming (1993), are embedded in Bryk's model, specifically; appreciation of the system (Bryk's principle 3); knowledge about variation (Bryk's principle 2), and theory of knowledge (Bryk's principle 5). Deming's fourth component, knowledge of psychology (what motivates people) is conspicuously absent however. Moreover, Bryk's core principles have incorporated Langley's model of improvement; Principle 1 relates to Langley's first question; Principle 3 relates to Langley's third question; Principle 4 relates to Langley's second question; and principle 5 relates directly to Langley's PDSA cycle.

Park et al (2013), Hough et al (2017) and Grunow et al (2018) are colleagues who worked together at the Carnegie Foundation for Teaching and Learning, and between them published papers which identified and defined continuous improvement approaches. Each of the publications build upon one another and are informed by the work described above. Park et al (2013) defined continuous improvement as "the act of integrating quality improvement into the daily work of individuals in the system." In 2013, Park et al found three characteristics that

continuous improvement organizations display, regarding the frequency, depth and system contextualization of their continuous improvement efforts. The three organizational characteristics were:

- Organizations must engage in improvement projects with high frequency and regularity.
- The improvement projects an organization engages in need to be interwoven into people's daily work, rather than disconnected from it, or in addition to it.
- The problems of practice in which the organization engages to improve are regarded as being products of the system, rather than individuals. This characteristic builds on Deming's component of appreciating the system (1993)

The common characteristics of continuous improvement organizations identified by Hough et al in 2017 were:

- The collective use of evidence based processes and practices. This integrates Langley's third question (2014) and Bryk's core principle 3 (2015)
- Collective organizational goals, responsibilities and priorities
- The use of a common improvement methodology
- The use of a data infrastructure to provide feedback on goals. The use of a data infrastructure makes it possible for teams within the organization to apply Langley's second question (2014) and Bryk's core principle 4 (2015)
- The development of a culture that learns from failure
- The development of leadership practices that grow a continuous improvement culture

Grunow et al (2018) defined continuous improvement as "an ongoing effort in pursuit of consistently higher levels of performance". Building upon previous findings, the key

assumptions that Grunow et al found in 2018 that distinguish a continuous improvement approach from other strategies were as follows:

- It is the system that produces results. Attention is focused on system design and operation. This assumption clearly builds on Deming (1993) and Park (2013)

- Attention is focused on identifying, understanding and improving the key processes that produce the results, rather than solely focusing on the end outcomes. Building on Deming's (1993) and Park's (2013) findings once again, this assumption is focused on key processes within the system.

- Collective learning and discovery are essential to progress. Measurement of processes is vital to understanding their effect. This assumption blends the attention to the system from Deming and Park, and the measurement ideas from Langley (2014) and Bryk (2015), to measure key processes within the system as an aspect of continuous improvement.

- The unique knowledge of the people doing the work is needed to improve the work. Those directly responsible for the work are the ones who are involved in continuous improvement to get better results. This assumption builds off Bryk's first core principle.

- As new learning and effective practices are discovered, they are purposefully spread throughout the organization. Necessary changes are made to adapt to local context by practitioners as the new practice is put through improvement cycles. This assumption builds off Langley's PDSA cycles (2014) and Bryks thoughts about how to spread and scale good ideas that work while taking local context into account (2015).

Lastly, continuous improvement necessitates practitioners to engage in rapid improvement cycles to learn how to implement well (Langley, 2014; Bryk et al 2015); Hough et

al, 2017; Grunow et al, 2018). While there are many different types of improvement cycles, all of them have similar features which include the following:

- setting goals using data

- creating a plan of action

- implementing the plan

- assessing the results using data

- reflecting on and adjusting the plan as necessary

While the field of continuous improvement continues to evolve within education, the main scholars cited in this section, from Deming, to LeMahieu, Langley, Bryk and the Carnegie Foundation team of Park, Hough and Grunow have a large degree of agreement. The ideas and technical models continue to evolve and build upon one another. There does seem to be one conspicuous outlier however, and that is a critical component of Deming's system of profound knowledge, specifically, knowledge of psychology, or what motivates people. The technical aspects of how to improve, and the characteristics of continuous improvement organizations have been covered, but how to get people to change the way they do things has been somewhat absent. Within my position at TUSD I have also noticed that we have focused on the technical aspects of improvement, but have somewhat neglected the aspects of organizational change which are required to make change stick. Within this study, this has been my motivation to combine the use of improvement science with a change management theory, namely using the lens of Fullan's coherence framework (2016).

The TUSD Cycle of Continuous Improvement

TUSD has developed its own Cycle of Continuous Improvement, which integrates the

principles defined by Bryk (2015), and the three central questions from Langley (2014). The

TUSD Cycle of Continuous Improvement is shown below in Figure 2.2:

Figure 2.2 (TUSD Cycle of Continuous Improvement, 2019)
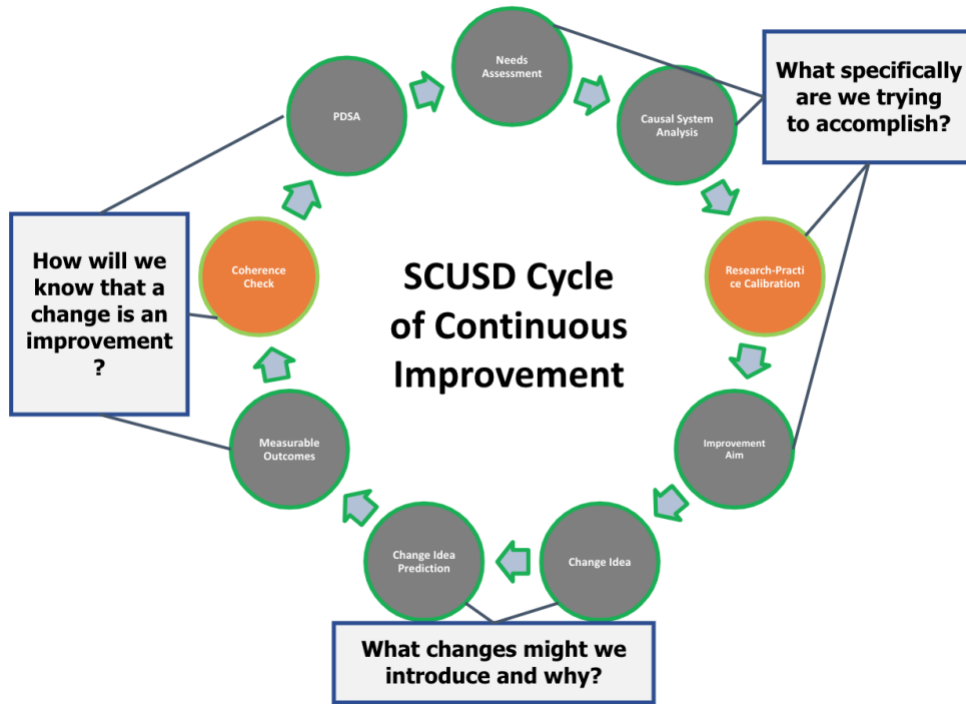
Each of the steps of the cycle of continuous improvement are described in appendix A.

Implementation of Improvement Science at TUSD and Fullan's Coherence Framework

The first research question asks "How is improvement science being implemented at

TUSD?". A schematic of implementation is illustrated in the diagram below, figure 2.3

