UC Irvine

UC Irvine Electronic Theses and Dissertations

Title

Examining Practices in the Initiation of a Teacher Preparation Networked Improvement Community

Permalink

https://escholarship.org/uc/item/9jk6q89t

Author

Sandoval, Carlos

Publication Date

2021

Peer reviewed|Thesis/dissertation

eScholarship.org Powered by the California Digital Library
University of California

UNIVERSITY OF CALIFORNIA,
IRVINE

Examining Practices in the Initiation of a Teacher Preparation Networked Improvement Community

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Education

by

Carlos Sandoval, Jr.

Dissertation Committee:
Professor Elizabeth A. van Es, Chair
Professor Louis M. Gomez
Associate Professor June Ahn

2021

Chapter 2 Published with Permission
Copyright 2021 Teachers College Record (www.TCRecord.org)

Copyright 2021 Carlos Sandoval

TABLE OF CONTENTS

	Page
LIST OF FIGURES	iii
LIST OF TABLES	iv
ACKNOWLEDGMENTS	v
CURRICULUM VITAE	vi
ABSTRACT OF THE DISSERTATION	xi
CHAPTER 1: INTRODUCTION	1
CHAPTER 2: Examining the Practices and Tensions of Generating an Aim Statement in a Teacher Preparation Networked Improvement Community	24
CHAPTER 3: Examining Power and Positioning in the Facilitation of Constructing a Shared Theory of Improvement	68
CHAPTER 4: Understanding the Process of Designing a Shared Practical Measurement Tool in a Teacher Preparation Networked Improvement Community	126
CHAPTER 5: CONCLUSION	178
APPENDIX A. Draft of Driver Diagram	197
APPENDIX B. Draft of Practical Measurement Survey	198

LIST OF FIGURES

		Page
Figure 1.1	Framework for Initiating a NIC	31
Figure 2.1	Practices In and Between Backstages and Frontstages	93
Figure 2.2	Categorized Notes from Teacher Educators	96
Figure 2.3	Draft 1 of Network Driver Diagram	97
Figure 2.4	Draft 2 of Network Driver Diagram	106
Figure 3.1	Process Model of Practical Measurement Design	144

LIST OF TABLES

		Page
Table 1.1	Participation by Campus Over Time	37
Table 1.2	Summary of Teacher Educators' Practices.	42
Table 2.1	Data Sources by Meeting Context	84
Table 2.2	Practices by Location	91

ACKNOWLEDGEMENTS

I would like to express my gratitude and appreciation to my committee chair, Professor Elizabeth van Es, for her intellectual guidance, mentorship, and support. I would also like to thank Professor June Ahn and Professor Louis Gomez for their wisdom, insight, and feedback. Finally, I would like to thank Professor Martha Feldman for her thoughts and for helping me to see the value of practices in the work and in the world.

I would also like to extend my deepest gratitude to the love of my life, Leandra, for her support, understanding, and company as I engaged in this process.

Financial support was provided by the University of California Office of the President, Grant ID CA-17-454624 and through the NSF Graduate Research Fellowship Program.

VITA
Carlos Sandoval, Jr.

Education
Ph.D. Candidate, Education (In Progress) | University of California, Irvine
M.A., Education (2020) | University of California, Irvine
B.A., Psychology (2013) | University of California, Los Angeles

Fellowships and Awards
- 2016-21 National Science Foundation Graduate Research Fellow
- 2018-20 California Teacher Education Research and Improvement Network Fellow
- 2019 UCI School of Education Keith Curry Doctoral Award
- 2016 Nevin Graduate Endowment Fellowship

Relevant Work Experience
Consultant, Network Health Project
Dates: August 2020 - Present
- This project is aimed at measuring and providing formative feedback to network leaders that are trying to form and develop networks for school improvement.
- Aid in revising current network health survey and develop new items that center equity and justice in network processes and continuous improvement work
- Aid in refining reporting routines and data visualizations
- Disseminate analysis of the network health data