Figure 2.3 <u>Implementation of Improvement Science at TUSD</u>

PL = Professional Learning
F = Facilitation of Local
     Improvement Teams

```
                        ┌─────────────────┐
                        │      CORE       │
                        │   (3rd party)   │
                        └─────────────────┘
          PL                   │ PL                   PL
      ┌──────────┐        ┌──────────┐          ┌──────────┐
      │ District │        │  Some    │          │Curriculum│
      │  Senior  │        │school    │          │   and    │
      │leadership│        │site admin│          │Instruction│
      │          │        │and       │          │          │
      │-Assistant│        │instruct. │          │-Some mgmt│
      │  Supes   │        │coaches   │          │and coaches│
      └──────────┘        └──────────┘          └──────────┘
          │ PL                 │ F                   │ PL
      ┌──────────┐             │              ┌──────────────┐
      │School    │             │              │ Curriculum   │
      │site admin│             │              │ and Instr.   │
      └──────────┘             │              │-All mgmt and │
                               │              │ coaches      │
                               │              └──────────────┘
            F                  │                    F
                   ┌────────────────────────┐
                   │ School site improvement│
                   │ teams working on goal  │
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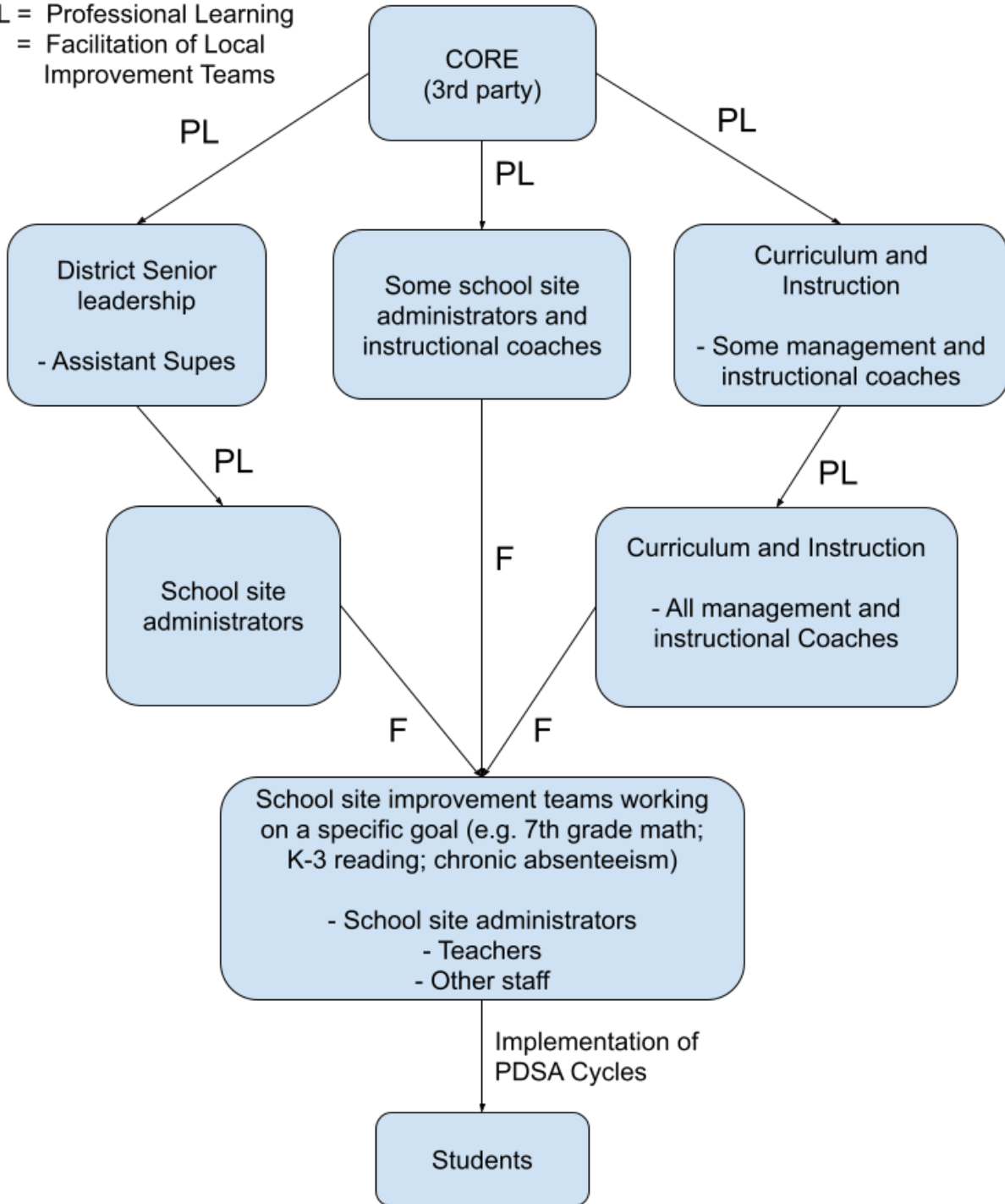
CORE
(3rd party)

PL

District Senior
leadership

- Assistant Supes

Some school site
administrators and
instructional coaches

Curriculum and
Instruction

- Some management and
instructional coaches

PL

School site
administrators

F

Curriculum and Instruction

- All management and
instructional Coaches

PL

F   F

School site improvement teams working
on a specific goal (e.g. 7th grade math;
K-3 reading; chronic absenteeism)

- School site administrators
- Teachers
- Other staff

Implementation of
PDSA Cycles

Students

TUSD was supported by a third party organization, CORE districts, in its implementation

of improvement science. CORE delivered professional learning on the tools, processes, mindsets

and implementation of improvement science to district leadership, curriculum and instruction leadership, many curriculum and instruction training specialists (instructional coaches) and some school site leaders. District leadership who received the professional learning from CORE included instructional assistant superintendents, who are principal supervisors, and the assistant superintendent of curriculum and instruction. These assistant superintendents then delivered professional learning to school site leaders, while the curriculum and instruction team delivered similar professional learning to the whole curriculum and instruction department. School site administrators, some with the assistance of curriculum and instruction training specialists were then tasked with facilitating improvement teams at school sites to go through the improvement science process and implement iterative PDSAs based on their improvement aim. The improvement aim that school sites took through the improvement science process was their main SPSA (School Plan for Student Achievement) goal, which was focused on improving a specific student outcome found on the California School Dashboard. SPSA goals could be focused on improving middle school math, or foundational reading in grades K-3, reducing chronic absenteeism in 9th grade students, or reducing the disproportionality of suspension rates. Collective capacity building, which "involves the increased ability of educators at all levels of the system to make the instructional changes required to raise the bar and close the gap for all students" (Fullan, 2016. P. 57), is an integral part of the cultivating collaborative cultures component of Fullan's Coherence Framework. The TUSD model of building collective capacity simultaneously across the system was multi-pronged and included the following; people participating in professional learning directly from CORE; through the train the trainer model, principals, assistant principals, and the curriculum and instruction department all participated in regular learning sessions over multiple years; self study and study groups on the book "Learning

to Improve" by Bryk et al (2015); multiple groups building their own capacity, such as the math department within curriculum and instruction, and informal principal groups; Gear Up! is an organization which worked with several TUSD schools and complemented the improvement science work. The groups that received simultaneous professional learning are in line with groups recommended by Fullan; a district leadership team (Assistant supes); a district capacity building team (curriculum and instruction); a principal team (school site admin); and school leadership teams (School improvement teams). The groups which received professional learning did so in a combination of direct professional learning from CORE and train the trainer professional learning, delivered by TUSD staff. Fullan (2016) notes that while districts may vary their approaches to capacity building, that there are three features that demonstrate a strong impact on changing practice and building coherence; (1) Learning partnerships within teams and laterally across the organization; (2) Sustained focus over multiple sessions; and (3) Cycles of learning from the work, which are structured inquiry with intentional application in roles and reflection on impact.

This study explores how improvement science was implemented as a change in practice at TUSD by utilising Michael Fullan's Coherence Framework. Michael Fullan has become a leading voice in change leadership theory from working directly with K-12 school districts and systems and developing change leadership theory since 1998 (Fullan, 2016). Fullan has described the process of change leadership as "how we help people through the change process and get greater coherence while we are at it" (2016). To help guide schools and districts to bring about system change within a reasonable timeline, Fullan (2016) developed the Coherence Framework, based on the right drivers of positive change; focusing direction; cultivating collaborative cultures; deepening learning; and securing accountability. School districts are

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encouraged to use the coherence framework to reflect on organizational coherence while leading complex change.

Using Fullan's coherence framework this study explores how improvement science is being implemented at TUSD at the district level, from district leadership to principals, and at the school level, from principals to school based teams. Using the elements of focusing direction, collaborative cultures, deepening learning and securing accountability, which are described below, this study explores the organizational coherence of how the change in practice of using improvement science to improve outcomes for all students, and in particular, the most underserved students. The conditions, contexts, resources, constraints and limitations of implementation are all explored.

1. Focusing direction - Having a vision which is widely shared and understood throughout the organization. People within the organization continually engage and re-engage in the vision, reaching further shared clarity from each engagement. There are four aspects of focusing direction; (1) Having a shared purpose to drive action; (2) Having a small number of goals that impact student learning; (3) Having a clear strategy to achieve the goals that is known by all; and (4) Change knowledge is used to move the system forward

2. Collaborative cultures - Bringing the shared vision into fruition is done in a collaborative manner. There are structures in place that support collaboration. Individuals within teams have a feeling of ownership and collective responsibility for the work. There are four aspects of creating collaborative cultures; (1) Having a growth mindset; (2) Lead learners modelling learning themselves and shaping a culture of learning; (3) Collective capacity

building; and (4) Having structures and processes to support intentional collaborative work.

3. Deepening learning - Engaging in the work inspires people and enables learning which sticks. People feel the learning is important and significant. There are three aspects of deepening learning; (1) Having clear learning goals; (2) Having a set of effective effective practices known and used by all; and (3) Having robust processes, which are used regularly to improve practice.

4. Securing accountability - The main driver of accountability should be internal, which is developed through a feeling of responsibility and ownership developed through engagement in a collaborative culture. The internal accountability should be reinforced with external accountability in the form of data and deliverables. There are three aspects of securing accountability; (1) Capacity building is used to continuously improve results; (2) Underperformance is seen as an opportunity for growth; and (3) External accountability is used transparently to measure progress.

It is worth noting that no change leadership theory or framework was explicitly utilized as TUSD went about attempting to become a continuous improvement organization. This is in my opinion is a gap. This study could hopefully highlight aspects of change management which the organization is strong at, and where it needs to improve.

Change Leadership Theory and Fullan's Coherence Framework

The second research question asks "What are the leadership conditions that support high quality, iterative PDSA cycles at schools?". There is growing consensus that principal leadership is critically important to implementing change to improve student outcomes (Branch et al. 2012; Wallace Foundation, 2012; Barber et al. 2010; Louis, Leithwood et al. 2010; Louis

Dretzke et al. 2010; Davis et al. 2005; Leithwood et al. 2004). The implementation of improvement science and the use of high quality PDSAs to drive improvement at schools is a change in practice at TUSD. Changing practice at the school level requires strong principal leadership to spearhead that change. Michael Fullan maintains that school principals are essential for setting the direction, creating the conditions and shaping the pathway for change. Using Fullan's coherence framework once again, this time at the school principal to teacher level, I will explore the leadership conditions that support high quality, iterative PDSA cycles at schools.

Combining Fullan's approach of the use of the right drivers to bring about change encapsulated within the Coherence Framework and the use of improvement science into a theory of improvement can be described as follows: If school leaders can help teachers and other school staff through the change process and effectively build coherence by focusing direction, building collaborative cultures, deepening learning and securing accountability, then important educational reform, in the manner of the successful use of high quality, iterative PDSA cycles can be implemented at school sites to improve student outcomes. The Coherence Framework is being used to explore the organizational coherence of this major change in practice.

Chapter 3

LITERATURE REVIEW

The Use of Improvement Science within Education

Before becoming Superintendent of TUSD in 2017, Jorge Aguilar led the Equity and

Access team in Fresno Unified School District (FUSD). From 2009 - 2014 Aguilar's Equity and

Access team utilized improvement science to increase FUSD's graduation rate from 69% to

79%, and it's UC/CSU A-G rate from 32% to 48% (Haxton & O'Day, 2015). This case study

focused on the use of improvement science carried out by the Equity and Access team in their

work with school counselors, and is particularly pertinent, as during this time Aguilar and his

team in FUSD used an early version of the Cycle of Continuous Improvement that went on to be

utilized in TUSD. The team in partnership with UC Merced developed a robust data system,

called the School Quality Improvement and Targeted Action Index, which helped the team

measure if a change was an improvement. This study involved multiple interviews with senior

leaders and district office staff, as well as quantitatively assessing graduation and a-g results and

is relevant as it involved large scale implementation of improvement science across a large K-12

school district.

In 2018, TUSD Superintendent Jorge Aguilar co-authored a case study for PACE (Policy

Analysis for California Education), which focused on the time he spent in FUSD. This paper

focused on the use of improvement science to increase college access for students in FUSD, and

complements the study above by Haxton and O'Day, as they both centered on the work of

Aguilar and his team over a similar timeframe at FUSD. Using the data system developed in

partnership with UC Merced, Aguilar's team found that although plenty of senior students were

eligible to apply to many post secondary options, most applied to just one, and would

undermatch, by not applying to more competitive institutions even though they may well have been eligible. The main root cause the team identified was "the lack of student awareness of their matched college options based on their academic profiles" (P. 3), and the aim was to increase the awareness students had about their post secondary choices. The Fresno team used the cycle of continuous improvement to operationalize each of the principles of improvement science. The change idea being tested was to mail individualized "I am Ready" packets to students which detailed the UC and CSUs that matched each student's academic profile. The student packets would also include fee waiver information and a method of setting up an appointment with a school counselor to discuss college options. When this change idea was operationalized, it led to an increase of the number of students applying to UC's and CSU's outside of Fresno from 382 to 587, which is the equivalent to an increase of around 54%. The experience of implementing improvement science to improve student outcomes, detailed in both the Haxton and O'Day study and the PACE brief, led to Aguilar and his team learning certain lessons around what conditions need to be in place for a large district to implement continuous improvement at scale. The lessons learned were as follows:

- Define what the district means by continuous improvement - a lack of agreement can lead to people thinking they are doing continuous improvement, when in fact they are not.
- All work should be anchored around the problem of practice - People should have a solid understanding of the problem, and a working understanding of a theory of improvement before implementing any solutions.
- Test before scaling, and use data to determine if a change is an improvement - Research and evidence is needed to support any change idea, and participants need to use data to take stock of both successes and challenges

- Balance science and practice - While change ideas should be fully vetted, windows of opportunity to change conditions in the present are often short. These considerations need to be weighed.

- Don't be afraid of failure - Continuous improvement involves testing theories of improvement. Sometimes these theories will not produce the outcomes we want in practice. These failures should be seen as opportunities to learn more about what works and what doesn't, and how the system operates in reality.

- Stay humble - A common attitude that colleagues in the district had was that they already had the expertise to solve the problems they were faced with. To counter this mindset, a common question team members asked was "If we know how to solve this problem, why haven't we yet?"

There are limitations to the applicability of the work Aguilar and his team performed in Fresno to the improvement work underway in Sacramento. While both the 2015 Haxton and O'Day study and Aguilar's 2018 PACE brief focused on large scale district wide implementation of improvement science, neither effort had any involvement of classroom teachers or principals on improving student learning. The use of improvement science was mostly utilized by the Equity and Access team at the central office as they worked with school counselors on the improvement aims identified. Conversely, in Sacramento City Unified, principals worked directly with teachers to improve student outcomes. Another added difference is that in Fresno, the counselors were management staff, whereas in Sacramento, teachers and counselors were represented members of the teachers union. This dynamic changes the manner in which principals have to work with teachers and counselors to engage in the process of continuous improvement.

Vicki Park (2019) wrote a report for PACE, based on a case study of the Long Beach Unified School District which focused on the district's efforts to use a continuous improvement approach to improve student learning through an integrated system of supports and a clear vision for high quality instruction. Long Beach USD has similar demographics to TUSD, but is a high functioning school district with a reputation for coherence. There were four lessons learned about how districts' should engage in continuous improvement:

1. Educators continually strive to build coherence across the system by sharing clarity of purpose.

2. Knowing-doing gaps are intentionally filled by leaders maintaining structures for shared learning

3. Differentiated support and coaching were provided to teachers and leaders, with clear expectations.

4. The scaling of good ideas requires more than spreading effective practices. It also requires deepening learning about implementation, considering limited time, resources and focus.

It is worth noting that the first three lessons learned correlate with the first three components of Fullan's coherence framework; focusing direction; collaborative cultures and deepening learning. Moreover, the fourth finding is about learning how to implement change at scale, which is the whole purpose of Fullan's coherence framework.

Tichnor-Wagner (2017) carried out a comparative case study that explored the perceptions of high school educators implementing PDSA cycles in an improvement science framework. The case study involved two large urban school districts innovation teams, which used improvement science and PDSA cycles to improve the outcomes of high school students.

The innovation teams were composed of district personnel, high school practitioners, researchers and development specialists. Tichnor-Wagner used the concepts of will and capacity as a framework for exploring educators' perceptions of implementing PDSA cycles. Semi structured interviews were used to garner data from 35 of the district and school practitioners responsible for implementation, 6 researchers and 5 development specialists. The study was also informed by observations of training sessions and document analysis. The study took place one year after initial implementation. There were two promising findings from the study. Firstly, district and school participants found value in PDSA cycles. Interestingly, some practitioners found value in PDSA cycles only after engaging in them, which informs us that initial motivation is not a prerequisite for practitioners to come to feel a sense of ownership and value in PDSA cycles. Secondly, practitioners found that the practice of PDSAs was not totally foreign to them, but rather built upon prior knowledge and schema. This suggests that the practice of engaging in PDSAs may be an incremental change for teachers, and as such may generate less resistance than a radical change. This finding is however complicated by the possibility that for some, the perceived familiarity of PDSAs may have clouded their conceptual understanding of the unique qualities of the PDSA cycle. The authors posited that these early misconceptions may have contributed to the first of three challenges, that although PDSAs were valued, they were seen by some as disconnected to their daily work. It is suggested that to mitigate this challenge, trainers connect PDSAs to prior knowledge, and at the same time, ask educators to reflect on differences to previously held schema. A second challenge was that practitioners resisted completing the necessary forms for each stage of the process. Improvement science blurs the traditional lines between researchers and practitioners, and requires practitioners to integrate disciplined research into their practice - this is not something that teachers are used to. The third challenge found was

one of resources, specifically time and expertise to carry out PDSA cycles effectively. Some practitioners felt that engaging in PDSAs was too much work, reported a sense of confusion around the purpose of engaging in PDSAs, and found they did not have the time and skills necessary to collect and analyze the data required by PDSA cycles. It is suggested that the responsibility for data collection and analysis be scaffolded over a number of years. Taken together, the three challenges suggest that if school districts want practitioners to engage in improvement science and PDSA cycles, they need to develop an infrastructure that supports the implementation of improvement science. While this study explored the perceptions of educators implementing PDSA cycles, the districts involved were not engaged in district wide implementation of improvement science, nor did the study focus on the leadership conditions that support the implementation of high quality iterative PDSAs.

There are other studies which have focused on the large-scale implementation of improvement science within education, such as Martin & Gobstein (2015) and Huang (2018). Martin and Gobstein studied the Networked Improvement Community (NIC) of the Mathematics Teacher Education Partnership, which successfully utilized improvement science to increase the quality and quantity of preparedness of math teacher candidates across a community of 90 universities and over 100 school systems. Huang (2018) studied the Carnegie Math Pathways Program at post secondary institutions to improve the rate and time within which students successfully completed their math pathways. Neither of these studies however, focused on improving student outcomes within a large K-12 school district.

Improvement science has been found to improve both student outcomes and processes in education. For small scale studies at the classroom or individual school level in K-12 and post secondary institutions, improvement science has been found to improve teaching and learning

(MacConnell & Caillier, 2016), design and refine curriculum (Gomez et al. 2015), redesign faculty support to improve math instruction (Edwards et al 2015), reduce chronic absenteeism (Daley, 2017), increase Cal Grant awards (Daley, 2017), and to improve feedback to beginning teachers (Hannan et al., 2015). It is important to note that while each of these studies have shown improvement science to be a promising practice, they have all been small in scale and have not addressed the use of improvement science across a large K-12 school district. As such these small scale studies may have limited external validity when it comes to large scale implementation.

Leadership Conditions That Support the Implementation of Reforms at Schools

The second research question of this proposal asks "What are the leadership conditions that support high quality, iterative PDSA cycles at schools?". There is in actuality, little literature on leadership conditions, or change leadership to implement improvement science or specifically PDSAs at K-12 schools. There has been however, growing consensus that principal leadership is critically important to implementing reforms to improve student outcomes (Branch et al. 2012; Wallace Foundation, 2012; Barber et al. 2010; Louis, Leithwood et al. 2010; Louis Dretzke et al. 2010; Davis et al. 2005; Leithwood et al. 2004). Hence, this section of the literature review moves one level out, and focuses on the leadership conditions that support the implementation of reforms at schools.

Hauge et al. showed that broad participation in distributed leadership can lead to a more reciprocal relationship in decision making between leadership and teachers, which in itself can lead to significant changes in the structure, routines and methods in which teachers work and collaborate, and the types of tasks that are developed and completed (2014). Changes to regular work processes were made in a collective manner, which distributed leadership and ownership of

the changes amongst those that are enacting the changes. Typically, school cultures, norms and structures have been significant barriers to introducing change to lead to school improvement. The principal in the study understood the social and institutional context of the school, and through the distribution of leadership was able to connect people to tools and resources to support them in the act of school improvement. An important factor to bring out is that distributive leadership involves the co-construction of change from a broad set of stakeholders. When change is co-constructed in this manner it is owned by those that will enact the change and is far more likely to be successful. Here it is important to note that the findings of this study fit nicely into Fullan's coherence framework. The principal and the teachers collaborated together to build a focused direction and created a collaborative culture. These changes resulted in deepening collective understanding and practices around teaching and learning and securing internal accountability through enhanced collaboration and collective ownership. Another limitation is that this study was conducted in only one school, which has an individual culture and idiosyncrasies, and as such the findings may have limited transferability to other schools.

Dian Fu Chang et al (2017) claimed that change within education is necessary to improve student performance. The responsibility of leading change in schools lies with school leaders, while the responsibility of enacting change in classrooms lies with teachers. Professional development is needed for teachers to change classroom practices. It is through this argument that the authors developed their research study that successful change implementation at schools is reliant on school leaders change leadership to impact teacher engagement in professional development. The logic of this argument is compelling. The theoretical framework utilized by the authors is embedded within this logic; namely that changes in classroom practice are dependent upon teachers' willingness to engage in professional development and the effect of the

professional development, which in turn is dependent upon the principals' change management. A stepwise regression model, which is a form of multiple regression, was utilized to determine the main factors that influence teachers' professional development. This study found that there was a positive relationship between principals' change leadership and teachers' professional development. 23.3% of the variance found in teachers' professional development could be explained by principals' change leadership. Two aspects of teacher professional development were considered, willingness to participate, the effect of participating. The indicators used to represent willingness to participate included willingness to engage in activities with others to promote effective teaching, willingness to participate in classroom observations, willingness to attend workshops, and willingness to keep study and innovation in teaching. The indicators used to represent the effect of participating in professional development included teachers considering student needs when designing lessons, promoting student learning and enhancing student capability, activating students with low motivation, and pursuing new learning opportunities. Firstly, 21.7% of the variance found in the willingness of teachers to engage in professional development could be explained by the "Building a supportive environment" dimension of principals' change leadership. Secondly, 18.1% of the variance found in the effect of teacher professional development can be explained by the "Building a supportive environment" and "Adjusting organization and performance" dimensions of principals' change leadership. To make the connection to Fullan's coherence framework explicit, building a supportive environment is an essential aspect of creating a collaborative culture focused on a collective aim, in this case

which was defined by teacher professional development. The teacher professional development also provided a focused direction for teachers at the same time as deepening learning.

Mei Kin (2018) studied the interaction of principal change leadership competencies, teacher change beliefs and teacher attitudes towards change. This was a quantitative study of the perceptions of over 900 teachers from high performing secondary schools in Malaysia. Mei Kin found that principals who were perceived to display the principal change leadership competencies of goal framing, capacity building, defusing resistance and conflict, and institutionalizing had a significant positive impact on teacher change beliefs, which in turn had a positive impact on teacher attitudes towards change. Specifically, the standardized regression weight of principal change leadership competencies on teacher change beliefs was 0.79 with a P value of 0.01, which was statistically significant. Moreover, the standardized regression weight of teacher change beliefs on teacher attitudes towards change was 0.77 with a P value of 0.01, which was also statistically significant. The study found that enhancing teacher attitudes towards change beliefs was an effective manner of increasing the likelihood that teachers would actually enact change. So in conclusion, principals who were perceived as practicing effective change leadership competencies were positively correlated to teachers attitudes towards change which in turn was positively correlated with teachers attitudes towards change. Indeed, principal change leadership competencies were found to have a greater impact on teacher attitudes towards change than teachers self interest. While the specific principal change leadership competencies identified by Mei Kin are sequential, they relate well to Fullan's coherence framework. Goal framing relates to having a focused direction, while capacity building, and defusing resistance and conflict relates to building collaborative cultures. Within Fullan's coherence framework, focusing direction and building collaborative cultures are the obvious starting points, which

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corroborates the sequence of the competencies identified by Mei Kin. The last stage of institutionalising is about making the change stick, which involves all four of the leadership competencies in Fullan's coherence framework working together in mutually reinforcing ways.

Grupp (2019) examined themes describing how educational developers in post secondary education facilitated change at different levels of their organization. Specifically the study focused on "ways of knowing and being" (Timmermans, 2014), and identified change leadership attributes called meta-competencies that describe the characteristics of leading and managing change (Caldwell 2003). The study framed the findings into three sets of change management competencies (Timmermans, 2014):

(a) Core ways of knowing and being

(b) Ways of knowing and being that facilitate change in individuals and groups

(c) Ways of knowing and being that facilitate systemic change

Within the three sets of change management competencies above, the following practices were all found to be important:

- Building relationships

- Adopting a scholarly approach

- Communicating effectively

- Understanding and adapting to context

- Reflection

It is important to note that the participants in Grupp's study were positioned between the administration who made decisions regarding direction and vision, and the faculty, who were often tasked with carrying out the vision of the administration. The educational developers were tasked with serving as levers of change between the administration and the faculty. As such,

when we compare these findings to Fullan's coherence framework, while the participants were tasked with forwarding and communicating a vision, they were not responsible for defining a focused direction. The change management practices above that were found to be important, all enabled the educational developers to collaborate effectively, to either facilitate change in individuals or groups or to facilitate systemic change. These findings further define the competencies needed within well placed individuals in an organization to realise the building of collaborative cultures, which is the second aspect of Fullan's coherence framework.

Summary

The research questions that this dissertation proposal are centered around are as follows:

1. How is improvement science being implemented at TUSD, from the district level to schools?

2. What are the leadership conditions at the school level that support high quality, iterative PDSA cycles at schools?

The first research question involves the implementation of improvement science from the district level to the school level as a change in practice across TUSD, which is a large K-12 school district. As such this research question utilizes Fullan's coherence framework to explore how improvement science is being implemented at TUSD at the district level, from district leadership to principals, using the elements of focusing direction, collaborative cultures, deepening learning and securing accountability. Within these elements of the coherence framework I will explore the conditions, contexts, resources, constraints and limitations of implementation.

The second research question utilizes Fullan's coherence framework once again, this time at the school level. I will explore the leadership conditions that support high quality, iterative

PDSA cycles at schools, using the elements of focusing direction, collaborative cultures, deepening learning and securing accountability.

While somewhat limited, there is literature regarding the use of improvement science in education. Both Haxton and O'Day (2015) and Aguilar et al (2018) document the district wide improvement science work at Fresno Unified School District. The improvement science implementation at Fresno however was all centrally run, from the district level. Tichnor-Wagner (2017) studied the perception of educators implementing PDSA cycles, and this study touched on the conditions needed for successful implementation of PDSAs, including professional learning, resources such as time and expertise, and district infrastructure to support continuous improvement. The study however did not involve large scale implementation across a school district, nor did it relate the conditions for successful implementation of PDSAs to school leaders. Park (2019) studied the use of continuous improvement at Long Beach Unified School District to improve student learning, and found that successful implementation at scale required sharing clarity of purpose, having structures for shared learning, providing differentiated support and coaching and learning about how to implement well. These findings correlate with the first three components of Fullan's coherence framework; focusing direction; collaborative cultures and deepening learning. Moreover, the fourth finding is about learning how to implement change at scale, which is the whole purpose of Fullan's coherence framework.

Martin & Gobstein (2015) and Huang (2018) focused on the large-scale implementation of improvement science within education, but both were at the post secondary level, and neither focused on improving student outcomes within a large K-12 school district. For small scale studies at the classroom or individual school level in K-12 and post secondary institutions, improvement science has been found to improve teaching and learning (MacConnell & Caillier,

2016), design and refine curriculum (Gomez et al. 2015), redesign faculty support to improve

math instruction (Edwards et al 2015), reduce chronic absenteeism (Daley, 2017), increase Cal

Grant awards (Daley, 2017), and to improve feedback to beginning teachers (Hannan et al.,

2015). It is important to note that while each of these studies have shown improvement science

to be a promising practice, they have all been small in scale and have not addressed the use of

improvement science across a large K-12 school district. As such these small scale studies may

have limited external validity when it comes to large scale implementation. In conclusion, there

is a significant gap in the literature regarding large scale implementation of improvement science

at K-12 districts, from the district level to principals. This is what the first research question of

my proposal will explore.

The lack of literature on leadership conditions, or change leadership to implement

improvement science or specifically PDSAs at K-12 schools is even more pronounced. Due to

this gap in the literature, I moved one level out and instead reviewed the literature on the

leadership conditions that support the implementation of reforms at schools, understanding that

improvement science and PDSA implementation is one such reform. Hauge (2014), Dian Fu

Chang (2017), and Mei Kin (2018) found that principal change management competencies led to

the implementation of reforms, such as the structure, routines and processes in which teachers

engaged, the willingness of teachers to participate and put into effect professional development

and teacher change beliefs and attitudes towards change. Indeed, the change management

competencies documented in each of these studies most directly related to focused direction and

collaborative cultures in Fullan's coherence framework. In conclusion, there is an even larger

gap in the literature regarding the leadership conditions that support high quality, iterative PDSA

cycles at schools. This is what the second research question of my proposal will explore.

Chapter 4

METHODOLOGY

Introduction

This dissertation used a qualitative approach of individual semi-structured interviews to explore the research questions "How is improvement science being implemented at TUSD, from the district level to schools?" and "What are the leadership conditions at the school level that support high quality, iterative PDSA cycles at schools?"

A qualitative approach allowed for detailed information to be collected and an in depth analysis of implementation to occur. Indeed, considering that improvement science implementation and the leadership conditions that support PDSA cycles is an understudied area, a qualitative approach is particularly helpful (Creswell and Cresswell, 2018). According to Merriam and Tisdell (2016), qualitative research is an inductive process which aims to understand the meaning that people have made of their experiences, it explores participants experiences and results in richly descriptive, in depth findings.

The qualitative data was generated from interviews with purposefully sampled participants including principal supervisors, principals, curriculum and instruction management and curriculum and instruction training specialists (sometimes referred to as instructional coaches). A total of eleven (11) individual interviews were conducted as follows; principal supervisors (3); principals of schools which had experienced success with implementing high quality iterative PDSAs at their school sites (3); curriculum and instruction management who had supported the implementation of improvement science across the district in their respective areas of math, English language arts, and social and emotional learning (3); and training

specialists who directly supported school based teams at schools which had experienced success with implementing high quality iterative PDSAs (2).

A document analysis of schools' PDSA cycles between September 2019 and March 2020 was also conducted. It was through this document analysis that schools which conducted high quality, iterative PDSAs were identified. The principals of the identified schools formed the purposefully sampled principals for individual interviews. The training specialists who supported these schools were also purposefully sampled.

Site and Sample

TUSD is a large, diverse K-12 district with over 4,000 employees serving around 41,000 students in 77 schools. Demographics of the district are approximately 39% Hispanic; 18% Asian; 18% White; 14% African American; 19% English Learners; 14% students with disabilities and 72% socio-economically disadvantaged. As is typical within many large urban school districts, TUSD had seen a rapid turnover of Superintendents; when Jorge Aguilar became Superintendent in 2017, he was the 6th Superintendent in 10 years. Academic achievement and student outcomes at TUSD are generally poor, with large disproportionalities observed for many minority student groups and in particular for homeless and foster students and students with disabilities. Subsequently, in the 2020-21 school year, TUSD entered its third year of differentiated assistance within California's system of support.

There has been a long history of incoherence at TUSD, which has been documented in multiple studies and reports such as "Improving special educational services in the Sacramento Unified School District" by the Council of Great City Schools (2017), and the "TUSD Fiscal Health Risk Analysis" report by FCMAT (2018). The district has been typified as having a loose collection of schools which experience a high degree of autonomy and low accountability. There

has been a de facto opt-in culture, with schools choosing to what degree to implement district wide initiatives, if at all. This has resulted in a scattershot approach of schools implementing what they want, how they want, with no need to justify or measure any particular approach. The SPSA document has been utilized as a way to spend funding, rather than a deliberate attempt to plan and measure school improvement. Under Superintendent Aguilar's leadership, schools have been expected to be much more deliberate in their approach to improvement. Starting with the 2019-20 SPSA, every school in the district was expected to use the cycle of continuous improvement to identify, plan, implement and monitor at least one priority goal for the school. It is this change from a scattershot approach with no defined process for schools to choose and implement goals to the much more deliberate, methodical process of improvement science and iterative PDSA improvement cycles which is being studied. It is within PDSA cycles that practitioners at TUSD schools made changes to classroom or school practices that impacted the lives of students. PDSA cycles at schools are key artifacts of the most systematic attempt at TUSD of putting continuous improvement into practice. To successfully implement this change in practice, TUSD has been attempting to transform from an incoherent system with an opt-in culture to a more coherent system whose decisions are deliberate and purposeful and driven by continuous improvement. To bring these changes in practice all the way from the district office to schools and classrooms requires coherence. This dissertation uses Fullan's Coherence Framework to explore the organizational coherence of this major change in practice.

The district is in dire financial straits, and has declared a negative budget status since 2018. There is a real danger of the district declaring bankruptcy in the near future and being taken over by the Sacramento County Office of Education. Moreover, TUSD has experienced tense labor relations for some time. There was a one-day strike in the Spring of 2018 and in 2020

there were 16 lawsuits being settled between the district and its labor partners. To date, these issues have not been resolved and labor relations are typified by an intense lack of trust on both sides. As these conditions imply, TUSD is a system under immense strain. A recent study conducted by CSU Sacramento found that TUSD is typified by a lack of psychological safety and trust in district leadership (Adamson et al 2021). The lack of trust is not just with labor partners, but also with principals and other stakeholders. It is under these very real conditions, which are also faced by other large, urban school districts that this study is taking place.

Data Collection

The qualitative data was generated from semi structured interviews with purposefully sampled participants including principal supervisors, principals, curriculum and instruction management and curriculum and instruction training specialists (sometimes referred to as instructional coaches). A total of eleven (11) individual interviews were conducted as follows; principal supervisors (3); principals of schools which had experienced success with implementing high quality iterative PDSAs at their school sites (3); curriculum and instruction management who had supported the implementation of improvement science across the district in their respective areas of math, English language arts, and social and emotional learning (3); and training specialists who directly supported school based teams at schools which had experienced success with implementing high quality iterative PDSAs (2). A document analysis of schools' PDSA cycles between September 2019 and March 2020 was also conducted. It was through this document analysis that schools which conducted high quality, iterative PDSAs were identified. The principals of the identified schools formed the purposefully sampled principals for individual interviews. The training specialists who supported these schools were also purposefully sampled. Since the onset of the COVID 19 pandemic in March, schools have not

documented any PDSA cycles. The schools which conducted high quality iterative PDSAs were identified using the series of rubrics in appendix B. The rubrics were informed by Carnegie Foundation for the Advancement of Teaching, Improvement Science 1 pagers. The focus group of curriculum and instruction coordinators will consist of the district Math Coordinator, the district English Language Arts Coordinator, the Social and Emotional Learning Director. The reason for choosing these department representatives was because these areas represent the improvement science focus of a majority of schools, which was either academic (math or ELA) or climate related (behavior or attendance).

Fullan's coherence framework was used to explore how improvement science was implemented at TUSD at the district level, from district leadership to principals (research question 1), and the leadership conditions that supported high quality iterative PDSA cycles at schools from principals to teachers and other school site staff (research question 2). The interview questions for the focus groups were devised to explore the research questions through the elements of Fullan's coherence framework; focusing direction, collaborative cultures, deepening learning and securing accountability (Interview questions appear in appendix C).

Individual, semi-structured interviews were conducted with purposefully sampled participants. Individual interviews allowed each participant to fully explain their perspective and for their worldview to be explored. The reason to engage in semi-structured interviews is to be able to be flexible in the wording, order and questions themselves within the interview so that the participants' opinions on the topic can be fully explored and the interview questions can be adjusted as the situation requires. As Merriam and Tisdell write (2016), semi structured interviews "allow the researcher to respond to the situation at hand, to the emerging worldview of the respondent, and to new ideas on the topic" (p.111). To purposefully select participants is

to base the selection of participants on those who will best be able to help the researcher answer the research questions (Creswell and Creswell, 2018). Due to the COVID 19 pandemic, all individual interviews were conducted via Zoom and the sessions were recorded and transcribed by Zoom.

Data Analysis

The method used to analyze the qualitative data and to generate findings was inductive and comparative (Merriam and Tisdell, 2016). This study involved four distinct groups of participants; principal supervisors; principals; curriculum and instruction management; and curriculum and instruction training specialists. The first layer of analysis involved going through each individual interview and pulling out findings as they related to each research question, and the thirteen subsections of Fullan's coherence framework. The findings for each interview within a particular group were compared with one another and an index of codes was created for each distinct group of participants for each research question (Saldana, 2016). After the index of codes was produced, the findings for each group were triangulated for each research question which led to the overall themes which were found. A full analysis of the data and synthesis of themes within each domain and across domains led to overall themes which answer the research questions. It is important to note that this process was not exactly linear, and involved going backwards and forwards between the transcripts themselves, the index of codes for each group, and the overall themes which were found. According to Merriam and Tisdell (2016), this type of multi-layered analytic coding and the triangulation of data to corroborate findings increases the internal validity and reliability of findings.

Positionality Statement

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After graduating from college in the United Kingdom I had a real desire to see and experience the world outside of the bubble I grew up in. I raised money to engage in volunteer work in Central America and had a life changing experience living and working with other volunteers and local people. After this I went from working in a factory in my home town, to being a farm laborer in Australia, to washing dishes in New Zealand and then teaching English in Italy. This was a pivotal time in my life. It was during this time that I became truly independent. It was during this time that I developed a well of inner strength that I continue to deepen and draw on to this day. It was during this time that I came to the realisation that I wanted to enter the field of education. I wanted to help young people realise their superpowers and reach their greatness. I wanted to fight for social justice, and to have a positive impact on society.

Throughout my educational career I have striven to achieve more equitable student outcomes. I taught secondary math in urban schools for 10 years, from South London and Manchester in the UK to Sacramento, California. While the accents may be different, the issues of inequitable school systems and how students of color and students of poverty are underserved are the same. I spent six years as a school site administrator in Sacramento, first as Assistant Principal at a middle school, and then as a Principal at an innovative Linked Learning school serving around 500 students in grades seven through twelve. After having success as a site principal, I moved into district administration and became the Assistant Superintendent of Curriculum and Instruction for Sacramento City Unified School District (TUSD), a role which at the time of writing I have been in for almost 6 six years. My career in education has taken the seeds of my beliefs and has allowed them to grow strong. Education is the vehicle by which people can transform their lives and is the most effective instrument to enact positive societal change that we have, so we can bring about a fairer, more equitable society within which student

outcomes cannot be predicted by all the usual discriminators such as socio-economic status, zipcode or race/ethnicity. This is the society I want to help build, one that we can be proud to hand on to our children and grandchildren.

Within the time I have spent at TUSD, I have been struck by a lack of coherence across our system. In around 2016-17, a small group of district leaders, including myself, studied Fullan's coherence framework and attended sessions led by Michael Fullan on how districts could bring about greater coherence. Frustratingly, nothing came of this at TUSD, as the work never went beyond the small group, who were not in a position to implement any of the ideas that came up. Since this time, I have been very interested in how to bring greater coherence to the system so that we are all rowing in the same direction with purpose, and have attempted to bring greater coherence to TUSD through my own sphere of influence.

Over my years as an educator, I have also been very interested in educational theory and research. I do not believe that practical experience alone is sufficient to reach the goals of equity, access and social justice within our school systems. Any attempt at achieving the aim of equity, access and social justice within education, needs to be fueled by an understanding of how practice, research and policy intersect to create better outcomes for all children. The practical aspects of the work need to be paired with research and best practices. Those of us at the forefront of educational reform need to be able to make research based, data driven decisions and have the disciplined critical thinking necessary to apply and implement the research in practice.

According to Guba, as cited by Creswell (2013), a worldview is "a basic set of beliefs that guide action" (P. 251). I am very interested in the intersection of policy, practice and research. I want to use research and policy as a means to put solutions into practice to solve real world problems in education. I am interested in finding out what works, putting it into practice,

and adapting it to make it work under local conditions, which according to Creswell (2013), makes my worldview pragmatism. It is perhaps because of my belief in pairing practice and research that I was drawn to the use of improvement science to produce better outcomes for all students, particularly those who are most underserved.

I decided early on in CANDEL that I wanted to do a dissertation on the application of improvement science at TUSD, where I am the Assistant Superintendent of Curriculum and Instruction. Through my interest in organizational coherence, and change management, I explored the use of Fullan's coherence framework as a lens through which to view the improvement science implementation at TUSD, and the implementation of PDSAs at school sites. While I do not supervise principals, my role may influence how principals respond to me during interviews. I work alongside principal supervisors as a peer and this may affect how principal supervisors respond to me. I oversee the whole curriculum and instruction department, and this may influence how curriculum coordinators and instructional coaches respond to me. I co-plan and co-facilitate the principal meetings, and curriculum office meetings which are focused on the implementation of improvement science and as such I am very close and knowledgeable about the work. An advantage to this familiarly is that I understand the different facets and levels at which the work is happening, which helped with collecting and interpreting the data. Being so close to the work is also a potential threat to internal validity, as some participants may feel that in interviewing them that I am attempting to push the work forward, or evaluate their performance, rather than simply collect data on implementation. Within the interviews I made purposeful efforts to reinforce that I was taking the role of a researcher and not the role of assistant superintendent of curriculum and instruction.

Chapter 5

FINDINGS AND ANALYSIS

Introduction

For this study, a total of eleven individual, semi-structured interviews were conducted. The interviewees fall into the following groups: principal supervisors (3); principals of schools which had experienced success with implementing high quality, iterative PDSAs at their school sites (3); curriculum and instruction management who had supported the implementation of improvement science across the district in their respective areas of math, English language arts, and social and emotional learning (3); and training specialists who directly supported school based teams at schools which had experienced success with implementing high quality iterative PDSAs (2). It is worthy of note, that out of all of the 77 schools in the district, only 3 were judged to have engaged in high quality, iterative PDSAs. The principals of each of these schools which happened to be one elementary school, one middle school and one high school, all agreed to be interviewed. The individual findings for each of the sub groups interviewed for both research questions can be found within appendix D.

Overall Findings and Analysis

Below are the overall findings for both research questions for this study. The overall findings were found by analyzing and triangulating the findings specific to each group. The overall findings for each research question are divided up into the four components of Fullan's Coherence Framework; focused direction; creating collaborative cultures; deepening learning; and securing accountability (2016).

Findings for Research Question 1

Research Question 1: "How is improvement science being implemented at TUSD, from the district level to schools?"

Focused Direction.

Theme 1: There Was A Lack Of Focused Direction Across The District, As Many Principals Opted Out And Did Not Engage Authentically With The Work Of Improvement Science.

It was mandated that principals engage in improvement science as a method to improve outcomes for all students, and in particular those student groups who have the poorest outcomes. However, there was wide variation in the application of improvement science by principals at their schools and many principals were not invested in the use of improvement science. In the words of principal supervisors:

"Not everybody was on the same page, I can say that not everybody looked at improvement science as a research based approach to improving conditions for our students in Sac City."

"So that is improvement science….they're doing it. But other principals are just not applying it."

This affirms the notion that in reality some principals were authentically engaged in the process and others were not. A focused direction would mean that everyone in the organization was authentically focused on the same things, and this was clearly not the case in TUSD. There is an opt in culture in TUSD, exemplified by people opting in to what they see value in, and want to do, and simply opting out of other things, whether they are mandated or not. The mindset for many is that "this too shall pass". As such, the lack of focused direction was not because the direction was not explicit, but rather that many principals simply did not agree with the use of

improvement science as an effective manner to improve student outcomes, and so did not engage authentically with the work. When addressing how other principals viewed the work of improvement science, one of the principals interviewed spoke to the lack of authentic engagement, specifically in principals actually engaging their staff in the work:

"A lot of my colleagues, not really understanding the value of the work and believing that the work they were doing was more important or was not applicable. And I think that that was a misconception. I don't think they understood how what they were already doing connected, right. And so for me, that made it hard at times because you know sometimes I would engage in a conversation. And they would say, are you doing that?...... You know, I didn't talk to my staff at all."

Some principals felt that although this is the district's direction, they did not own it or believe in it. What was being taught was not being authentically put into practice by a considerable number of principals. Rather than engaging with teacher teams in a genuine manner, some principals simply chose to complete any deliverables on their own, for reasons of compliance. Even after principals should have been working with teacher teams for two years, some principals had not even mentioned the use of improvement science to their staff. A curriculum and instruction manager noted that:

"I thought the principals had been talking about this for the last two years, three years. So why is this new to this teacher?".

Meanwhile, another curriculum and instruction manager went further, and noted not just a lack of commitment, but active resistance to the use of improvement science as a method to improve student outcomes:

"We have people who are actively resisting, which makes it very, very difficult"

There is a weight of evidence that identifies a lot of principals simply opted out of engaging authentically in the process of improvement science, which led to there being no real focused direction across the district.

Creating Collaborative Cultures.