Graduate Student Researcher for California Teacher Education Research and Improvement Network (CTERIN)
Dates: April 2017 - Present
- Led the initiation of a University of California-wide networked improvement community on improving the preparation of teachers to build on multilingual students' strengths
- Designed a set of improvement measures and facilitated over a dozen conversations around improvement data
- Conducted a literature review on the design of teacher education programs
- Conducted a literature scan on preparing new teachers to work with English learners
- Used literature reviews to collaborate with teacher educators to develop a shared problem and theory of action
- Analyzed classroom video and artifacts from preservice teachers.
- Led the research design of studies examining the processes of this networked improvement community

Graduate Student Researcher for Research Project Examining Teachers' Noticing for Equity

Dates: June 2017 to September 2017

- Organized, transcribed, and content logged teachers' noticing interviews
- Analyzed transcripts and content logs to generate models of teachers' noticing for equity
- Aided in the development of a manuscript to the Journal of Research on Mathematics Education (resubmitted)

Graduate Student Researcher for the Orange County Educational Advancement Network
Dates: June 2018 to September 2018

- Gathered practical resources from existing research for establishing partnerships
- Designed and developed conversation protocols for graduate students new to building partnerships
- Led meetings with graduate students to test and revise conversation protocols

Research Coordinator for the Carnegie Foundation for the Advancement of Teaching
Dates: July 2015 - August 2016

- Lead for the Community College Pathways (CCP) Faculty Support Program
    - Coached community college faculty on using quality improvement methods and tools
    - Designed and developed a measurement system and quality improvement infrastructure
    - Led and facilitated projects for using data to improve the quality of the Faculty Support Program
- Lead for CCP's Instructor Notes Redesign Project
    - Coached a team of Carnegie Foundation staff and community college faculty in user-centered design tools and methods for redesigning CCP's instructor-facing curricular materials
    - Managed the design and testing processes of revised instructor notes, including conducting site visits and collecting data about their use
- Improvement Science Coach for the Carnegie Foundation's External Offerings
    - Coached teams on using quality improvement methods and tools in education
    - Designed and led an improvement science workshop for the New York City Department of Education

Post-Baccalaureate Fellow for the Community College Pathways (CCP) initiative at the Carnegie Foundation
Dates: July 2013 - June 2015

- Analytics, collaborative technology lead for the CCP's Faculty Support Program
    - Designed mechanisms for, collected, aggregated, displayed, and presented improvement data to CCP faculty and Carnegie Foundation staff.
    - Analyzed 50 hours of classroom video for the development of video-based resources for CCP faculty.

- Led user-centered design project with community college math faculty to redesign the Faculty Support Program
    - Employed user-centered design methods and tools to lead and facilitate with CCP faculty the conceptualization and execution of the redesign of the Faculty Support Program.
    - Coached a team of CCP faculty on user-centered design methods and tools.

Publications

- van Es, E.A., Hand, V., Agarwal, P., & **Sandoval, C.** (accepted). Multidimensional noticing for equity: Theorizing mathematics teachers' systems of noticing to disrupt inequities. *Journal for Research in Mathematics Education.*
- **Sandoval, C.** & van Es, E.A. (2021). Unveiling the micropolitics in the production of a shared aim statement in a teacher preparation networked improvement community. *Teachers College Record, 123*(6).
- **Sandoval, C.**, & van Es, E.A., Campbell, S.L., & Santagata, R. (2020). Creating coherence in teacher preparation: Examining teacher candidates' conceptualizations and practices for equity. *Teacher Education Quarterly, 47*(4).
- **Sandoval, C.,** & van Es, E.A. (2020). Complexifying the process of generating a shared aim in a teacher preparation networked improvement community. *Conference Proceedings in the International Conference of the Learning Sciences.*
- Santagata, R., Lee, J., & **Sandoval, C.** (2019). Research practice partnerships in mathematics teacher education. In G. M. Lloyd, & O. Chapman (Eds.), *International Handbook of Mathematics Teacher Education: Vol 3: Participants in Mathematics Teacher Education* (pp. 183-210). Leiden, The Netherlands: Koninklijke Brill NV.
- Edwards, A., **Sandoval, C.**, & McNamara, H. (2015). Designing for improvement in professional development for community college developmental mathematics faculty. *Journal of Teacher Education, 66*(5), 466–481. http://doi.org/10.1177/0022487115602313