Theme 2: Building Capacity Was Accomplished Through A Variety Of Parallel And Exclusive Structures, Which Facilitated Principals And Curriculum And Instruction Support Staff To Be Trained At The Same Time. Peer To Peer Collaboration Facilitated Effective Learning.

Principals, curriculum and instruction management and training specialists all had a variety of opportunities available to learn about improvement science implementation. According to the principals interviewed:

"There was some reading and studying on my own, but also the principals meetings, you know, being taken through that whole process, not only learning about the theory. Learning about what it would actually look like and then actually experiencing going through a PDSA, so those trainings were very helpful. And I also was part of the CORE learning sessions with a group of principals and we went through the process there as well. So there was a lot of direction from the district and a lot of being able to experience that along with colleagues at the direction of the IAS'."

"I took all the opportunities that came up to learn more about improvement science. I latched on to like when another principal was going through that with the staff. I just asked them if I could join along and just sit alongside them just to hear the conversations, just so, in addition to the learning opportunities I got from the district I searched for other

things that allowed me to hear the conversations and to actually do the work. Because then it started making a lot more sense to me."

"I think I'm more heavily invested than a lot of my peers, and I participated in, you know, more work groups and collaborated more and I actually didn't just say I was doing the work, I mean, I was actually doing the work. So I would probably call myself an early implementer"

And according to one of the curriculum and instruction managers:

"Well, I was fortunate to learn about it from multiple perspectives. I learned about it from my experience in working with the CORE…...which was beneficial because I got to work with outside districts and agencies, just to gain a different perspective there and to see some real life examples of good experiences and learn from what failed. So that was great. And then I also was able to learn about it with the entire curriculum and instruction department and that was when I got to work with my colleagues, the other coordinators and we got to bring back the learning that we've engaged in to present it to our teams, which I think is a great way to learn right when you have to teach others what you're learning in theory. So that was a wonderful opportunity. And then finally, in my fellowship in working with the IAS'. And so working with the principals and in their application of learning the process of improvement science around things that were happening at their sites with students and teachers."

The parallel professional learning sessions that principals and curriculum and instruction staff participated in helped build a common language and set of processes between each of the groups. This was intentionally planned so that principals and curriculum and instruction staff

could partner together to facilitate teacher teams going through the improvement process. Principals felt that this parallel training was effective:

"The principals got trained and at the same time as the instructional coaches at the district got training. So, it was nice to go through the learning with her (instructional coach) and at the same pace and after going through that when I met with her then it was a natural next step. Hey, how do we bring this to the staff? So it was a good way to roll this out to train the School Administrators and instructional coaches."

Training specialists concurred that parallel training was effective:

"I think also that we had the same text that we were referencing in learning to improve was another, because it gave a common language, we were able to like look at when we did their needs assessment, she and I were able to reference like the same couple pages within the book and our discussion in that I think that helped a lot.

"You know, we were all getting training from the same source"

Some of the parallel learning opportunities that Principals and curriculum and instruction staff participated in were as follows:

- Monthly principal meetings

- All C&I meetings which mirrored principal meetings

- Learning sessions facilitated by CORE Districts

- Reading "Learning to Improve" by Bryk et al (2015)

There were also other, more exclusive opportunities that members of these groups took advantage of. For example, the successful principals volunteered for a variety of principal work groups, the curriculum and instruction staff took part in other third party opportunities such as Math in Common, and focused their department meetings on improvement science to deepen

their knowledge. Moreover, another third party, Gear Up!, worked with several schools and complemented the improvement science work as well. The Gear Up! work managed to be complementary and not confusing because Gear Up worked directly with the principals and training specialists who were being trained on improvement science, who were able to make the work cohesive. For those individuals who were really interested and invested in the work, there were many opportunities to build their capacity. Indeed, having multiple opportunities and forums to learn about the work, and to learn from different experts seemed to deepen the understanding if engaged participants.

Within each of the structures available, capacity building was most effective when participants were able to collaborate together, try out the learning for themselves, and learn from one another's experiences. According to principal supervisors:

"I'd have principals present their work. We would give about 10 to 15 minutes for that principal to kind of show this is the PDSA we engaged in and this is what we found…...And then we're sharing. That's when I saw that ability of this being able to grow bigger"

"When principals feel ownership over whatever it is that they're doing at their sites and when they're meeting with others and others challenge or question or prod a little bit. And when I think of the group that I work with, we've developed good enough trust with each other and maybe camaraderie...When they feel enough comfort with whatever it is that they're we're discussing whether it's a PDSA or whether it's just the change idea itself or being able to see the process and they're able to sort of challenge each other to think clearer or to take an extra step. Which is what we need. We need people that we trust, that we value to ask us those kinds of questions."

When asked about when learning was most effective, principals also responded that it was when they were learning together:

"I think the work in the principal's meetings, because not only did we go through the learning, the process together, but we really provided feedback to one another. So we were able to get feedback from all of our colleagues about the process and what we were going through and I think anytime colleagues are working together and sharing the work and knowing that you're part of a team working on something rather than, you know, working in isolation is just so much more fun to me."

Training specialists had similar experiences of effective peer to peer learning:

"I think also just getting to talk to people. I'm thinking about …. one popular instructional strategy that CORE uses and actually we use in our C and I meetings a lot is, here's a little chunk of information and you're gonna go talk to people about it."

Collaborative learning was also highlighted as being particularly effective by curriculum and instruction managers:

"We went and met with a table of other groups: we researched, we discussed and then we came back together as a team and we shared what we learned. Okay, so it was super powerful because I was like oh my gosh, like I would never have thought it was chronic absenteeism until like the research was presented and we talked about it."

Theme 3: The Contentious Relationship Between The District And The Teachers Union Was A Barrier To Building The Capacity of Teachers.

There have been many years of mistrust between the district and the teachers union, typified by an inability to come to agreement on much at all. The district had a plan to include teacher teams in the professional learning sessions facilitated by CORE Districts, but the teachers

union blocked teacher participation. This sad turn of events was addressed by one of the curriculum and instruction training specialists:

"That (teacher participation in CORE sessions on improvement science) didn't happen because the teachers union didn't like the CORE organization and stepped in to demand to bargain over it and then that bargaining never happened"

This resulted in teachers getting relatively little training on improvement science implementation, while principals and curriculum and instruction staff received much training from a variety of sources. Moreover, because of the contentious relationship, some principals were unable, or possibly unwilling to persuade their teachers to engage in improvement science implementation. The effect of the hostility between the district and the teachers union was captured by curriculum and instruction managers:

"There's a very contentious relationship between sites and the district. And so I think anytime site leaders try to bring district learning to their sites, you're going to have people that are gonna be like, Nope, that's from the district"

"I think there are some really great leaders out there that want to lead the improvement science work at their schools, but they can't because they have so many teachers that are following the Union's lead on everything and not what we're trying to show them from the district perspective. And I think that's really what stops the work."

This finding was also underscored in the words of a principal:

"Teachers are rebelling against anything the district is asking them to do."

Principal Supervisors added evidence to this finding as well:

"It was very difficult with some of my sites because of (the teachers union). So our bargaining unit has had an impact in the way we see our system in the way we intervene

with our system. Some teachers will use that to hide themselves so that they don't have to do"

Deepening Learning

Theme 4: Principal Supervisors Needed Time To Become Effective Trainers. Engagement With CORE Districts Helped Principal Supervisors Become More Effective Facilitators, And Helped Other Participants Build Capacity

The principal supervisors leading the work had a steep learning curve the first year of implementation (18-19). As such, much of the teaching during the first year of implementation was mechanical and ineffective, which contributed to the learning in the first year not sticking with many principals. A principal supervisor noted:

"I think we got off to a rocky start with improvement science. As a group, pretty mechanical. I look back at that and think, Oh my gosh, I might as well have just been a talking robot,".

"Unfortunately, we had very little impact on principals the first year."

The second year of learning (19-20) was much more effective. The district partnered with CORE Districts, a third party to train both the principal supervisor team and teams of principals which helped with implementation. Having the 3rd party directly teach groups of Assistant Superintendents and principals and C&I staff helped support capacity building. Principal supervisors noted the following:

"You know when you haven't taught it before. You're not always that good at answering the questions and directing the conversation. But once you've practiced it, done it, failed at it, then cleaned it up a little bit and succeeded at it, you're much more comfortable teaching it. And I think that was what came through to the principals.".

"That second year. I think people grasped it a little bit more and realized that it was here to stay."

" I also think having David Montez (from CORE) is a huge help for us."

"Some of the things I think we did really well with partnering with some of the outside agencies (CORE).....Starting to kind of do Train the Trainers. So we were the first group that learn something and we presented it to the principals, but then CORE started bringing in principals to go through that same training that we went to. So I think there was multiple layers of learning that the principals got kind of top down and then laterally from their peers, which was beneficial."

Principals concurred that the training with CORE was effective:

"The work that I did with those colleagues in that CORE space and the training that we did that was like a very big aha as well. The way they laid out the improvement science and the psychology of change and the way they talked about how to move your staff forward in this work. I think that was really critical to solidifying for me. The moves that I was going to make on our campus."

Curriculum and instruction training specialists also felt that the CORE training was effective:

"The CORE training design is superb. What I've noticed is that they have a really exemplary teaching model that gets the participants involved in sort of an accordion fashion. We'll do some learning, then we'll do some discussion or role play or exploration of the implications of that learning, then we'll come back together and do some learning...they keep the participants in motion intellectually constantly and I think that's

why that was such a powerful experience for me it was because of the design and delivery by the people who were doing it"

The finding that principal learning sessions became more effective was echoed by the principals themselves:

"I think the trainings within our principals meetings I just really learned a lot and I think when things are just streamlined and focused and clear."

For those invested in the training and who wanted to learn, it took multiple years, and multiple connected structures of professional learning for TUSD to become as proficient as they did at improvement science implementation. This was aided by the partnership with CORE Districts.

Theme 5: For Those Invested In It, Being Involved In Improvement Science Implementation Provided Deep Learning Which Has Stuck and has impacted the way in which people work.

IS provided deep learning for participants who began to think through an improvement science lens, and use the approach in aspects of their work where it was not mandated. According to principal supervisors:

"It really is powerful when you're actually the one using it. When you're the one leading it within your own work."

"I am very appreciative of having been part of the process of improvement science because I'm applying it within my own work."

"So I think this is the route to go and you know I'm a believer now, so it's good."

Principals interviewed also started to use improvement science across different areas of their work, and demonstrated an improvement mindset within their work:

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"It just seems to make so much sense, running these PDSAs and, you know, making

sustainable change…...I have my weekly attendance meeting at one o'clock, and we're

really running a PDSA right now with outreach to students."

When asked about the impact of improvement science learning on their teams,

curriculum and instruction coordinators felt that the training changed the manner in which their

teams went about their work of coaching to improve student outcomes:

"And so I think the team is getting better at critically thinking through will this make

sense, and if we do this, does it really lead to this. So I think that would be an impact. I

think the other thing that they're finding again, is that improvement science is really a

mindset….. You have to be intentional about making sure that you are really looking at

data, the right way. So I think the other impact is really forcing them to be more

thoughtful about their approaches and the way that they're doing their work at the sites

and not just haphazardly doing things because you know they think or feel that that's the

best thing to do."

The curriculum and instruction training specialists themselves concurred that learning

about improvement science has impacted the manner in which they work:

" I feel like I've been able to use some of the principles from improvement science to help

myself. I think it's made me more systematized in the way I think about improvement in a

very general sense, but also in the way I coach teachers"

Overall, for each of the groups interviewed, engagement with improvement science has

provided the kind of deep learning which has stuck, which they now apply to other areas of their

work.

Theme 6: Engaging In The Implementation Of Improvement Science Gave Schools and Improvement Teams A Common Set Of Effective Practices.

Schools and departments in TUSD have typically gone about the process of improvement in their own manner. The district has lacked a common methodology for improvement, leaving schools to work it out on their own. The use of improvement science provided that common set of effective practices and procedures for improvement teams to engage in. According to principal supervisors:

"I've always felt that all of our schools operate kind of on their own island and have always done what they want to do. So this is one way to bring a district together and all go through a similar process to bring about change."

"It provides some consistency and an overarching platform. I think a system, any system, but a system our size needs to have some consistency and some common language and common focus. And so I see improvement science in that regard."

Principal supervisors also found that the common methodology and language set from the district to schools, made its way to school based improvement teams:

"The principal did a really nice job with the training of individuals and the expectations set for the individuals…..The language was a common language. There was a consistency. There was a process identified, there was knowledge of the framework that was being used to identify these strategies."

Principals concurred that improvement science gave schools a common language and set of practice for them and their teams to engage in:

"I think one of the crucial things is, it's a tool for sites to use with their staff …….. you have a common language and common procedures to look at student data to look at

change ideas to try to strive towards you know the treatment and improving so, I think that's the key is, there's some fidelity on how schools and their staff look at things for improvement and there's building feedback to inform you what the next move with the next decisions should be."

"I really feel that it's important to constantly work on the alignment piece, in order to start to bridge all of that variability and work toward more alignment."

Curriculum and instruction management also noted that improvement science gave district based teams and school based teams a common language and set of practices:

"Our district has lacked a cohesiveness about how we operate and do things, particularly making decisions. And so, having this process by which we can achieve and arrive at decisions that are based in data and are good for teaching and learning is something we needed and so improvement science brings that to us and it's something that I see that can be done when we're looking at, if you will, a district wide lens versus a more of a school site or even a classroom lens so it has that ability to be all these particular groups or ways of looking at things can still use that same methodology."

"The consistency of messaging has helped. So those set expectations of this is what we're doing, this is how we're going to improve I think that's been really helpful"

Theme 7: Very Few Schools Successfully Engaged in High Quality, Iterative PDSA Cycles.

The document analysis of PDSAs revealed that only 3 schools out of the 77 in the district had engaged in high quality, iterative PDSAs; one elementary school, one middle school and one high school. The principals of these schools were in different segments, and reported to different principal supervisors. One commonality between the middle and the high school is that both

schools were involved with Gear Up!, a third party which complemented and supported the improvement science work at certain schools. To be considered a school which engaged in high quality, iterative PDSA's, the schools would have had to have documented at least 3 iterative PDSA cycles, which at least stayed at the same level of quality. The rubrics for PDSA's are in appendix B. There were some schools which spread themselves thin, and conducted PDSA's with many teams, with each team only documenting one or so PDSA cycle, achieving spread but no depth. On the other end of the scale, some schools only documented one or two PDSA cycles in total. This finding is more evidence that many principals were not invested in improvement science and that the district lacked a focused direction which all of its schools were taking.

Securing Accountability.

Theme 8: Principal Participation In Improvement Science Was A Top-Down Mandate Which Enforced Compliance.

For many years now TUSD has had an opt-in culture, where the unspoken default culture was that school leaders could choose whether to implement a districtwide initiative or not. TUSD could have been described as a district with high levels of autonomy for schools with low levels of accountability. In the words of a curriculum and instruction manager:

"How are we holding our leaders accountable for doing the things that we say they ought to do? And then how are they holding their teachers accountable for doing the things that they say they are supposed to do?"

Perhaps to counter this, principals had to engage in improvement science because they were required to by the superintendent and by their direct supervisors. According to principal supervisors:

"It's the superintendent's wish to do it"

"Some principals engage because that was the thing to do because this was a way that our

system is moving in this direction, our superintendent supports that."

Homework and deliverables were collected from principals. Compliance was enforced

through external accountability from senior management to principals. According to principal

supervisors:

"We started collecting homework and deliverables from the principals…...There was

always all of the threatening emails and follow up…….So I think there was just the

recognition that it wasn't going away."

"I held my principles accountable. So yeah, they had to do it because I asked them to. But

they also did it with each other. There was also a sense of that camaraderie and also

competition, a little bit."

Additionally, external advisory groups (such as Community Advisory Council, District

English Learner Advisory Committee, Black Parallel School Board, African American

Achievement Taskforce, other parent groups) would inspect SPSA's and may expect to see

certain things in them. This transparency exerted external pressure. Once again, according to

principal supervisors:

"You have all these external groups reading them (SPSA's). And I think that that added

another layer of accountability."

The fact that engagement in improvement science to improve student outcomes within

the SPSA was a top down mandate, dovetails with the first finding that many principals did not

engage authentically with the work. As compliance was enforced, many principals who did not

authentically engage in the improvement science process, may well have simply completed any

required forms and documents in an inauthentic manner, possibly on their own, with no input from their teachers, for reasons of compliance.

Theme 9: For Invested Principals, Collaboration With Peers Developed A Sense Of Shared Accountability.

Collaboration between principals during principal meetings on improvement science increased the amount of shared accountability towards one another. As noted above by a principal supervisor, there was external accountability applied in the form of mandated deliverables, but a sense of camaraderie as well:

> "I held my principles accountable. So yeah, they had to do it because I asked them to. But they also did it with each other. There was also a sense of that camaraderie and also competition, a little bit."

For the few successful principals interviewed, the feeling of shared accountability to one's colleagues and to one's supervisor was strong. Having deliverables due at each principals meeting as an external pressure helped too.

> "I felt accountable to my colleagues and my IAS to do the work. So it goes along with the deliverables and being held accountable to your colleagues I think for a lot of us. That's a big motivator, you know, I want to be a team player, and I want to be accountable to my colleagues."

> "We know students are more successful when things are clear when they understand the expectations and they know specifically what they need to do. And I think as adults, it's the same thing. So, that's what this is all about and working together and sharing the work and knowing that you're part of a team"

This finding of shared responsibility between principal colleagues may well be skewed, as a result of only interviewing the few principals who experienced success with running high quality, iterative PDSA's. This finding is in contradiction to the lack of a focused direction and authentic engagement of some principals. Both things however may well be true. The invested principals felt a sense of shared responsibility towards one another, and as such experienced the external pressure of deliverables and transparency as a positive motivator. On the other hand, for uninvested principals, there would have been no sense of shared responsibility, and the external pressure would simply have forced the falsification of the process and related documentation.

Findings for Research Question 2

Research Question 2: "What are the leadership conditions at the school level that support high quality, iterative PDSA cycles at schools?". The following findings are for schools which have had success in running high quality, iterative PDSA cycles at their schools.

Focused Direction.

Theme 1: The Principal Championed The Effort.

Each of the successful principals were individually bought into the process and were champions of the use of improvement science to get better results. Improvement Science was seen as a way to focus the work of teachers and capitalize their collective efficacy on a common problem, and to use common processes and tools to solve the problem. When talking about schools which experienced success with PDSA's, principal supervisors had this to say:

> "I know the principal was hands on. As were both of the assistant principals. So you had all three of the leadership team working directly with their math department"

> "It was really nice because this principal leaned in had a group, a team of people that were leaned in"

While not all the principals interviewed specifically spoke about being a champion of the work, it was clear to me through their answers and stories they were completely invested in the use of improvement science and PDSA's as a method to improve student outcomes. The sentiment of one principal who addressed this aspect head on is below:

"They (teachers) need to have a leader. They need to have someone who's committed to working with the team to get through the process. So that's number one, whether that's the site leader or the training specialist or a highly capable teacher on campus. It was me. And I will say when it's the site leader I think it is more powerful. Because I know the work they're doing inside and out and they know I'm invested in it because I'm spending the same amount of time they are in those readings, and thinking and learning along with them. And I'm also providing them feedback in our meetings."

When talking about schools which experienced success with PDSA's, curriculum and instruction management had this to say:

"He (the principal) supported the leadership team and prioritized this so the learning kept going."

"That was led by the principal initially and then she brought in the coaches. So she set up the structure. She set up the calendar. She actually sits in on those meetings, she sets the agenda."

"It's the leader that has the mindset that this is important. This is valuable. And this is something that can transform and can shift. The learning, the continuous improvement of the school community. And so I think that leader has to set the tone. And has to set forth expectations, has to facilitate the conversations and or facilitate setting up structures to allow those conversations to take place, in absence of that then it just doesn't happen."

"Where the principal is involved with the team that is doing the work. Having that leadership and that principal being the one who removes barriers, who makes it so that teachers can do the work without it feeling like a lot of extra work helps them to see, and this is why. And here's how are making gains, that's a critical piece"

When talking about the ingredients schools needed to experienced success with PDSA's, a curriculum and instruction training specialists added the following:

"I think one is an admin staff that's that's interested and is engaging"

There is consensus from all groups on the aspect of principal engagement. While principals championing the effort may not guarantee success, no principals who did not champion the effort were successful..

Theme 2: Principals Intentionally Started The Work With Teams With Which They And the Training Specialist Had Trusting Relationships

Each principal started with a small team of teachers with the right mindset who were used to collaborating as an effective team. Trusting relationships between the teachers on the team, the principal and the training specialist were seen as very important factors in starting this work as a high functioning team. When asked what contributed to schools having success with PDSA cycles, principal supervisors had the following to say:

"Relationships, because through leveraging those relationships we get the work done for kids…. conditions being set that also establish a good relationship, a good collaborative approach between the principal and the teachers."

"The ones that I've seen be more successful than others are with a team that's already been working authentically as a team. Where teams really are honest with each other

about what they've tried or what they haven't tried, what's been successful, what's not been successful and wanting the team as a whole to get better."

Principals added the following:

"I think it's that team building and I think when administration is kind of part of that too. I think if you're just telling people what to do, versus really being in there and doing the work with them and having a good relationship when they trust the support."

"It's absolutely relationships and we know that we hear that all the time, but I think it's trust and team building."

"The foundation is the relationships."

"Just understanding how to work together as a group and trusting one another, I think, has to be there".

Indeed, within the difficult climate of the school district, personal relationships between the principal and teachers were seen as having paramount importance.

"I've got some folks who are just militant, and anti, and thank God they like me, because if that wasn't there, it would be really rough."

Trusting relationships were considered as important for team effectiveness by curriculum and instruction management as well:

"It's because (school) has a math team that has worked together for quite a number of years with me as a coach and then having another training specialist come in as a coach, which again was something that had some longevity. So there was trust built up. There was an understanding that what we are bringing to them and I say we, as facilitators as well as the principal leadership there. This wasn't a new team brought together you know to do this work. It was a team that was already established."

Training specialists concurred that trusting relationships were key to moving the work forward:

"The trust the team has in me, I think, is a big one…...I'm not positive they knew what was happening at all times. But they were very engaged and willing to try and I think if I didn't have a relationship with them or they didn't trust me that would not have happened."

"I'm wondering if the training specialist has something to do with it. So I'm trying to think if I wasn't there, if the relationship wasn't there…...And I think the fact that they were already doing professional learning helped since we were able to tie it into what they were already learning about with us and going out and trying what they learned with us. I think it just kind of fit into the process really well. And I'm wondering about, if we hadn't been doing professional learning with them whether they would have been willing to pick this up and try and run with it a little bit."

In conclusion, teacher teams which were effective at running PDSA cycles had pre-existing positive relationships and trust withone another, with the principal and with the training specialist. It makes sense that positive, trusting relationships are a pre-requisite to collaborating effectively together.

Theme 3: Time Was Spent Building Consensus On A Focused Direction

Each principal worked with their teachers to build consensus on where and how they should focus their collective efforts. Principals did not simply mandate the direction of the work, but guided it, starting with a common understanding of why this was important for the team to focus on. Principal supervisors commented as follows:

"You've set those conditions straight so that your team believes in you as a leader and they believe that you're there to support them. That this has not been done unto them."

When asked how they motivated teacher teams to engage in the process of using improvement science to improve student outcomes, building consensus was very important to principals:

"Yeah, there's stuff that the District wants me to roll out, you know, but it's in the messaging because especially with these types of things you're not going to get a lot of good results if you mandate things but just having the discussions with the staff on the value of this. And that's where I go back to it's the principals role to message new initiatives to the staff and not make it seem like it's a mandate….That's one of the key things about being a site administrator is being the messenger of the district initiative and communicating that with the staff in a way that makes them accept it."

"I do want to say I had to do a lot of groundwork. First, I had to really kind of catch them up on building advocacy. Like, what we commonly believed about teaching and learning, so I started there. I made them all create instructional visions by team for math and ELA.... There has to be some common advocacy...what we all believe we can do here. Because if you don't have that, you don't have buy in and not everybody will implement."

The successful principals all spent time building consensus and buy in amongst the group of teachers and saw this investment of time and energy as being critical to moving the work forward.

Creating Collaborative Cultures.

Theme 4: Principals Partnered With Their Training Specialist To Lead Teacher Teams Through The Improvement Science Process.

Principals and their Training Specialist (TS) worked in partnership to train staff and take them through the improvement science and PDSA process. This was noted by principal supervisors when asked about effective practices to engage teacher teams in improvement science and PDSA's:

"Definitely working with their training specialist. A lot of people, you know, wanted that extra support as well."

"He (principal) had received a TS. Seeing how powerful that had been and then showcasing that to a second and third grade team in team meetings. They got pretty jazzed about the impact that they were seeing for students in increasing reading fluency, and anyway it was good."

Principals and their training specialists facilitated the improvement science process by copying the process they went through in principal meetings and/or CORE meetings. According to the principals interviewed:

"It was really me and the training specialist who kind of talked with the group. We talked through, we kind of told them what the process was about"

"We started out with, you know, like I said, learning what the PDSA was. I invited our TS at the time………I mirrored that CORE process with my staff, so I was like one step behind. So I would learn it, come back to my site and do it, you know, and so it helped me lay things out in a very organized fashion as well. I just really kind of followed that CORE methodology, like the way they kind of laid it out in a very systematic and meaningful way. And I think that's what really helped my site."

"So from my experience, I just tried to copy that journey that I went through…. it was a lot of help to have our TS join all the times that we met as a math department, you know, as that expert voice in the room. And hey, we trust her. So let's try it, you know."

The training specialists concurred with the team approach to training teachers:

"I think it was a tag team. She (principal) was there for the meeting, she was there for the planning and also there for the meeting that we did the 'plan' portion of the PDSA and discussed the 'doing' portion of PDSA."

"They (teachers) did some work with their principal, and I came in to supplement that at department meeting time"

A curriculum and instruction manager pointed out that the curriculum and instruction staff often helped with some of the more technical aspects of the work such as data analysis and presentation, while building teacher capacity at the same time.

"Although teachers can look at data, to pull it and organize it and display it in a way that makes sense. That takes some background work. And so that's the kind of thing we did to make sure the meetings could flow better But it wasn't always me. It was definitely trying to bring the teachers into that because they need to be able to function and run those meetings without a facilitator, right, we started talking about working ourselves out of a job."

The effective partnerships of the principal as the site leader, and the training specialist as the content expert was further bolstered by the fact that both principals and training specialists had parallel trainings on facilitating teams through the improvement science process (see finding for research question 1, theme 2). The principal and training specialists had complementary skills and responsibilities to effectively lead the teacher teams.

Theme 5: Principals Created An Environment Within Which Teachers Felt Safe To Take Risks And Try New Things.

Principals made deliberate efforts to create a climate where it was safe to ask questions and to make mistakes. Principals wanted to create a safe to fail atmosphere for teachers to try something new. Learning from failure is an integral part of the improvement science process, and as such, principal supervisors recommended the following to principals:

"Principals have to be willing to engage in a conversation that they don't know exactly how it's going to turn out on the other side and be willing to model the fact that they're not always perfect. I always try to highlight something that I did. That was a disaster. Something that I tried that didn't work. And what I learned from that. And I think the more that we can model the mistakes we've made, the more authentic the relationship is and the coaching can be."

Moreover, principals often modelled the mindset of transparently learning from mistakes:

"Hey, if we don't make mistakes, we're not pushing ourselves hard enough, you know, because we're setting the bar way too low if it always comes out the way we want it to come out. A big part of learning is making mistakes, but not making those same mistakes over and over. So that's always the mindset I want to give the staff, let's not be afraid to try new things. Let's have a concrete plan for trying this new thing out, but if we crash and burn, that's part of learning. There's no shame in that."

Curriculum and instruction management agreed that successful schools set up a safe space to try new change ideas:

"I also think that within improvement science sometimes you're not going to improve and sometimes change ideas will not work. And that's okay as long as we're learning how to

either adapt, adopt or abandon. I also think that they're very successful there (at a particular school) because they do observations and so there's some accountability, but it's also a safe space like they'll do walkthroughs of what they're working on and they'll share out and things like that. So all those systems are in place for them to succeed with improvement science."

"Learning from failing forward...As long as you're trying things and you're looking at is it really improving things for students"

Training specialists also noted that a safe environment was necessary for teachers to try new things:

"I think that it's partly the culture at the school. That the teachers are willing to try things and maybe that's created by, you know, making an environment where when they try things there are no negative consequences."

Learning from mistakes and seeing failure as an opportunity to learn was explicitly addressed as part of the training on improvement science. The evidence here suggests that schools which successfully engaged in improvement science and PDSA's managed to internalize this important aspect of an improvement mindset.

Theme 6: Teachers Were Empowered To Make Decisions, With Some Limited Autonomy.

While principals participated as an active member of the improvement team, they did not make all of the decisions. Principals practiced "loose tight" leadership, wherein they gave teachers limited autonomy to make decisions. Within the limited autonomy, it was the teachers themselves, in collaboration with the principal and training specialist, who came up with certain

ideas, such as the change idea(s) they were going to try. This meant that buy-in was built in from the start of the process. Principal supervisors noted the following effective practice:

"Allowing teachers to explore for a while on their own, but not sort of frivolously. Sharing what we know is good evidence based practice e.g. here are four research based strategies that you can try"

Principals encouraged and empowered teachers to make decisions within the improvement science process:

"It was the teachers themselves that came up with the new change idea you know and when that happens, you have the built in buy in there"

"That's the dream. It's not just getting together, but really collaborating and where that process is successful."

Some principals managed to empower teachers to take over even more responsibility:

"And so I just sat back. I didn't say a word. And they just kind of talked with each other and came up with a plan for how they were going to be adding this portion to their daily routine where they were going to be having these kids write a written explanation about their thinking. They talked about how they were going to collect the data and what they were going to bring back and then they just looked at me. I think at that point I realized they understood the process, they understood why it was meaningful, they understood what they were learning from it and doing something with that learning. And I was like, Okay, I think we've got this under control."

The finding that teachers were empowered to make decisions within the improvement science process was confirmed by curriculum and instruction management:

"There was choice within the teams of what they were going to look at data wise, and then what change ideas they were going to use once they did their analysis. So I think choice was a big thing, autonomy, you know, and buy in there."

"The teachers feel very valued at the school like they are in control of the change ideas they select, and so when teams feel valued, it's a stronger, cohesive team."

Training specialists often assisted with presenting teachers with limited autonomy, giving choice between several evidence based change ideas which could be potentially effective:

"Well, we presented them with a couple different ideas, "which one doesn't belong" was one of them. Another popular one of the math talks, "Open middle", and I think the third one we showed them, we described. They decided on "which one doesn't belong"."

"We wrote part of that PDSA together. And then they planned what they were going to do, essentially it was what we showed them in this Gear Up training. We showed them a kind of instructional technique and then later on they tried implementing that instructional technique. Then we came back together at another meeting and discussed the results."

It seems that principals and training specialists practiced a slow releaseof responsibility with teacher teams. At the start, this meant limited choices, and as teachers became more proficient, they could start planning and running parts of the process themselves. As noted in research question 2, finding 9, most teacher teams did not reach the level of independent proficiency.

Theme 7: Principals Provided The Necessary Resources And Structures For Teacher Teams To Be Successful.

The principal provided the necessary resources for teacher teams to successfully engage in the work, such as regular collaborative time, substitute release time and technical support from themselves or training specialists. Principal supervisors noted the following characteristic of successful schools:

"Unbridled support, you know. I think that we have some folks that would be willing to try stuff if they felt like they had support from their leader to do it. Whether that means I'm going to come in if you want me to come in and take part of your group while you work with another group. I can do that, or if you want me to come in and teach your class while you're watching your colleagues teach that same lesson. I'm up for that. I think they have to see that it's not just that we're going to talk about it, but that we're willing to support it, with our time…..the time says to them. "Oh, okay. That's really serious if he's willing to come in and take my class, while I go watch John". And for the team, saying to them "I really value that kind of conversation we get into, but we run out of time. What about a support day? What about bringing in people, so you can work for a couple of hours in the afternoon?"."

Regular meetings were key. Each successful team took advantage of the collaborative structures they had in place to move the work forward and substitute teachers were provided to give teachers release time as needed.

"I spent every staff meeting, every curriculum meeting talking about this. There was never a staff meeting or curriculum meeting that we did not talk about this."

"Subs were gotten as needed"

Consistent short team huddles of 10-15 minutes were often utilized to check in on change idea implementation, as well as the longer, more structured regular meetings.

"The other thing I think is really critical is, you know, being very consistent and committed in the time you have to set aside. You have to agree when you're going to meet how often you're going to meet. We had two types of meetings here at (school). We had a huddle. And then we had, you know, a PDSA team meeting. So we met every week, once a week, but we alternated huddles would typically last 10 to 15 minutes and they would be during the teachers agreed that we would do it during lunch. So it could be you know, something that maybe wasn't going well or clarification that a teacher needed or we sometimes we would just meet and look at the exit tickets together and calibrate them and kind of like we recalibrate our brains around like what we've been looking at and what we were noticing. And then the PDSA team meetings would be much more structured and much longer. So those would be more of like our collaborative Thursdays."

Curriculum and Instruction managers also commented on the necessity of providing collaborative structures and resources for teacher teams to be successful:

"Making sure that whoever's moving the work feels like they can move the work right. You have the systems in place, you have the supports, you have the resources. And you provide the time for a lot of reflection, so that people can grow and change."

"The team also prioritizes this at their Collaborative Time, which I think is really important too."

"They have a structure for regular meetings, so there's a structured regular meeting, meeting time, regular agenda, teachers are there."

As noted above, regular, consistent collaboration time were provided, andsubstitutes were provided as needed. This finding principals provided the structures and resources for teacher

teams to be successful dovetails with research question 2, theme 4, that the principal partnered with the training specialists to facilitate the teacher teams. The training specialists provided content expertise, while the principal and training specialist provided needed technical assistance, such as facilitating team planning, or presenting data in such manner that it could easily be analyzed by the team.

Deepening Learning.

Theme 8: Success Was A Motivating Factor To Deepen And Broaden The Work.

Principals found that teachers seeing their efforts being rewarded with success was a real motivating factor for both teachers on the team, and for other teacher teams at the school:

"Teachers can see that a team came together and focused in this way and improved outcomes for kids. If we see success, then that breeds success."

"I think the other piece that was very motivating is once they started doing the work, and they started seeing those positive results, they were like on fire."

The perspective that success was a motivating factor for teachers was echoed by curriculum and instruction managers:

"Showing data that this is actually working. When other grade levels see that sixth grade is making improvements in math because they're trying out these change ideas, then other grade levels are like, well, I want to try it if it's working for you. I want to try it. So then they want to start learning about the process. So everybody's bought in."

"They (teachers) want their kids to learn, to achieve and have that sense of achievement. And when we can point to and say, boom. Look, your star was here, now your star is all the way up here, I mean that's a huge motivator right and they want it...They (teachers) want to know they're winning."

"There's a lot of people that are naysayers with the work from the beginning, but once they see growth and they feel supported and they feel like, Oh my gosh, I did that and I'm teaching others and they're teaching me then this can actually be very effective for everybody involved."

Moreover, principal supervisors noted that initial successes also motivated principals more:

"Principals were motivated by seeing changing student outcomes. Actually, for many of my principals seeing changes in teacher behaviors to become better teachers and therefore student outcomes. Yes, they want their students to perform better, but I think their real pleasure is watching teachers teach better and engage with students better and see those student results and therefore get jazzed by their own teaching and want to go back in and do it again and again."

"I think the more they see it having an impact on their teachers and students, the more they believe in it. It has taken time to get to this place."

Success can lead to a virtuous cycle, with all stakeholders becoming more engaged, more motivated and more inspired to continue and deepen the work. Teachers and leaders alike may well have been somewhat uncertain about the effectiveness of the use of improvement science and PDSA's to improve student outcomes, but when the data clearly showed an improvement, that was both motivating to the people involved and affirming of the process.

Theme 9: Teachers Needed More Training To Become Independently Proficient In Implementing PDSAs.

While some teacher teams experienced success with PDSA cycles, principals, curriculum and instruction management and training specialists all felt that teachers needed more training on

improvement science and running PDSAs to become independently proficient. Teacher teams had much less time to learn the process than principals and training specialists and as such really had to depend upon the principal and training specialists to lead them through the process. The perspective of one principal is captured below:

"So really, this is where I would have done things differently and taken more time. It was really me and the training specialist who kind of talked with the group. We talked through, we kind of told them what the process was about and I really feel that we rushed and went straight from that, to now let's do one. I still think we went too quickly into now let's do this. I actually heard just this year that they (teachers) still were not completely convinced or they didn't like the template. They felt that it was a lot of work and they felt that tracking data and that whole process was more than what they wanted to do. And to me, that's a lack of understanding. That's a lack of understanding what needs to happen in order to really make these PDSA's authentic and effective in improving outcomes for kids. So I think we would have slowed down. I think the work we went through in the principal's meetings was much slower, more deliberate. There were more steps involved."

According to another principal, there was a need for professional learning days dedicated to the use of improvement science for teachers:

"Things could have gone faster with built in PD days for all staff"

Training specialists concurred that teachers needed more time to become proficient in the use of improvement science and running PDSA's to improve student outcomes. Some of this lack of training for teachers was mitigated by the training specialists or principals being the guides and documenters of the process:

"I think teachers need much more time to be effective practitioners of PDSA cycles, as I recall training specialists tried to mitigate that by being guides and documenters and really the ones doing the the learning and the improvement science and then just exposing teachers to the parts of it that were, you know, that were most relevant or easiest places for teachers to jump in and provide something."

Even though there was consensus that teachers needed more time and training, training specialists did note changes in teacher behavior due to the improvement science work they were involved in:

"Based on the work we did to build the structure of how they meet, this impacted them because I know that they still bring student work to their meetings on a regular basis. That is something they look at to compare what they're doing in their classrooms, and talk about what they're doing in their classrooms and that wasn't happening before"

"I would say they're still doing aspects of improvement science, though it just hasn't been documented or I guess reflected upon from the improvement science lens, but I still think they're using it almost every day. They still want the best for their students. And they're still making changes to their instruction to try and engage as many students as they can."

Securing Accountability.

Theme 10: Historically Poor Data Was Used As A Reason To Improve.

Historically poor data was used to motivate teachers as a reason to improve. At the same time, principals were empathetic towards teachers about how hard they were working, knowing that teachers wanted to make a difference, and wanted to see good results. Below are statements from each of the three principals interviewed:

"When you look at the outcomes that we have been achieving year over year historically speaking, the pattern has essentially been that students are not achieving. So there is no better proof that you need to improve than looking at that…..When you work as hard as these teachers work and make no mistake, they work very hard, but you continually get poor results, that is a feeling that makes it very difficult for quality educators to want to remain in one place, right. And so it's important that teachers feel like the work they're doing is having a meaningful impact….It doesn't feel good when we work that hard and don't succeed. So let's change that…….It's unacceptable that we have such low performance. It's just unacceptable and you can't tiptoe around that, you know, you can't say, well, it's okay. I say that because I know my staff was dissatisfied…..No one wants to come to work every day and work that hard and feel like you've done absolutely nothing. Right, so I think that was a big motivating factor. And I think that I'm not sure they ever had someone say, well, "This crappy, what are we going to do about it?" You know, I don't think they'd ever had just had someone very transparently say that and there was no judgment. Right. It was just like, this is where we are."

"I mean, the need to improve, you know, the use of data. I mean, the data is what it is and then math. It's just so easy because the data is so bad right that the need for improving student outcomes is just, you know, really, really obvious"

"Hey, let's give this a try. Because what we've done in the past has not worked very well, so, let's try this on for size, you know."

It is worthy of note, that principals leveraged historically poor data as a motivating factor for teacher teams to improve. This type of needs assessment and collection of baseline data is an essential part of the process of continuous improvement, and helps teams come to consensus on

what exactly they are trying to achieve. Each of the principals involved were able to present historically poor data as a reason to improve, without it having a counterproductive effect on teachers. This may have been because of the positive relationships and trust that existed between the teachers and the principal, or it could also include the empathetic manner in which each of the principals worked with teachers.

Theme 11: Efforts Were Taken To Build Shared Responsibility Amongst The Team.

Building collective efficacy and a sense of shared responsibility required considerable effort from some teams, but was seen as an important investment by all principals. The heavy emphasis on creating a collaborative culture at successful sites, on team building and having a working on a shared goal, led to team members feeling a sense of shared accountability to one another and to the principal. Principal perspectives on building shared accountability amongst their teams are below:

"It's still that I versus we, what are we going to do and it's building consensus and saying, let's land on this one change idea. When people have really strong ideas about, *for my kids*, this is what works, instead of these are *our kids,* so that collective responsibility. So I think it's reaching consensus and really saying I don't love this idea, but for the sake of the team, I'm going to go back and I am going to try this and I'm going to try it with fidelity. And we've talked about that in a lot of trainings, just because you've agreed to do something, is it really being implemented with fidelity? So can you really get at whether the results you're getting are authentic and whether they're valid."

"At least for me, and I think it's the same for the staff, is just being held accountable to your colleagues, you know that hey, if they're asking me to do this, then I don't want to let my colleagues down."

One principal named shared responsibility as soft accountability. Michael Fullan calls this internal accountability.

"By soft accountability, I mean that they knew that we were holding each other accountable to the work we were doing."

Training specialists also noted the shared responsibility amongst teacher teams:

"I think they (teachers) have a feeling of shared responsibility. I've observed that they care about bringing back results when it's time to discuss results together. But I don't get a sense that that feeling of responsibility is highly enthusiastic. So much as just, you know, this is the right thing to do or the polite thing to do. You know, to make things easier for me and my teammates, right, which is okay, if that's the motivation, you know, that's better than no motivation or or having a bad attitude about it. I've been to a bunch of their after school meetings and people will show up, you know, sort of exhausted from what happened at school that day or You know, whatever is going on. Between teachers in the school district and all of that. But they'll still bring their, you know, pile of student work and they'll still talk about it. And the way that they're supposed to. And, you know, examine it together. And I think that's I think that's the school culture, right, because when you really don't want to, but you do it anyway. Then you're doing it because you care."

Shared accountability was common amongst successful teams, and is clearly a driver to ensure participants go the extra mile as agreed upon by the group.