Presentations

- Sandoval, C., & van Es, E.A. (2021, April 19-28). Concentrating on power and equity in practices of networked improvement communities. Presentation at the 2021 annual Carnegie Foundation Summit on Improvement in Education.
- Sandoval, C., & van Es, E.A. (2021, April 8-12). Engaging tensions in constructing an aim statement in a teacher preparation networked improvement community. Paper presented at the 2021 annual meeting of the American Education Research Association.
- Sandoval, C., & van Es, E.A. (2021, February 14-17). Practical, improvement-focused measurement in teacher preparation. Presentation at the 2021 annual meeting of the Association of Teacher Educators.
- Davidson, K., Bell, A., Riedy, R., Sandoval, C., … Marin, A. (2020, June 19-23). Preparing researchers to participate in collaborative research. Symposium presented at the 2020 International Conference of the Learning Sciences.

- Sandoval, C. & van Es, E.A. (2020, April 1-3). Improving the preparation of teachers to build on multilingual students' strengths. Poster presented at the 2020 annual Carnegie Foundation Summit on Improvement in Education.
- Sandoval, C. & van Es, E.A. (2019, April 16-18). Improving the preparation of teachers for multilingual students. Poster presented at the 2019 annual Carnegie Foundation Summit on Improvement in Education.
- Sandoval, C., van Es, E.A., Agarwal, P., & Mendoza, E. (2018, November 3). Noticing and positioning to advance equity in mathematics. Conference presentation at the 2018 annual meeting of the California Mathematics Council - South.
- van Es, E.A., Hand, V.M., Mercado, J., Agarwal, P., & Sandoval, C. (2018, April 14). The role of positionality and noticing in advancing equity in mathematics. In D.J. Coffey (Chair), *Identity Exploration Through Critical Moments of Pedagogical Interaction in the Content Area.* Roundtable session conducted at the 2018 annual meeting of the American Educational Research Association.
- Sandoval, C., Edwards, A.R., McNamara, H. (2018, February 22). Learning our way into effective professional development: Networked improvement science in community college developmental math. Conference presentation at 2018 Research on Undergraduate Mathematics Education conference.
- Liu, D., Zinger, D., Lew, L., Sandoval, C., & Godfrey, L. (2017, October 5). Community-based scholarship: Activism on and off the field. Conference presentation at 2017 Digital Media Learning Conference.
- Sandoval, C., Edwards, A., McNamara, H., & Bohannon, A. (2017, April 30). Role of measurement in defining and continuously improving quality professional development in developmental mathematics. In A.R. Edwards (Chair), *Taking the 'Measure' of Networked Improvement Communities: Examining the role of measurement across a NIC.* Symposium conducted at the 2017 Annual meeting of the American Educational Research Association.
- Sandoval, C., Edwards, A., & McNamara, H. (2016, April 12). Tests of change in the continuous improvement of professional development for community college developmental mathematics. In A.R. Edwards (Chair), *Problem-Disciplined Practice-Based Inquiry for Improving Mathematics Teaching and Learning: Plan-Do-Study-Act Cycles as Tools for Improvement.* Symposium conducted at the 2016 annual meeting of the American Educational Research Association.
- *Edwards, A., Sandoval, C., & McNamara, H. (2016, April 11). Processes of adaptive integration in scaling professional development for community college developmental mathematics faculty. In J.R. Dolle (Chair), *Improving "Go to Scale" Efforts Through Adaptive Integration: Lessons from Carnegie's Networked Improvement Communities*. Symposium conducted at the 2016 annual meeting of the American Educational Research Association.

<u>Service</u>

(2020 - Current) Inaugural Graduate Student Representative, Improvement Science in Education SIG at AERA

(2019 - Current) Lead Facilitator, Research-Practice Partnership Graduate Student and Postdoctoral Scholar Network

(2020) Reviewer for WestEd publication on networked improvement science in teacher preparation
(2020) Reviewer, *Quality Assurance in Higher Education*
(2019-20) Reviewer, *Teacher Education Quarterly*
(2019) Reviewer, *Mind, Culture, and Activity*
(2019) Facilitator, UCI School of Education Student Qualitative Working Group
(2018) Co-Chair, UCI School of Education Diverse Educational Community and Doctoral Experience (DECADE) chapter