Theme 12: Transparency Of Results Shored Up Accountability.

The sense of shared accountability was backed up by the expectation from principals that teachers transparently shared their results with the team. The expectations that principals verbalised are below:

"They (teachers) saw each other at their team meetings, they had to bring their data to the team meetings. I was present. I can see who's attending and who's got their data. But also, you know, my commitment to giving them the feedback they needed when they implemented that PDSA."

"In collaborative time, just being another member of the team, being encouraging you know constantly talking about using data."

Without the sharing of results, teacher teams would not be able to have discussions regarding their PDSA cycles, and there would be no real documentation of PDSA cycles. Transparency of data is a prerequisite for engaging in continuous improvement.

Theme 13: COVID 19 Stopped The Progress Of The Work.

The COVID 19 shutdown stopped teacher teams performing PDSAs. While it could technically have been possible to continue with PDSAs during distance learning, no new PDSA cycles were documented, probably because all educators struggled with coming to grips with the new landscape of distance learning. If any PDSAs did occur, they were not documented. Principals were dismayed that the momentum they had gathered all of a sudden came to a halt. In the words of one of the principals:

"I'm super bummed about the shutdown because it stopped the opportunity"

Chapter 6

CONCLUSIONS AND DISCUSSION

Introduction

The purpose of this study was to explore how improvement science was implemented at

TUSD, from the district level to schools, and to investigate the leadership conditions at the

school level that support high quality, iterative PDSA cycles at schools. While there is some

literature on the implementation of improvement science within K-12 education, not a lot exists.

Moreover, there is even less research on the leadership conditions that support high quality,

iterative PDSAs at school sites. This chapter includes a summary of the study, a discussion of the

findings, implications and recommendations for policy and practice, recommendations for future

research and then a conclusion. The discussion of findings is organized by the research

questions, and then by the four components of Fullan's Coherence Framework.

Summary of the Study

This study used semi structured interviews with purposefully sampled participants

including principal supervisors, principals, curriculum and instruction management and

curriculum and instruction training specialists. A total of eleven (11) individual interviews were

conducted as follows; principal supervisors (3); principals of schools which had experienced

success with implementing high quality iterative PDSAs at their school sites (3); curriculum and

instruction management who had supported the implementation of improvement science across

the district in their respective areas of math, English language arts, and social and emotional

learning (3); and training specialists who directly supported school based teams at schools which

had experienced success with implementing high quality iterative PDSAs (2). To identify

schools which had conducted high quality, iterative PDSAs, a document analysis of schools'

PDSA cycles between September 2019 and March 2020 was conducted. Rubrics including the components of high quality PDSA's were used in the document analysis to evaluate schools' PDSA's. These rubrics were based on quality components of PDSAs identified by the Carnegie Foundation for Teaching and Learning. The principals of the three identified schools formed the purposefully sampled principals for individual interviews. The study was conducted at Tree Unified School District, a large K-12 district in Northern California with a diverse student population.

Discussion of the Findings

The discussion of findings is organized by research question, and then by the four components of Fullan's Coherence Framework.

Research Question 1

The first research question of this study asks "How is improvement science being implemented at TUSD, from the district level to schools?" The findings within each component of Fullan's Coherence Framework are discussed below. The findings for this research question are all in alignment with the research.

Focused Direction.

Theme 1 found that there was a lack of focused direction across the district, as many principals did not engage authentically with the work of improvement science. This finding reveals that TUSD was not operating as a continuous improvement organization should. According to Park (2013), the work of continuous improvement should be embedded into people's regular work, rather than being seen as an unnecessary addition, as it was for many in TUSD. Indeed, continuous improvement organizations should develop collective organizational goals, responsibilities and priorities (Hough, 2017), but it is clear that in TUSD responsibilities

and priorities were not established in a collaborative manner so that they were truly collective

goals. According to Park (2019), the scaling of best practices, in this case the use of

improvement science to improve outcomes for students, requires not just telling people what to

do, but also deepening learning about what it takes to implement the practice. This fault line in

effective implementation for TUSD is reflected in a sub component of focused direction, known

as clarity of strategy - how do we go about achieving the goals that we have? (Fullan 2016).

"Clarity is subjective - is it clear in people's minds and actions?" (Fullan, 2016 p.24) The district

mandated that all principals were to use improvement science to improve student outcomes, but

it is clear from the findings that in people's minds and actions many principals did not agree

with, or perhaps even care to understand this strategy. Fullan explores the quality of change

within an organization by comparing the explicitness of the strategy (in this case, the use of

improvement science to improve outcomes for students) with the change climate (trust,

collaboration, non-judgmentalism). The change quality quadrants has been reproduced below:

Table 6.1 - Fullan's Change Quality Quadrants (P.25, 2016)

	Low Explicitness	**High Explicitness**
High change climate	Superficiality	Depth
Low change climate	Inertia	Resistance

As discussed in chapter 4, there was a distinct lack of trust at TUSD, and as such the change

climate was best described as being low. The explicitness of strategy increased as time went on,

and as such moved from low to high, although this may have been experienced differently by

different people. This would mean that overall, the change climate was either one of inertia,

whereupon people ignored the change and just continued to do what they were doing, to one of

resistance. Fullan's description of the resistance quadrant seems to accurately describe the

conditions at TUSD "When conditions for change are weak, there is low trust or collaboration; therefore there is little willingness to innovate or take risks. When this is combined with a very directive strategy that makes heavy demands or mandates, resistance and pushback escalate." (P. 26, 2016). Considering the evidence discussed and the context of TUSD, the finding that there was a lack of focused direction is in alignment with the research.

Creating Collaborative Cultures.

There were two findings under creating collaborative cultures, which are both connected to capacity building. Firstly, capacity building of principals and curriculum and instruction support staff was achieved through a variety of structures and peer to peer collaboration facilitated effective learning, and secondly, the contentious relationship between the teachers union and the district was a barrier to capacity building for teachers. According to Fullan, "Capacity building is a key lever for developing coherence because as knowledge and skills are being developed, the collaborative culture is deepened, shared meaning is clarified, and commitment is reinforced." (P.56, 2016). Fullan recommends the building of capacity in district leaders, a district capacity team, principals, and school leadership teams. Within the district there were ongoing, regular professional learning sessions for the first three of these groups; district leadership (Assistant Superintendents leading the work); district capacity team (curriculum and instruction staff, both management and training specialists); and principals. The professional learning engaged in was described by participants as being both collaborative and effective. There is much research identifying peer to peer collaboration as being effective (Fullan, 2016, Dufour et al, 2012). However, because of the toxic relationship between the teachers union and the district, teachers did not engage in professional learning as part of school leadership teams with CORE. This led to the only professional learning teachers received was from their principal

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and training specialist. The amount and intensity of the professional learning teachers received was much less than principals and training specialists, and as such less capacity was built in teachers. This was a significant barrier to effective implementation and a missing key participant group to the school leadership teams who received training from CORE districts.

Deepening Learning.

There were four findings under deepening learning; firstly, principal supervisors needed time, and engagement with CORE Districts to become effective trainers and engagement with CORE Districts helped all participants build capacity; secondly, for those invested in it, being involved in improvement science implementation provided deep learning which stuck and impacted the way in which people worked; thirdly, engaging in the implementation of improvement science gave improvement teams a common set of effective practices to use; and finally, very few schools successfully engaged in high quality, iterative PDSA cycles.

As previously discussed in the finding for focused direction, Fullan explores the quality of change within an organization by comparing the explicitness of the strategy with the change climate. The change quality quadrants has been reproduced in table 6.1 above. For many of the principals involved, the climate of change was experienced as being low, however, for some principals, specifically the principals who experienced success with the implementation of improvement science, the change climate increased with time, and was eventually high. Moreover, as principal supervisors had the time and training to become effective trainers, the explicitness of how to implement improvement science moved from low to high. Therefore, in the first year of implementation which had low explicitness of strategy and a mixture of change climate experienced by most as low, and by some as high, the result was mostly inertia, with some superficiality. As implementation moved into year 2 and the strategy of implementation

became better, principals moved into either resistance, or depth. This is consistent with the finding that for those invested in it, that improvement science implementation provided deep learning which stuck. Fullan describes the depth quadrant as follows: "When people are operating in conditions of high trust, collaboration, and effective leadership, they are more willing to innovate and take risks. If we balance that with a strategy that has precision, clarity, and measures of success, we see changes implemented with depth and impact." (P. 26, 2016). The associated finding of this point is that very few schools successfully engaged in high quality, iterative PDSA cycles. The document analysis of PDSAs revealed that only 3 schools out of the 77 in the district had engaged in high quality, iterative PDSAs; one elementary school, one middle school and one high school. This highlights an important deficiency in the implementation of improvement science across the district, and shows that the vast majority of principals ended up in either the superficiality, inertia or resistance quadrants. It is quite plausible that both the change climate and explicitness of strategy was experienced differently by different principals. The fact that only 3 schools managed to engage in high quality, iterative PDSAs does show however, that only a few schools made it into the depth quadrant, which would require a high change climate and high explicitness. It is possible that engaging with Gear Up! helped the middle and high with either the change climate at their schools, and/or the explicitness of strategy.

The third finding within deeping learning was that engaging in the implementation of improvement science gave improvement teams a common set of effective practices to use. This is consistent with what Hough et al (2017) found were some of the hallmarks of an effective continuous improvement organization; there is the collective use of evidence based processes and practices; and the use of a common improvement methodology.

Combining the first three findings demonstrates that for the principals who experienced the change climate as being positive, who were invested in the use of improvement science to improve outcomes, that their schools started to display some of the characteristics of effective, continuous improvement organizations.

Securing Accountability.

There were two findings under securing accountability, firstly that principal participation in improvement science was a top down mandate which enforced compliance, and secondly that for invested principals, collaboration with peers developed a sense of shared accountability. According to Fullan (P. 109, 2016) "If you want effective accountability, you need to develop conditions that maximize *internal accountability* - conditions that increase the likelihood that people will be accountable to themselves and to the group. Second, you need to frame and reinforce internal accountability with *external accountability* - standards, expectations, transparent data and selective interventions." Indeed, to achieve lasting improvement, Fullan emphasizes that internal accountability must precede external accountability. As principal participation in the use of improvement science was a top down mandate, combined with the finding above from focused direction that many principals were not on board with implementation, it is clear that TUSD led with external accountability, with mandates and deliverables. The second finding that for invested principals, collaboration with peers developed a sense of shared accountability shows that internal accountability was experienced by some principals. For these principals, the external accountability was actually felt as a valid reinforcement, rather than being met with resistance. Indeed, the invested principals who felt the pull of internal accountability described the professional learning they received as collaborative,

which is consistent with Fullan's argument that building strong internal accountability is reliant upon creating strong collaborative cultures, built on trust and a non-judgemental atmosphere.

Other Thoughts.

TUSD attempted to implement improvement science across all 77 schools in the district all at once, at a time when internal capacity was low and participant will was resistant. Bryk (2015), developed a framework to analyze the context for improvement for an institution, which is reproduced below in table 6.2

Table 6.2 - Context For Improvement (Bryk et al., P.120, 2015)

Sizing up a context for improvement		Participants' will		
		Resistant	**Indifferent**	**Ready**
Extant know-how limited	**Limited capacity**	Very small scale test	Very small scale test	Very small scale test
	Good capacity	Small scale test	Small scale test	Moderate scale test
Substantial know-how exists	**Limited capacity**	Small scale test	Moderate scale test	Large scale test
	Good capacity	Moderate scale test	Large scale test	System-wide implementation

Using this framework, the recommended scale of testing should have been small, perhaps a few schools. While extant know-how exists, to be prepared for system-wide implementation, participants would have needed to be ready and willing and substantial know-how and capacity would have needed to have existed. If TUSD had started with a few schools, had learned more about implementation, and then scaled up slowly, there may have been more success with implementation.

Research Question 2

The second research question of this study asks "What are the leadership conditions at the school level that support high quality, iterative PDSA cycles at schools?" The findings for this research question are all in alignment with the research. The findings within each component of Fullan's Coherence Framework are discussed below.

Focused Direction.

There were three findings under focused direction; firstly, the principal championed the effort; secondly, principals intentionally started the work with teams with which they and the training specialist had trusting relationships; and lastly, time was spent building consensus on a focused direction. There is growing consensus that principal leadership is critically important to implementing change to improve student outcomes (Branch et al. 2012; Wallace Foundation, 2012; Barber et al. 2010; Louis, Leithwood et al. 2010; Louis Dretzke et al. 2010; Davis et al. 2005; Leithwood et al. 2004). The implementation of improvement science and the use of high quality PDSAs to drive improvement at schools is a change in practice at TUSD. Changing practice at the school level requires strong principal leadership to spearhead that change. Michael Fullan maintains that school principals are essential for setting the direction, creating the conditions and shaping the pathway for change, and as such, it is no surprise that the principal needed to champion the effort. Hague (2014), Dian Fu Chang (2017), and Mei Kin (2018) found that principal change management competencies led to the implementation of reforms, such as the structure, routines and processes in which teachers engaged, the willingness of teachers to participate and put into effect professional development and teacher change beliefs and attitudes towards change. Amongst other things, the change management competencies documented in

these studies relate to the principal leading the change, and ensuring that there is a focused direction for the change.

The second and third findings were that the principals intentionally started the work with teams which they and the training specialist already had trusting relationships, and that time was spent with the team building consensus on a focused direction. Fullan (2016) stated that a collaborative approach during initial implementation is especially important, as it is the bedrock upon which everything is built. Taking a pre-existing team which collaborates well with one another and with the principal and training specialist because of trusting relationships would accelerate the important process of consensus building amongst the group on a focused direction. Indeed, Park (2019) found that one of the manners in which districts should engage in continuous improvement was to have educators strive to build coherence across the system by sharing clarity of purpose, or as Fullan would put it, focused direction. Finally, Hague et al (2014), found that when change is co-constructed by including stakeholders, it is owned by those that will enact the change and is far more likely to be successful. The time principals spent with teams on building consensus was an important step towards successful implementation.

Creating Collaborative Cultures.

There were four findings under creating collaborative cultures; firstly, principals partnered with tier training specialist to lead teacher teams through the improvement process; secondly, principals created an environment within which teachers felt safe to take risks and try new things; thirdly, teachers were empowered to make decisions with limited autonomy; and finally, the necessary resources and structures to be successful were provided to teacher teams. It is important to note that principals seemed to put most of their effort into creating collaborative cultures, and consequently this area has the most findings. The findings and the practices

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employed are reinforced by the literature. At schools which were successful with the implementation of PDSAs the principals were actively involved in the process, and partnered with their training specialists, which is aligned with the concept of the principal taking the role of lead learner (Fullan, 2016); modelling learning, shaping a culture of learning and maximizing the impact on learning. At successful schools, principals were conscious to create a safe environment for teachers to take risks and try new things, which may or may not work. Consequently, the school based improvement teams would learn from their failures. Learning from failure is a hallmark of continuous improvement (Bryk 2015, Hough 2017, Aguilar 2018). The third finding was the empowering of teachers to collaborate effectively to make improvement and the fourth was that the necessary resources and structures were put in place to support teachers. These two findings go together, as teacher teams cannot collaborate effectively if they do not have the time and resources to do so. Grunow (2018), found that collective learning and discovery were essential to progress and continuous improvement. Hauge et al (2014), found that distributed leadership and co-construction of change led to the change itself being more successful. Having structures and processes for shared learning so that the team can learn from one another, and close any knowing-doing gaps is another hallmark of high functioning continuous improvement teams (Fullan 2016, Park 2019). Embedded within these findings is the importance of positive relationships - between the principal and team members and between team members themselves, which Grupp described as being an important change-leadership competency (2019).

Taken as a whole, the principal change management competencies found as important by Hague (2014), Dian Fu Chang (2017), and Mei Kin (2018) align with both developing a focused direction and creating collaborative cultures. The significant efforts that principals put into creating effective collaborative cultures align with the existing literature on effective practice.

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Deepening Learning.

There were two findings under deepening learning, firstly that success was a motivating Factor to deepen and broaden the work, and secondly that teachers needed more training to become independently proficient at implementing PDSAs. Fullan (2016) highlights the connection between experiencing success, and strengthening the direction of the work "Humans need to experience success to keep going; they need to understand and experience the conditions that advance the cause" (P. 17). In other words, team members become more invested in the strategy, after they see that the strategy is actually working. As such there is a magnetism between developing a focused direction, and deepening learning on how to accomplish the work. The previously mentioned fault line of teachers not receiving an equivalent amount of training as principals and training specialists becomes apparent here as well. The lack of training for teachers meant that they were reliant upon the principal or training specialist to lead them through the process, and as such the deep learning experienced by principals and training specialists was not experienced in the same manner by teachers, who were the ones actually doing the work. This could well be a root cause that explains the low number of schools that actually performed a series of high quality, iterative PDSAs. As found by Bryk (2015), and Grunow (2018), the involvement of the people closest to the work, in this case the teachers, was essential for continuous improvement to be a success. While a few schools experienced some success, the findings in this study would show that more success would surely have been accomplished with more training and involvement of teachers.

Securing Accountability.

There were four findings under creating securing accountability; firstly, historically poor data was used as a reason to improve; secondly, efforts were taken to build shared responsibility

amongst the team; thirdly, transparency of results shored up accountability; and finally the onset of COVID 19 with subsequent school closures stopped the progress of the work. According to Langley (2014), and mirrored by Bryk (2015) the first step in improvement science is to answer the question "What is it we are trying to achieve?". Moreover, the first step of the TUSD cycle of continuous improvement and in the goal development of SPSAs is to complete a needs assessment. Indeed, Grunow (2018), described continuous improvement as the ongoing pursuit of increased levels of performance. Consequently the first finding that successful principals engaged their improvement teams in looking at data, and used it as a springboard and reason to improve is completely aligned with the literature.

The second and third findings are at the heart of securing accountability. At successful schools, significant effort was invested in creating collaborative cultures, which in turn had the effect of building shared responsibility amongst the improvement team - this is what Fullan (2016) terms as internal accountability. The use of transparency of results, and deliverables for team members, known by Fullan as external accountability, shored up and reinforced the internal accountability that already existed. It is important to note that to successfully secure accountability, Fullan insists that internal accountability must precede external accountability, and as such, these findings are also aligned with the literature.

The final finding under securing accountability is that the onset of COVID 19 stopped work of PDSA cycles at school sites. Schools closed for a month starting in mid March 2020 and then opened in distance learning in mid April 2020. Perhaps not surprisingly, there is no evidence that any schools continued with PDSA cycles from April 2020 onwards.

Limitations

There are limitations to conducting interviews to gather data, which include the information being filtered through the views of the participants, the fact that some participants will be able to articulate their views better than others, that the information gathered is done so in a designated setting rather than occurring naturally in the field, and that my presence as the researcher may bias the responses participants give (Creswell and Creswell, 2018).

To determine which schools engaged in high quality, iterative PDSA cycles, documents of the PDSA forms submitted by schools were analyzed. Although it was required that principals submitted completed PDSA documents to a shared Google folder after each PDSA cycle was completed, there is no guarantee that this happened with fidelity. Moreover the documents may have been incomplete, inaccurate or inauthentic (Creswell and Creswell, 2018). The document analysis of PDSAs revealed that only 3 schools out of the 77 in the district had engaged in high quality, iterative PDSAs. However, it is entirely possible that some schools simply did not document all of the work that they were doing, and that the actual number of schools which engaged in high quality, iterative PDSAs is higher than 3.

As detailed in my positionality statement, my position as Assistant Superintendent of Curriculum and Instruction and my proximity to the work has the potential to bias the manner in which participants respond to me. Lastly, another limitation of the study is that it only involves the implementation of improvement science within TUSD, and as such this limits its external validity (Suter, 2012).

<div align="center">**Implications and Recommendations for Policy and Practice**</div>

The implementation of improvement science to achieve goals and impact student outcomes for all students and specific student groups within the SPSA is the biggest change in practice within TUSD for a generation. A thorough analysis of the conditions of implementation

at the district level, and conditions that lead to high quality, iterative PDSA cycles at the school level could be invaluable to practitioners at TUSD, from teacher teams, principals, curriculum coaches and principal supervisors all the way up to the superintendent. Moreover, there are many other school districts which are implementing improvement science which could learn from the implications from the study.

This study may also be relevant to the improvement science community in education, from those who work in continuous improvement in state departments of education, county offices, school districts and schools, to third parties who support improvement science implementation such as CORE Districts and the Carnegie Foundation. This study could also be useful to the academic community who study continuous improvement and how to improve student outcomes at scale.

To effectively implement improvement science at schools, and to effectively engage school based teams in high quality, iterative PDSAs, the following recommendations should be taken into account:

- Size up the context for improvement to judge the scale of implementation. This is done by juxtaposing capacity to implement and willingness to engage. If in doubt, start small. Both capacity and will to scale up can be built during small scale implementation.

- Having expertise and support from a third party can help strengthen implementation. Adequate time and support should be provided to build internal capacity for all groups, including district leadership who are guiding the work, school based teams including teachers who are doing the work, and district capacity supporting teams, such as the curriculum and instruction department who support the work at school sites.

- The climate for change is key. If the change-climate is low, organizations can expect to be met with either inertia or resistance. Taking the time and effort to garner consensus on a focused direction is paramount to ensure participants engage authentically in the work.

- Organizations should create the conditions for strong internal accountability (trust, collaboration, non-judgmentalism, safe environment to question and make mistakes) before increasing external accountability (transparency, mandated deliverables).

- Organizations should make use of a change management framework, such as Fullan's Coherence Framework to guide the organizational change process. Taking time to build a focused direction which is shared and owned by stakeholders and at the same time creating a culture of collaboration is the best starting place. The change climate can be monitored and adjustments can be made as appropriate. Indeed, the implementation of change could be an aspect that the organization applies the tenets of improvement science to.

Recommendations For Future Research

Given the limited research on wide scale implementation of improvement science within K-12 education, this would be an obvious place to start. The use of continuous improvement in education continues to gain traction within school districts and the California county offices of education which support schools and districts in differentiated assistance to improve on poor outcomes. Opportunity gaps for underserved student groups such as students of color, EL students, students with disabilities and homeless and foster students are reported to have increased during the COVID 19 pandemic, and schools and districts must develop methods to raise the bar and close the gap for all students. However, the manner in which schools and

districts go about implementation of improvement science to achieve this aim is an understudied area.

Secondly, there is even less research that exists on the leadership conditions at school sites to support high quality, iterative PDSAs. If schools are going to be able to improve independently, then capacity has to be built in those closest to the work, to engage in cycles of inquiry. This then begs the question of how to create the necessary conditions to accomplish this.

Conclusion

The conclusion of this study includes the positive and negative aspects of how improvement science was implemented at TUSD from the district level to schools, which is research question 1, and then frames the leadership conditions at the school level that support high quality, iterative PDSA cycles, which is research question 2.

Aspects Which Helped Improvement Science Implementation At TUSD

- Having time and training support from a third party helped principal supervisors grow into their role as providers of improvement science professional learning.
- Significant capacity to implement improvement science was built in invested principals, and curriculum and instruction support staff.
- Invested principals developed a shared sense of accountability to their peers and supervisors for implementing the work.
- Improvement teams at invested school sites developed a common set of effective practices to engage in continuous improvement.

Aspects Which Hindered Improvement Science Implementation At TUSD

- Many principals st TUSD did not engage authentically with the work of improvement science.

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- The contentious relationship between the district and the teachers union stopped teachers from receiving high quality, professional learning from CORE Districts. This resulted in teachers having less than adequate training to effectively engage in PDSA cycles.

- Principal supervisors were not given the time to become proficient at improvement science before they were responsible for training principals.

- The district led with external accountability, mandating principal engagement in improvement science without first building the conditions for strong internal accountability.

- Very few schools engaged in high quality, iterative PDSA cycles.

Leadership Conditions At The School Level That Support High Quality, Iterative PDSA Cycles

- Principals took an active role in the improvement team and championed the effort

- Principals were collaborative, and spent time coming to consensus amongst their improvement teams on a focused direction.

- Principals created a safe environment for teachers to take risks and to learn from failure.

- Time and resources were invested in building teachers' collective capacity to improve.

- Success was used as a catalyst to deepen and broaden the work.

- Principals spent a lot of effort and resources on creating a collaborative culture, which strengthened the conditions for strong internal accountability. Accountability was further bolstered by the use of external accountability, in the form of transparency and deliverables. The conditions for strong internal accountability preceded the use of external accountability.

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APPENDICES

Appendix A: TUSD Cycle of Continuous Improvement

Cycle of Continuous Improvement (CCI)

Step of the CCI	Definition / Main points
1. Needs Assessment	- Used to make a compelling argument of need - Used to prioritize needs - Involves statements of fact - Requires an inquiry process - Ends in a problem statement which needs to: - Define a problem - Identify a target population - Include baseline data
2. Causal System Analysis	This analysis involves "seeing the system" that produces the current outcomes. Involves building a fishbone diagram by following the steps below: **1.** Start with a problem statement (from needs assessment) **2.** Identify root causes and contributing factors **3.** Quality control iterations - Eliminate factors that are not within our control (Influence/impact, student/adult) - Check root causes/contributing factors - Avoid solutionitis **4.** Identify the tenet for each root cause **5.** Determine the highest priority root cause to resolve, based on our ability to impact the root cause * See "How to build a fishbone diagram" for more details
3. Research Practice Calibration	Focused on exercising the muscle to temper the desire to implement solutions without demonstrating a solid base of understanding of the: Problem being solved; Academic, technical, and/or clinical expertise that informs the problem being solved; or Working theory of practice improvement for the problem being solved.
4. Improvement Aim	- Based on solving the highest priority root cause from the causal system analysis - Answers the question, **"What are we trying to accomplish?"** and clearly specifies how much, for whom, and by when.

	- We use a related indicator to measure the improvement aim (see measurable outcomes) - Is the starting place for a driver diagram and is the focus aim
5. Change Idea	Developed through a driver diagram and involves the following steps: 1. **Proposing change ideas designed to achieve the improvement aim** 2. Determining the highest priority *change idea* to implement, based on which *change idea* will have the greatest effect on the improvement aim, and on our ability to implement the *change idea* successfully. 3. Listing actions and milestones needed to operationalize the change idea
6. Change Idea Prediction	A prediction declaring the impact that the *Change Idea* will have on your selected SQII/PATAI subelement. This is the large scale improvement we are seeking.
7. Measurable Outcomes	The *measurable outcomes,* (indicators and related indicators) are a sequenced set of smaller scale indicators that the **change idea can be measured by**. These *measurable outcomes* need to be proposed by the team and there needs to be a direct correlation between the *measurable outcomes* and the subelement in the change idea prediction (a sequenced set of small scale changes leading to a larger scale change). The *measurable outcomes* need to be closely monitored throughout the change idea implementation. Based on your *Improvement Aim*: 1. Propose language for an *overarching SQII indicator* that would allow you to attribute the achievement of the *Improvement Aim* to your *Change Idea*. 2. Based on your proposed *overarching SQII indicator*, list the *related SQII indicator(s)* that already exist or must be created to monitor sequentially and eventually populate the *overarching SQII indicator*.

8. Coherence Check	Designed to encourage you to pause and reflect about a number of critical questions that require clear and specific answers. These questions should serve as the basis for a discussion with your supervisor and partner stakeholders who will be involved in your improvement effort.
	    Do you have a deep understanding of the problem that you are seeking to resolve?
	    Does the *Improvement Aim* specify what you are seeking to accomplish?
	    Is the *Change Idea* tied to a *Root Cause* that will result in direct impact to your *Improvement Aim?*
	    Is your *Change Idea* viable given your organizational capacity?
	    Do you have a sequenced set of related indicator(s) that you can measure between the implementation of your *Change idea* and when your proposed overarching SQII indicator is populated?
	    Assuming you successfully implement your *Change Idea*, will you be able to attribute an improvement to your proposed overarching SQII indicator to your *Change Idea*?
	    Is your *Change Idea* prediction realistic and reflective of the total impact of the *Change Idea* on the subelement ?

9. Plan Do Study Act (PDSA) Cycles	Begins with articulating a *Change Idea* and declaring a *Change Idea* prediction about what we expect will happen **(Plan)**. Assuming a *Change Idea* is implemented **(Do)**, the next step is to compare actual results to a *Change Idea* prediction **(Study)**. What you do with the results **(Act)** becomes the basis for the next *PDSA Cycle* by **deciding whether to adopt, adapt, abandon, or scale** a *Change Idea* or the action steps required to implement the *Change Idea.*

Appendix B: Rubrics for High Quality Iterative PDSA Cycles

Rubric for High Quality Iterative PDSAs

The PDSA rubrics were informed by the Carnegie Foundation for the Advancement of Teaching Improvement Science 1 pagers.

School Name:
Type of School:

Facet	Y/N (Must have all Y's to be considered)
Has the school documented at least 3 PDSAs?	
Do the PDSAs follow logically on from one another? Are they iterative?	
Does the quality of the PDSAs improve over time? Do the scores improve or at least stay the same?	

PDSA 1

Facet	Description	Number of possible points	Score
Plan section	- Plan for execution of the test is clear and replicable - The change idea is small and specific - Predictions are clear, specific and falsifiable - Data collection plan is clear	4	
Do Section	Includes - Includes observations - Any failures, errors or surprises are noted - Data collection is complete	3	
Study	- Results from predictions are recorded - Learning is summarized	2	
Act	A next step is identified (Repeat, adapt, adopt, or abandon)	1	
Total Score		10	

PDSA 2

Facet	Description	Number of possible points	Score
Iteration	● Does this PDSA logically iterate from the previous PDSA? (If no, stop here)	Y/N	
Plan section	● Plan for execution of the test is clear and replicable ● The change idea is small and specific ● Predictions are clear, specific and falsifiable ● Data collection plan is clear	4	
Do Section	Includes ● Includes observations ● Any failures, errors or surprises are noted ● Data collection is complete	3	
Study	● Results from predictions are recorded ● Learning is summarized	2	
Act	● A next step is identified (Repeat, adapt, adopt, or abandon)	1	
Total Score		10	

PDSA 3

Facet	Description	Number of possible points	Score
Iteration	● Does this PDSA logically iterate from the previous PDSA? (If no, stop here)	Y/N	
Plan section	● Plan for execution of the test is clear and replicable ● The change idea is small and specific ● Predictions are clear, specific and falsifiable ● Data collection plan is clear	4	
Do Section	Includes ● Includes observations ● Any failures, errors or surprises are noted ● Data collection is complete	3	
Study	● Results from predictions are recorded	2	

	● Learning is summarized		
Act	● A next step is identified (Repeat, adapt, adopt, or abandon)	1	
Total Score		10	

Appendix C: Interview Protocols

Research Questions

1. How is improvement science being implemented at TUSD, from the district level to
   schools?

2. What are the leadership conditions at the school level that support high quality, iterative
   PDSA cycles at schools?

Individual Interviews for RQ1

1. Senior level district leadership - up to 4 total

   ○ Instructional Assistant Superintendents (IAS)

Individual Interviews for RQ1 and RQ2

1. Purposeful sample of Curriculum and Instruction Staff - up to 6 total

   ○ ELA coordinator

   ○ Math coordinator

   ○ SEL Director

   ○ Training specialists who supported schools which were successful in completing
     high quality, iterative PDSA cycles

2. Purposeful sample of principals - up to 5 total

   ○ Those whose teams engaged in high quality, iterative PDSAs. Based on
     document analysis

Interview Protocol

Date/Time of Interview:_____

Interviewer Name: Matt Turkie

Respondents Names: _____

Interview method: If the interviews cannot be in person, then I will use Zoom

Opening Protocol, Introduction and Interview Process

1. Provide participants with unsigned version of the Consent Form to keep. This will be
   emailed in advance if the interviews cannot be in person.

2. Read Preamble:

    a. My name is Matt Turkie, and I'm a doctorate student at UC Davis. Today is [fill
       in date] and we are at [fill in location] talking with [fill in names]. Thank you all
       for talking with me today. The reason I asked you to participate in this focus
       group is to hear about your experience in the implementation of improvement
       science at TUSD.

    b. We will spend at most an hour and a half together, and I am going to be asking
       you all some questions about implementing improvement science at Sac City. I
       will be recording the interview so I can transcribe and analyze the data, look for
       themes and report findings. I will change your name and will not use any
       identifying information to protect your identity. Your individual responses will be
       combined with others so your identity will not be revealed.

    c. All recordings and notes will be securely kept.

    d. Your participation and answers are voluntary and you can stop at any time.

    e. Do you have any questions before we begin?

Individual Interview Questions for Senior Level District Leadership

1. While there are lots of legitimate reasons for Sac City to be engaged in improvement science, what are the ones which you personally are prioritizing? (How are you making meaning out of improvement science? What does improvement science mean to you?)

2. Can you describe the process which you go through to help principals implement improvement science? (What within that learning was the most impactful for you?What makes you say that? Is it more collaborative or directive?)

3. Tell me about a time when your coaching of an individual principal or group of principals went well. (What did it look like? How do you know?) - (*What impact did it have on the team? Does it enable learning that is engaging? Does it inspire? Does it enable learning that will stick with you? Does it enable learning which you think is important/significant?*)

4. Tell me about a time when your coaching of an individual principal or group of principals did not go well. (What did it look like? How do you know?) - (*Does it enable learning that is engaging? Does it inspire? Does it enable learning that will stick with you? Does it enable learning which you think is important/significant?*)

5. What are the motivating factors that encourage your principals to implement improvement science to the best of their ability? (What makes you say that? In what manner are those you coach/lead, held accountable for implementation? Is there a feeling of shared responsibility? Or do people do it just because they have to out of a sense of compliance?)

Interview Questions for Principals (RQ1 and RQ2 Focus)

1. While there are lots of legitimate reasons for Sac City to be engaged in improvement

science, what are the ones which you personally are prioritizing? (How are you making

meaning out of improvement science? What does improvement science mean to you?)

2. Can you describe the process which you have been through to learn about improvement

   science? (What makes you say that? Is it more collaborative or directive?)

3. How about your improvement team? What was the process they went through to learn

   about improvement science and how to implement PDSAs?

4. Tell me about a time implementing PDSAs with your improvement team when things

   were going really well. (What did it look like? How do you know?) (*Does it enable*

   learning that is engaging? Does it inspire? Does it enable learning that will stick with

   you? Does it enable learning which you think is important/significant?)

5. How about a time when things were not going well? What did that look like? What was

   the reason for the difference do you think?

6. What are the motivating factors that encourage you and your improvement team to

   implement improvement science and specifically PDSA cycles to the best of your ability?

   (What makes you say that? In what manner are you/your team held accountable for

   implementation? Is there a feeling of shared responsibility? Or do you do it just out of a

   sense of compliance?)

7. What, in your opinion, has helped with effective implementation of PDSAs at your

   school site? (What makes you say that?) (May not need to include.)

Interview Questions for Curriculum and Instruction Focus Group (RQ1 and RQ2 Focus)

1. While there are lots of legitimate reasons for Sac City to be engaged in improvement

   science, what are the ones which you personally are prioritizing? (How are you making

meaning out of improvement science? What does improvement science mean to you?)

2. Can you describe the process which you have been through to learn about improvement science? (What makes you say that? Is it more collaborative or directive?)

3. How about improvement teams you support? What was the process they went through to learn about improvement science and how to implement PDSAs?

4. Tell me about a time when you were implementing PDSAs with an improvement team and things were going really well. (What did it look like? How do you know?) (*Does it enable learning that is engaging? Does it inspire? Does it enable learning that will stick with you? Does it enable learning which you think is important/significant?*)

5. Tell me about a time when you were implementing PDSAs with an improvement team and things were not going really well. What was the difference? (What did it look like? How do you know?) (*barriers etc.*)

6. What are the motivating factors that encourage you and those you support to implement improvement science and specifically PDSA cycles to the best of your ability? (In what manner are you/your team held accountable for implementation? Is there a feeling of shared responsibility? Or do you do it just out of a sense of compliance?)

7. What, in your opinion, has helped with the effective implementation of PDSAs at school sites? (May not be needed)

Conclusion & Next Steps

● Thank you all. That was the last question and this interview is now concluded. [END RECORDING]

● Thank you all so much for talking with me and sharing your experiences, and perspectives for

my dissertation

● I will have this recording transcribed, and will then analyze the data along with the other focus

groups I am conducting. As I analyze the data, I may need to clarify something. Would it be

OK to reach out to you for any clarifications?

● When I am finished, I will send a copy of my dissertation to you, if you would like to read it.

● Thank you again. I could not do this without your help. I really appreciate your time and

openness.

Appendix D: Findings and Analysis by Subgroup

Findings and Analysis for Principal Supervisors

Within each group, within each research question, the findings are divided up into the

four components of Fullan's Coherence Framework; focused direction; creating collaborative

cultures; deepening learning; and securing accountability. After presenting the findings specific

for each group, other findings are explored, and then overall findings are presented.

To help with navigation of the findings by group, the following numbering scheme has

been used: G = Participant group, R = Research question, F = Fullan component.

- G1 = principal supervisors, G2 = principals, G3 = Curriculum and instruction
  management, G4 = Training specialists
- R1 = Research question 1, R2 = Research question 2
- F1 = Focused direction, F2 = Collaborative cultures, F3 = Deepening learning, F4 =
  Securing accountability

Findings for Research Question 1

Research Question 1: "How is improvement science being implemented at TUSD, from

the district level to schools?"

Below are the findings, from the perspective of principal supervisors, of how improvement

science was implemented at TUSD. These findings have been divided under the four components

of Fullan's Coherence Framework.

Focused Direction.

- G1.R1.F1.1 - While IS provides a consistent manner for TUSD schools to bring about change, a major reason why TUSD is participating in IS is because it is the Superintendents direction.

- G1.R1.F1.2 -There was wide variation in how principals engaged in the work. Not all principals believed this was the way the district should be going about change. The feeling from some principals was that this was the district's direction, but they did not own it. What was being taught was not being authentically put into practice by a considerable amount of principals. Rather than engaging with teacher teams in an authentic manner, some principals chose to simply complete any deliverables on their own. Whereas other principals went through an authentic collaborative process with their teams and engaged in the work fully. Those principals who leaned into the learning found it easier to successfully complete their SPSA's and mid year reviews and in seeing a more positive impact.

"obviously there's variation, but I think that the people that have been doing it for two or three years now definitely see a positive impact."

Creating Collaborative Cultures.

- G1.R1.F2.1 - Principals engaged in learning about improvement science from a variety of sources:
    - Monthly principal meetings (all)
    - Reading "Learning to Improve" by Bryk et al (2015) (all)
    - Trainings with CORE Districts (some)

- G1.R1.F2.2 - Including principals in the work in a more collaborative manner increased the level of learning for principals. Trust between principals was necessary for this to happen

  "I'd have principals present their work. We would give about 10 to 15 minutes for that principal to kind of show this is the PDSA we engaged in and this is what we found, and they were imperfect. And then we're sharing. That's when I saw that ability of this being able to grow bigger"

  "When principals feel ownership over whatever it is that they're doing at their sites and when they're meeting with others and others challenge or question or prod a little bit. And I think the group that I work with. We've developed a good enough trust with each other and maybe camaraderie...When they feel enough comfort with whatever it is that they're we're discussing whether it's a PDSA or whether it's just the change idea itself or being able to see the process and they're able to sort of challenge each other to think clearer or to take an extra step. Which is what we need. We need people that we trust, that we value to ask us those kinds of questions."

- G1.R1.F2.3 - Good professional relationships and trust between principal supervisors and principals was important.

  "You've got to build a relationship where a principal can feel that they can be totally honest with you so that they will allow you to coach them that they'll listen to that coaching"

- G1.R1.F2.4 - Structures were in place to support the work over multiple years. Monthly whole group principal meetings and then individual or small group check ins.

- G1.R1.F2.5 - The poor relationship between the district and the teachers union was a barrier to progress for some school sites. Some principals were unable to successfully engage their teachers in the improvement science process because teachers did not want to go along with a district led initiative

Deepening Learning.

- G1.R1.F3.1 - The principal supervisors leading the work had a steep learning curve the first year of implementation (18-19). As such, much of the teaching was mechanical, and less effective which resulted in the learning in the first year not sticking with many principals.

"I think we got off to a rocky start with improvement science. As a group, pretty mechanical. I look back at that and think, Oh my gosh, I might as well have just been a talking robot,".

"Unfortunately, we had very little impact on principals the first year."

- G1.R1.F3.2 - The second year of learning (19-20) was much more effective. The district partnered with CORE, a third party to train both the principal supervisor team and teams of principals which helped with implementation. Having the 3rd party directly teach groups of A Supes and principals and C&I staff helped support the train the trainer model

"You know when you haven't taught it before. You're not always that good at answering the questions and directing the conversation. But once you've practiced it, done it, failed at it, then cleaned it up a little bit and succeeded at it, you're much more comfortable teaching it. And I think that was what came through to the principals.".

"That second year. I think people grasped it a little bit more and realized that it was here to stay."

- G1.R1.F3.3 - IS provided deep learning for principal supervisors, who began to think through an IS lens, and use the approach where it was not mandated.

  "It really is powerful when you're actually the one using it. When you're the one leading it within your own work."

  "I am very appreciative of having been part of the process of improvement science because I'm applying it within my own work."

  "So I think this is the route to go and you know I'm a believer now, so it's good."

- G1.R1.F3.4 - Engaging in the implementation of improvement science gave improvement teams a common set of effective practices.

  "I've always felt that all of our schools operate on kind of their own island and have always done what they want to do. So this is one way to bring a district together and all go through a similar process to bring about change."

  "It provides some consistency and an overarching platform. I think a system, any system, but a system our size needs to have some consistency and some common language and common focus. And so I see improvement science in that regard."

Securing Accountability.

There were multiple factors that motivated principals to engage in the work. Some of these factors were external:

- G1.R1.F4.1 - Principals had to do it because they were required to by the Superintendent and by their direct supervisors. As mentioned previously, not everyone felt that this was the best approach. Not everyone was bought in.

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- G1.R1.F4.2 - Homework and deliverables were collected from principals. Compliance was enforced through external accountability from senior management to principals. Additionally, external advisory groups who would inspect SPSA's and expect to see certain things in them provided external pressure.

  "You know, there was always all of the threatening emails and and follow up"

  "You have all these external groups, reading them (SPSA's). And I think that added another layer of accountability"

However, there were some elements of internal accountability found:

- G1.R1.F4.3 - Collaboration between principals during principal meetings on IS increased the amount of shared accountability towards one another.

- G1.R1.F4.4 - Some principals became motivated to continue with the use of improvement science by seeing improved student results and changes in teacher behavior, which strengthened internal accountability.

  "Principals were motivated by seeing changing student outcomes. Actually for many of my principals seeing changes in teacher behaviors to become better teachers and therefore student outcomes. yes, they want their students to perform better, but I think they're real pleasure is watching teachers teach better and engage with students better and see those student results and therefore get jazzed by their own teaching and want to go back in and do it again and again."

  "I think the more they see it having an impact on their teachers and students, the more they believe in it. It has taken time to get to this place."

Findings for Research Question 2

Research Question 2: "What are the leadership conditions at the school level that support high quality, iterative PDSA cycles at schools?"

Below are the findings, from the perspective of principals supervisors, of the leadership conditions that support high quality, iterative PDSAs at school sites. These findings have been divided under the four components of Fullan's Coherence Framework.

Focused Direction.

- G1.R2.F1.1 -Trusting relationships and a collaborative approach between the principal and teachers were central to being able to move the work at school sites

- G1.R2.F1.2 - Principals practiced loose tight leadership

  "Allowing teachers to explore for a while on their own, but not sort of frivolously. Sharing what we know is good evidence based practice e.g. here are four research based strategies that you can try"

Creating Collaborative Cultures.

- G1.R2.F2.1 - The principal/site admin were hands-on, leaned into the work, and worked directly with a team of teachers. Principals worked and learned alongside teachers, and were open to where true authentic collaboration took them. This got teacher buy-in from the start of the process. Choosing a department or grade level team of teachers who were used to working together helped.

- G1.R2.F2.2 - Principals partnered with their training specialist to work with their teacher team

- G1.R2.F2.3 - Principals took advantage of extra support wherever they could, from partnering with their training specialists to having extra support from outside agencies such as Gear Up.

- G1.R2.F2.4 - Principals provided a safe environment for teachers to take risks and modeled vulnerability and making mistakes. This modelled an openness to the improvement science process for teachers.

  "Principals have to be willing to engage in a conversation that they don't know exactly how it's going to turn out on the other side and be willing to model the fact that they're not always perfect. I always try to highlight something that I did. That was a disaster. Something that I tried that didn't work. And what I learned from that. And I think the more that we can model the mistakes we've made, the more authentic the relationship is and the coaching can be."