Professional Memberships
(2020 - Current) International Society of the Learning Sciences (ISLS)
(2015 - Current) American Educational Research Association
(2019 - Current) Graduate Student Representative of Improvement Science in Education Special Interest Group at AERA

Teaching & Mentoring Experience
(2019 - 2020) Supervised three undergraduates funded by UCI's Undergraduate Research Opportunity Program (UROP)
(2018 - 2019) Oversaw the work and professional development of 14 undergraduate research assistants
(2018) Teaching Assistant, EDUC 25: Introduction to Education, Disciplinary Perspectives
(2017) Reader, EDUC 143AW: Classroom Interactions

ABSTRACT OF THE DISSERTATION

Examining Practices in the Initiation of a Teacher Preparation Networked Improvement Community

by

Carlos Sandoval, Jr.

Doctor of Philosophy in Education

University of California, Irvine, 2021

Professor Elizabeth van Es, Chair

The prominence of networked improvement communities as an approach to educational improvement has grown since its conception by Anthony Bryk and colleagues in 2010. Although NICs have shown promise for addressing complex problems of practice in education, I argue that understanding their *enactment* enables those leading and studying NICs to gain insight into how these networks can be implemented in ways that are effective, equitable, and just. This three-study dissertation examines how a networked improvement community in teacher preparation was initiated, focusing on *practices* that network members engaged in as part of this process. To study how the process of network initiation was enacted, I employed an inductive, qualitative approach to see what practices teacher educators and improvement facilitators engaged. Data sources for this study were primarily qualitative, and included meeting recordings, meeting artifacts, one-on-one interviews with teacher educators, and memos generated by the facilitators. The first study examines how teacher educators engaged a central tension between centering multilingualism and centering language acquisition as the network decided on the focus of its improvement efforts. I found teacher educators engaged in a set of practices that resulted in a

network aim that centered multilingualism and peripheralized language acquisition. The second study examines the practices that improvement facilitators engaged in as they led the network in the process of constructing a shared theory of improvement. This study examined how power and positionality were produced through facilitation practices. I found that facilitators' engagement in particular practices shaped how teacher educators participated; additionally, facilitators were positioned in particular ways to engage in those kinds of power-producing practices. The third study examines the process through which teacher educators and facilitators engaged in to construct a shared measurement tool designed to guide the network's improvement activities. Findings included a set of practices both teacher educators and facilitators engaged in that drove the design process. Together, these three studies highlight a range of practices that facilitators and teacher educators engaged in that constituted the work of launching an improvement network. These studies also highlight the importance of attending to *how* improvement work comes to be enacted, enabling those leading improvement efforts to improve their practices for doing improvement.

CHAPTER 1

Introduction

The field of education has become centrally concerned with engaging in research that foregrounds the needs and problems of schools and schooling. Scholars across disciplines and communities have made clear that traditional research and development activities have fallen short of the demands of our schools (e.g., Bryk & Gomez, 2008; Burkhardt & Schoenfeld, 2003; Datnow, 2002; Gutierrez & Penuel, 2014). These scholars characterize traditional research as a set of activities in service of research agendas developed by university researchers and the carrying out of those agendas primarily for the dissemination of knowledge that then informs top-down mandates to practitioners at scale. These scholars make visible how this way of conducting educational research does little for improving educational systems locally or at scale and how existing approaches to educational reform and improvement alienate practitioners via policy that operates through top-down mandates. Instead, researchers have begun to embrace and advocate for engaging in collaborative work with practitioners to address pressing problems of practice in education (Donovan, 2013; Tseng, 2012). One approach to collaborative educational improvement work that has emerged is networked improvement science. Networked improvement science is an approach to research and development that centrally concerns itself with identifying problems of practice in schools, understanding the processes and systems that produce those problems, developing shared measurement tools to monitor those problems, and iteratively testing changes to the system that address problems (Bryk et al., 2015). Improvement networks seek to bring together a range of stakeholders from diverse institutions and settings to address common problems of practice to leverage learning across sites and spread and scale changes to systems that have been designed and tested via cycles of inquiry (Bryk et al., 2011).