- G1.R2.F2.5 - Teacher teams which were really honest with one another were more successful

- G1.R2.F2.6 - The principal provided the necessary resources, such as regular collaborative time, substitute release time and technical support from themselves or training specialists for teacher teams to be successful.

  Deepening Learning.

- G1.R2.F3.1 - The use of common language, common expectations and known and understood processes to go about the work helped teacher teams succeed

  "The principal did a really nice job with the training of individuals and the expectations set for the individuals. So that was expectations. The language was a common language. There was a consistency. There was a process identified, there was knowledge of the framework that was being used to identify these strategies."

  Securing Accountability.

- G1.R2.F4.1 - The heavy emphasis on creating collaborative cultures at successful sites led to a strong sense of shared responsibility.

  "This principal leaned in and had a team of people that were leaned in. The team was very, very supportive of the process …. and I felt that that was very successful in the way he was able to engage his team around this work."

  "I know the principal was hands on. As were both of the assistant principal. So you had all three of the leadership team working directly with their math department. So I think that that had some instant buy in from their team."

Findings and Analysis for Principals

Findings for Research Question 1

Research Question 1: "How is improvement science being implemented at TUSD, from the district level to schools?"

Below are the findings, from the perspective of principals who had success with the implementation of PDSAs, of how improvement science was implemented at TUSD. These findings have been divided under the four components of Fullan's Coherence Framework.

Focused Direction.

- G2.R1.F1.1 - Although improvement science provided a common process and a common language for schools to go about improving outcomes, not all principals were on the same page. Not all principals believed that this is the way we should be going about change. The feeling from some principals was that although this was the district's direction, they did not own it or believe in it.

- G2.R1.F1.2 - Having too many initiatives is a barrier to implementing IS

"I mean there's just so much going on all the time. I think the other thing would be Teachers feeling overwhelmed."

Creating Collaborative Cultures.

- G2.R1.F2.1 - There were multiple opportunities provided by the district for principals to learn more about IS, while not all principals took advantage of these opportunities, each of the successful principals interviewed took the most from the learning opportunities offered to them and combined this learning with actually doing the work in an authentic manner.

"So I took all the opportunities that came up to learn more about improvement science." The structures which the successful principals took advantage of to learn about IS, included the following:

    - Monthly principal meetings (all)
    - CORE sessions (all)
    - Self study, including reading "Learning to Improve" by Bryk et al (2015) (all)
    - PELP (some)
    - Gear Up (some)
    - SPSA work group (some)

- G2.R1.F2.2 - The monthly principals meetings and the CORE sessions were found to be very useful in building principals' capacity. These sessions gave principals an opportunity to learn the process and to collaborate with colleagues. Collaborating with peers was very useful to build principal capacity

- G2.R1.F2.3 -Having the curriculum and instruction support staff (training specialists and coordinators) being trained at the same time as principals was very useful, as each of the principals worked with their Training Specialist to train their staff.

- G2.R1.F2.4 -Actually doing the work in an authentic manner was key to learning:

  "The key is actually doing it yourself. The practical part of it and just getting dirty I think is the best way to learn"

- G2.R1.F2.5 -District/union issues are a barrier to the implementation of IS

  "Teachers are rebelling against anything the district is asking them to do."

Deepening Learning.

- G2.R1.F3.1 - IS provided deep learning for principals, who began to think through an IS lens, and use the approach where it was not mandated.

  "It just seems to make so much sense, running these PDSAs and, you know, making sustainable change"

- G2.R1.F3.2 - The structures and processes put in place by the district that principals took advantage of helped build a common set of effective practice

Securing Accountability.

- G2.R1.F4.1 - For the successful principals, internal accountability was strong and helped with learning about IS and implementing IS - feeling accountable to one's colleagues and to one's supervisor. The use of having deliverables at each principals meeting as external accountability helped too.

  "I felt accountable to my colleagues and my IAS to do the work. So it goes along with the deliverables and being held accountable to your colleagues I think for a lot of us. That's a

big motivator, you know, is I want to be a team player, and I want to be accountable to my colleagues."

Findings for Research Question 2

Research Question 2: "What are the leadership conditions at the school level that support high quality, iterative PDSA cycles at schools?"

Below are the findings, from the perspective of principals who had success with the implementation of PDSAs, of the leadership conditions that support high quality, iterative PDSAs at school sites. These findings have been divided under the four components of Fullan's Coherence Framework.

Focused Direction.

- G2.R2.F1.1 - Each of the successful principals were individually bought into the process and were champions of IS. Improvement Science was seen as a way to focus the work of teachers and capitalize their collective efficacy on a common problem, and to use common processes and tools to solve the problem.

- G2.R2.F1.2 - Each principal started with a small team of teachers with the right mindset who were used to collaborating as an effective team.
  "People understanding the need to take on roles and responsibilities and working collaboratively…... And just understanding how to work together as a group and trusting one another, I think, has to be there".
  Each principal then planned to use that team to help expand the work to other teams/depts.

- G2.R2.F1.3 - Team building, trust and relationships were seen as very important factors in facilitating a high functioning team. In the difficult climate of the school district,

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personal relationships between the principal and teachers were seen as having paramount importance.

"I've got some folks who are just militant, and anti and thank God they like me, because if that wasn't there, it would be really rough."

- G2.R2.F1.4 - Principals participated as an active member of the team. Each principal worked with their teachers to build consensus on why this was important for the team to do. Principals did not simply mandate it, but guided the work, starting with a common understanding of why this was important for the team to focus on.

- G2.R2.F1.5 - It was the teachers themselves, in collaboration with the principal and Training Specialist who came up with the change idea they were going to try. This meant that buy-in was built in.

Creating Collaborative Cultures.

- G2.R2.F2.1 - Principals and their Training Specialist worked in partnership together to train staff and take them through the IS and PDSA process. Principals and their TS took teachers through the IS process by copying the process they went through in principal meetings and/or CORE meetings. (2 copied the principal meetings, 1 copied the CORE process).

"I mirrored that process with my staff, so I was like one step behind. So I would learn it, come back to my site and do it, you know, and so it helped me lay things out in a very organized fashion as well. I just really kind of followed that CORE methodology, like the way they kind of laid it out in a very systematic and meaningful way. And I think that's what really helped my site."

- G2.R2.F2.2 - Principals made deliberate efforts to create a climate where it was safe to ask questions and to make mistakes. Principals wanted to create a safe to fail atmosphere for teachers to try something new.

"Hey, if we don't make mistakes, we're not pushing ourselves hard enough, you know, because we're setting the bar way too low if it always comes out the way we want it to come out. A big part of learning is making mistakes, but not making those same mistakes over and over. So that's always the mindset I want to give the staff, let's not be afraid to try new things. Let's have a concrete plan for trying this new thing out, but if we crash and burn, that's part of learning. There's no shame in that."

- G2.R2.F2.3 - Facilitating true teacher collaboration was seen as a main part of the process:

"That's the dream. It's not just getting together, but really collaborating where that process is successful."

"And so I just sat back. I didn't say a word. And they just kind of talked with each other and came up with a plan for how they were going to be, you know, adding this portion to their daily routine where they were going to be having these kids write a written explanation of their thinking. They talked about how they were going to collect the data and what they were going to bring back and then they just looked at me. "So did you catch that in the notes?" like yes I did. So I think for me, I felt like they didn't really need me here anymore. I think at that point I realized they understood the process, they understood why it was meaningful, they understood what they were learning from it and doing something with that learning. And I was like, okay, I think we've got this under control."

- G2.R2.F2.4 - Regular meetings were key. Each successful team used the collaborative structures they had in place to move the work forward and substitute teachers were paid for to provide the teachers with release time as needed. Short team huddles of 10-15 minutes were used to check in on change idea implementation, as well as longer, more structured meetings

Deepening Learning.

- G2.R2.F3.1 - Principals found that teachers seeing their efforts being rewarded with success was a real motivating factor for both teachers on the team, and for other teacher teams at the school:

"Teachers can see that a team came together and focused in this way and improved outcomes for kids. If we see success then that breeds success."

"I think the other piece that was very motivating is once they started doing the work, and they started seeing those positive results, they were like on fire."

- G2.R2.F3.2 - Although teachers saw value in the whole process, some teachers did not see the value in some of the processes they went through, and found the data tracking onerous.

"They felt that it was a lot of work, and they felt that tracking data and that whole process was more than what they wanted to do. And to me, that's a lack of understanding."

Principals felt that having more time to train teachers on IS would have been useful. Teacher teams had less time to learn the process than principals and Training Specialists had. Principals would have wanted more time to be able to go through the process in a slower and more deliberate manner.

Securing Accountability.

- G2.R2.F4.1 - Historically poor data was used to motivate teachers as a reason to improve. At the same time principals were empathetic towards teachers about how hard they are working, knowing that teachers want to make a difference, and want to see good results. "When you look at the outcomes that we have been achieving year over year over year, historically speaking, the pattern has essentially been that students are not achieving. So there is no better proof that you need to improve than looking at that…..When you work as hard as these teachers work and make no mistake, they work very hard, but you continually get poor results, that is a feeling that makes it very difficult for quality educators to want to remain in one place, right. And so it's important that teachers feel like the work they're doing is having a meaningful impact….It doesn't feel good when we work that hard and don't succeed. So let's change that."

- G2.R2.F4.2 - Building collective efficacy required considerable effort from some teams, but was seen as important by all principals
"When people have really strong ideas about, *for my kids*, this is what works, instead of these are *our kids,* so that collective responsibility. So I think it's reaching consensus and really saying I don't love this idea, but for the sake of the team, I'm going to go back and I am going to try this and I'm going to try it with fidelity. And we've talked about that in a lot of trainings, just because you've agreed to do something, is it really being implemented with fidelity? So can you really get at whether the results you're getting are authentic and whether they're valid."

- G2.R2.F4.3 - The focus on team building and having a collaborative team working on a shared goal led to team members feeling a sense of accountability to one another, and to the principal.

"By soft accountability, I mean that they knew that we were holding each other accountable to the work we were doing."

"At least for me, and I think it's the same for the staff is just being held accountable to your colleagues, you know that hey, if they're asking me to do this, then I don't want to let my colleagues down."

- G2.R2.F4.4 - The soft or internal accountability was backed up with external accountability.

"They saw each other at their team meetings, they had to bring their data to the team meetings. I was present. I can see who's attending and who's got their data. But also, you know, my commitment to giving them the feedback they needed when they implemented that PDSA."

Other Limitations/Barriers to Progress.

- The COVID 19 shutdown stopped teacher teams performing PDSAs. While it could technically have been possible to continue with PDSAs during distance learning, this did not happen, as teachers and principals struggled with the new landscape of distance learning. If any PDSAs did occur, they were not documented.

Findings and Analysis for C&I Management

Findings for Research Question 1

Research Question 1: "How is improvement science being implemented at TUSD, from the district level to schools?"

Below are the findings, from the perspective of curriculum and instruction management who supported the work, of how improvement science was implemented at TUSD. These findings have been divided under the four components of Fullan's Coherence Framework.

Focused Direction.

- G3.R1.F1.1 - Not everyone is invested in the use of IS. Some do it only out of a sense of compliance. This is true of all groups within the district, including training specialists and principals:

"We have people who are actively resisting"

- G3.R1.F1.2 - As training specialists engage in the work of IS with teacher teams, more come to believe in it. This is heavily dependent upon school site leadership however, and if they are invested in the work. Even after two years, some principals had not even mentioned the use of IS to their teachers.

- G3.R1.F1.3 - For those that are invested in IS, the reasons to be involved have become clearer, which include common messaging, common processes and a set of common practices to find out what works and what doesn't to improve student outcomes.

Creating Collaborative Cultures.

- G3.R1.F2.1 - All of the curriculum and instruction management learned about IS from multiple sources, which made the learning more effective as they got multiple doses from multiple perspectives. The structures within which the curriculum and instruction management learned about IS included the following:
    - CORE Sessions (all)
    - All C&I meetings (all)
    - Reading Learning to Improve (all)
    - Inclusion in principals meetings - Coordination with principal supervisors was important. (all)
    - Math in Common (some)

- G3.R1.F2.2 - The training specialists learned about IS through multiple sources as well, which included the following:
    - CORE Sessions (all)
    - All C&I meetings (all)
    - Reading Learning to Improve (all)
    - Dept. meetings (all)
    - Math in Common (some)
    - Being on school site improvement teams (some)
- G3.R1.F2.3 - The learning of IS was most effective when it included the following:
    - Sharing real exemplars
    - Trying it out themselves and doing the work with their teams.
    - learning together with others in a structured process.
- G3.R1.F2.4 - The relationship between the district and the teachers union has been a barrier to the work.

"There's a very contentious relationship between sites and the district. And so I think anytime site leaders, try to bring district learning to their sites, you're going to have people that are gonna be like, Nope, that's from the district"

Deepening Learning.

- G3.R1.F3.1 - The effect of learning IS on curriculum and instruction management and training specialists was that they became better at critical thinking and finding out what works and why. They have also developed an improvement mindset.
- G3.R1.F3.2 - Engaging in the implementation of improvement science gave improvement teams a common set of effective practices.

"Our district has lacked a cohesiveness about how we operate and do things, particularly making decisions. And so, having this process by which we can achieve and arrive at decisions that are based in data and are good for teaching and learning is something we needed and so improvement science brings that to us and it's something that I see that can be done when we're looking at, if you will, a district wide lens versus a more of a school site or even a classroom lens so it has that ability to be all these particular groups or ways of looking at things can still use that same methodology."

Securing Accountability.

- G3.R1.F4.1 - For many years now TUSD has had an opt-in culture, where schools and leaders could choose whether to implement a districtwide initiative. This opt-in culture has carried through to the implementation of IS. There is a feeling that more accountability is needed.

"How are we holding our leaders accountable for doing the things that we say they ought to do? And then how are they holding their teachers accountable for doing the things that they say they are supposed to do?"

Findings for Research Question 2

Research Question 2: "What are the leadership conditions at the school level that support high quality, iterative PDSA cycles at schools?"

Below are the findings, from the perspective of curriculum and instruction management who supported the work, of the leadership conditions that support high quality, iterative PDSAs at school sites. These findings have been divided under the four components of Fullan's Coherence Framework.

Focused Direction.

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- G3.R2.F1.1 - The principal made the use of IS a priority and made the necessary resources available.

  Mandating the use of IS to plan and implement the first goal within each school site's SPSA helped make IS a priority. Successful schools started small with one goal, and one improvement team of teachers who were interested in doing the work.

- G3.R2.F1.2 - The IS work was prioritized by the team of teachers as well as the principal

- G3.R2.F1.3 - Trusting relationships was seen as key to success. Trusting relationships between and amongst the principal, training specialist and teachers. Teams who were more successful with the implementation of PDSAs were typically teams who had collaborated together for a number of years previously, and already had trusting relationships established.

- G3.R2.F1.4 - While the principal was there to guide the work, teacher teams had a certain degree of choice and autonomy - this led to teachers feeling valued and aided in motivation. It also led to a sense of shared accountability.

  Creating Collaborative Cultures.

- G3.R2.F2.1 - School leaders practiced a growth mindset with both their teachers mindsets, and with creating a safe place to fail - both of these are very important for IS. "There's a lot of people that are naysayers with the work from the beginning, but once they see growth and they feel supported and they feel like, Oh my gosh, I did that and I'm teaching others and they're teaching me then this can actually be very effective for everybody involved."

  "learning from failing forward...As long as you're trying things and you're looking at is it really improving things for students"

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- G3.R2.F2.2 - Having school site leaders who were actively engaged and involved was of paramount importance. The principal is needed to set the tone and the expectations.

- G3.R2.F2.3 - Principals removed barriers for teachers to engage successfully in the work. Necessary resources such as subs and time and access to content experts were provided to teacher teams.

  "Making sure that whoever's moving the work feels like they can move the work right. You have the systems in place, you have the supports, you have the resources. And you provide the time for a lot of reflection, so that people can grow and change."

- G3.R2.F2.4 - Successful principals partnered with their assigned C&I training specialist or coordinator to train teacher teams in IS and to lead them through the PDSA process. Within this partnership, some principals led the work themselves and set the agenda, while in others teacher leaders and training specialists would take more of a leadership role. Training specialists often helped with some of the more technical aspects of the work such as data analysis and presentation

- G3.R2.F2.5 - Each successful team had a structure of regular meetings to focus on the implementation of IS and PDSAs.

  Deepening Learning.

- G3.R2.F3.1 - Engaging in the processes of IS has had a lasting impact on teachers. The teachers involved talk more about teaching content to one another:

  "Based on the work we did to build the structure of how they meet impacted them because I know that they still bring student work to their meetings on a regular basis. That is something they look at to compare what they're doing in their classrooms right and talk about what they're doing their classrooms and that wasn't happening before"

- G3.R2.F3.2 - Having success and seeing improvement was motivating for both teachers and training specialists. It also made teachers who weren't involved, want to become involved.

"They want to know they're winning."

Securing Accountability.

- G3.R2.F4.1 - For the successful schools, buy in and motivation increased as teachers found success with the process. The strong emphasis on capacity building and collaboration led to strong internal accountability.

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Findings and Analysis for C&I Training Specialists

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Findings for Research Question 1

Research Question 1: "How is improvement science being implemented at TUSD, from the district level to schools?"

Below are the findings, from the perspective of training specialists who supported the work at successful schools, of how improvement science was implemented at TUSD. These findings have been divided under the four components of Fullan's Coherence Framework.

Focused Direction.

- G4.R1.F1.1 - Improvement science provided a common process and a common language for teacher teams to go about improving outcomes.

Creating Collaborative Cultures.

- G4.R1.F2.1 - The training specialists learned about IS through multiple sources which included the following:
  - CORE Sessions (all)
  - All C&I meetings (all)

- ○ Reading Learning to Improve (all)

- ○ Dept. meetings (all)

- ○ Math in Common (some)

- ○ Gear Up! (Some)

● G4.R1.F2.2 - The learning of IS was most effective when it included the following:

- ○ Collaborating with team mates and practicing with a context outside of education

- ○ Having the opportunity to learn collaboratively.

- ○ Being part of multiple groups learning IS.

- ○ Professional learning sessions from CORE were very impactful - accordion style teaching - getting some content, and then discussing or trying something out in collaboration with colleagues.

● G4.R1.F2.3 - Principals and training specialists engaging in the same professional learning on IS from the same sources aided with implementation. Principals partnered with training specialists to lead the IS work at school sites and to lead teacher teams through PDSA implementation. Having the curriculum and instruction support staff (training specialists and coordinators) being trained at the same time as principals was very useful, as each of the principals worked with their Training Specialist to train their staff.

● G4.R1.F2.4 - There was a plan for teacher teams to engage in the same training from CORE, along with principals and training specialists, however the teachers union blocked teacher participation.

"That didn't happen because the teachers union didn't like the CORE organization and stepped in to demand to bargain over it and then that bargaining never happened"

This resulted in teachers receiving relatively little training on IS. While principals and training specialists received much training from a variety of sources, teachers received relatively little. Only the few hours of weekly collaborative time or release days

- G4.R1.F2.5 - Some teachers felt that this was another thing they had to do, which was added to their plate. However, teachers did see the value in the use of IS and how it can be used to improve teaching and learning. It was strongly felt that teachers needed more time to be adequately trained in IS and the use of PDSAs.

Deepening Learning.

- G4.R1.F3.1 - The use of IS has helped training specialists become more competent, methodical and effective in their work of supporting and coaching teachers on effective instruction.

" I feel like I've been able to use some of the principles from improvement science to help myself. I think it's made me more systematized in the way I think about improvement in a very general sense, but also in the way I coach teachers"

Securing Accountability.

- G4.R1.F4.1 - The training specialists did not have much to say about securing accountability from the district level to schools in the implementation of improvement science. This makes sense as training specialists are not involved at this level.

Findings for Research Question 2

Research Question 2: "What are the leadership conditions at the school level that support high quality, iterative PDSA cycles at schools?"

Below are the findings, from the perspective of training specialists who supported the work at successful schools, of the leadership conditions that support high quality, iterative PDSAs at

school sites. These findings have been divided under the four components of Fullan's Coherence Framework.

Focused Direction.

- G4.R2.F1.1 - Having a principal who is interested and who engaged in the work with teachers was seen as essential to moving the work forward.

- G4.R2.F1.2 - Training specialists and principals practiced loose tight leadership by presenting teachers with limited options to choose from - and then teachers chose.

- G4.R2.F1.3 - Having trust already built between the teacher team and the training specialist by having been engaged in coaching together was important.

- G4.R2.F1.4 - A culture of collaboration at the school pre-existing the IS work was important.

Creating Collaborative Cultures.

- G4.R2.F2.1 - Teacher teams learned about IS and how to run PDSAs from the principal and the training specialist. At some secondary schools this dovetailed nicely with the Gear Up! work which was happening. The TS also provided technical assistance, such as writing up forms.

- G4.R2.F2.2 - Having a safe to fail culture, where teachers would receive no negative consequences for trying something out and it failing.

- G4.R2.F2.3 - Structures were in place for regular collaboration and substitutes were provided to give time for teachers to engage in the work.

Deepening Learning.

- G4.R2.F3.1 - The use of IS and PDSA cycles with teachers brought an awareness that this could be an effective tool to improve teaching and learning. However, the impact

could have been so much more, with more training for teachers and more time and space

to engage in the work.

"I would say they're still doing aspects of improvement science, though, it just hasn't

been documented or I guess reflected upon from the improvement science lens, but I still

I still think they're using it almost every day. They still want the best for their students.

And they're still making changes to their instruction to try and engage as many students

as they can."

- G4.R2.F3.2 - Teachers really needed more time to learn about IS. Both training

   specialists and principals spent a long time learning about IS from a variety of sources,

   where teachers had only a few hours.

   "I think teachers need much more time to be effective practitioners of PDSA cycles".

   Some of this lack of training for teachers was mitigated by the training specialists and

   principals being the guides and taking the lead in documentation.

   Securing Accountability.

- G4.R2.F4.1 - There is a feeling of shared responsibility by the teachers, even when they

   are tired.

   "I've been to a bunch of their after school meetings and people will show up, you know,

   sort of exhausted from what happened at school that day or you know, whatever is going

   on. Between teachers in the school district and all of that. But they'll still bring their, you

   know, pile of student work and they'll still talk about it the way that they're supposed to.

   And, you know, examine it together. And I think that's the school culture, right, because

   when you really don't want to, but you do it anyway. Then you're doing it because you

   care."

Other Limitations/Barriers to Progress.

- The COVID 19 shutdown stopped the progress of PDSA cycles at school sites.

Other Findings For Research Question 1

The document analysis of PDSAs revealed that only 3 schools out of the 77 in the district had engaged in high quality, iterative PDSAs; one elementary school, one middle school and one high school. The principals of these schools were in different groups, and reported to different principal supervisors. One commonality between the middle and the high school is that both schools were also involved with Gear Up!, a third party which complemented and supported the improvement science work at certain schools.