To date, improvement networks have shown promise and potential for addressing a range of educational problems at scale and across sites. Examples include efforts aimed at increasing developmental mathematics success rates in community colleges (Edwards et al., 2015; Huang, 2018; Merseth, 2011), new teacher retention and support (Coburn et al., 2015; Hannan et al., 2015), and educational leadership development (Thornton et al., 2020). As a result, networked improvement communities have received a large amount of support for improving educational systems at varying levels of scale (Barletta et al., 2018; Feygin et al., 2020; LeMahieu et al., 2017). Drawing from the quality improvement turn in healthcare (Mery et al., 2017), improvement scholars and practitioners seek to build the capacity of the field of education to engage in rigorous, continuous, networked improvement (Proger et al., 2017; Rohanna, 2018).

Although NICs have proven promising and efforts to build the capacity of educational systems are well underway, research is needed to critically examine these efforts and how they come to be enacted. Examining how NICs are lived generates insight into potential problems in the enactment of educational improvement and how those problems can be addressed and overcome. This sentiment is echoed in the research-practice partnership (RPP) world by Coburn and Penuel (2016), who, call on those engaged in RPPs to examine the techniques, strategies, and tools used in partnership. Although distinct from RPPs, I argue that understanding the techniques, strategies, and tools used in *improvement networks* specifically helps those engaged in improvement work and improvement-focused research develop a repertoire for doing improvement. Scholars have made similar calls to examine how continuous improvement efforts are enacted in healthcare, with Langley and Denis (2013) calling on those studying and leading continuous improvement projects to attend to the enactment and micropolitics that constitute improvement of healthcare practices and systems. Joshi and colleagues' (2021) study of one

improvement network serves as an example of a close and critical examination of improvement networks. In this study, researchers examined whether and how NICs are sustainable once external support from improvement organizations and experts are removed. The authors highlight a potential issue with the sustainability of networked improvement, making visible how the NIC constricted and some improvement activities ceased, although core network infrastructure was maintained. Their study also begins a line of questioning surrounding a critical examination of improvement work in order to identify issues that emerge in starting and sustaining NICs as well as identify strategies, techniques, and actions that can successfully address those issues in ways that allow improvement work to carry forward.

I position my dissertation as taking up this line of questioning surrounding how improvement efforts are lived and performed in education. In particular, I study a teacher preparation improvement network to understand the enactment of launching of improvement networks. I focus on the launch of improvement efforts because of the role the process of network initiation plays in shaping networked improvement efforts. In networked improvement communities, the network initiation process determines what the aim of a network is, the theory of action used to achieve the aim, the system of measures used to monitor progress towards the aim, and the people who participate to accomplish the aim (Russell et al., 2017). Thus, network initiation is a critical juncture in which the direction of improvement efforts is formed. Additionally, the focus on networked improvement in teacher preparation affords insight into the enactment of improvement efforts in a context that has been under-researched by those engaging in improvement-focused scholarship. Studying a teacher preparation improvement network also affords insight into the utility of improvement in a setting with challenges that improvement science is well-positioned to address. Before turning to describe the specifics of this dissertation,

I offer more context into the field of teacher preparation research and its (potential and lived) relationship to improvement.

Challenges of Teacher Preparation Practice and Research

Teacher preparation scholars have generated several outcomes to which teacher preparation programs ought to consider holding themselves accountable. Examples of these outcomes include: the development of teachers' knowledge of subject matter (Darling-Hammond & Bransford, 2005; Grossman et al., 2005; Zeidler, 2002); the development of a commitment and practices for enacting social action, social justice, and educational reform (Cochran-Smith, 2004; Darling-Hammond, 2006; Hammerness, 2006; Rust & Clift, 2015); persistent challenges in the work of teaching, such as exposing student thinking and enlisting student participation (Barnhart & van Es, 2016; Kennedy, 2016); and developing beginning repertoires of practice and dispositions for examining their own teaching (Dinkelman, 2003; Feiman-Nemser, 2001). There is no shortage of thinking around the kinds of outcomes to which teacher preparation programs should aspire. However, despite the range of outcomes that programs can choose to pursue, how programs can go about improving program activities to reach these outcomes is unclear and calls for teacher education that is systematic in its own evaluation and improvement (Zeichner, 2012). Examples of how programs organize to improve in systematic ways towards particular outcomes are sorely needed.

In addition to achieving particular outcomes, an approach to teacher preparation program improvement is also needed as a counter to longstanding attacks on teacher education. These attacks consist of scholars outside the field of teacher preparation questioning the need for rigorous teacher education (Venable, 1951; Zeichner, 2010). These attacks on teacher preparation have enabled research projects that have aimed to evaluate teacher preparation in

ways that are reminiscent of process-product research on teaching, seeking to take discrete features of teacher preparation programs and examine their impact on standardized test scores (Grossman & McDonald, 2008; e.g., Goldhaber et al., 2013). The attacks on teacher education and the resulting traditional research projects have led to calls to regulate and make top-down mandates to teacher preparation programs and teacher educators in ways that ignore the wealth of research generated by teacher preparation scholars and the kinds of outcomes to which they should aspire (Zeichner, 2012). This desire to focus on regulating and mandating components of teacher preparation without input from teacher educators mirrors the existing relationship among research-policy-practice in K-12 that has motivated the need for networked improvement science in the first place.

Thus, I argue that networked improvement science offers an approach that has the potential to counter existing attacks on teacher preparation while helping teacher educators engage in efforts to systematically improve their programs. Networked improvement science offers a systematic approach for: a) making teacher preparation program outcomes specific and actionable through the use of aim statements and its commitment to focusing on problems (Bryk et al., 2015); b) developing theories of action that afford programs much-needed coherence and cohesion (Hammerness, 2006); c) creating teacher preparation practice-focused and practitioner-driven measurement systems rather than traditional models of teacher preparation measurement and evaluation (e.g., Goldhaber et al., 2013); and d) engaging in rigorous cycles of inquiry that allow teacher educators to test changes to teacher preparation practice that will drive improvement to desired outcomes (Bryk et al., 2015). Additionally, engaging in networked improvement science efforts affords teacher educators opportunities to engage in shared inquiry with one another within programs and across sites, addressing critiques of teacher preparation

program research that typically examine one activity in one program with one group of students at one point in time (Cochran-Smith & Villegas, 2015). By bringing together programs to work on testing changes together and using practice-focused measures over time, networked improvement science can aid in enabling teacher educators to learn with and from one another en route to teacher preparation program improvement at scale.

For this potential to be realized, however, networked improvement communities must be launched in teacher education and studied to understand how they come to be enacted and what is (un)successful in the facilitation of and participation in these networks. This testing and studying of networked improvement science in teacher preparation are the focus of my dissertation. I seek to understand how a teacher preparation networked improvement community was enacted by studying its launch, revealing dynamics that constitute doing improvement work in the teacher preparation context. Doing so affords opportunities to interrogate improvement practices to identify which ones work, and those that can be improved. Thus, this dissertation is broadly concerned with the dynamics that constitute the launching of a NIC and how the launching of a NIC unfolds. In doing so, I examine the processes of generating a shared network aim, a shared theory of improvement, and a shared system of measurement. To describe how I approached studying these processes, I first articulate the general framework I take to studying the launching of this improvement network. I then describe the setting in which this dissertation takes place, a teacher preparation networked improvement community spanning eight University of California teacher preparation programs. I follow with a description of the broad analytic approach to the three studies, highlighting the similarities in the analytic techniques I employed across the studies. I end this introduction by providing a synopsis of the three studies that comprise this dissertation.

General Theoretical Framework

To understand how the launching of a teacher preparation NIC is enacted, each of the three studies in this dissertation draws on practice theory and process philosophy as broad frames and lenses. Practice theory is concerned with examining how practices, or situated action, emerge and shape the social world. Feldman and Orlikowski (2011) describe three central tenets of practice theory: situated actions comprise social and organizational life; dualisms are rejected as ways of theorizing; and relations between and among phenomena are relational (p. 1241). The first tenet, that social and organizational life is made up of situated actions, highlights an attention to what individual actors are doing and how their actions are situated within structures and how those actions simultaneously produce, reproduce, and modify those structures. The second tenet concerning the rejection of dualisms refers to how concepts and constructs are frequently conceptualized as being in opposition to one another (e.g., mind vs. body; structure vs. agency). Instead, practice theory is concerned with how these opposing concepts and constructs exist together. The third tenet of viewing phenomena as being relational is an alternative to theorizing in dualisms, viewing concepts and constructs as being related in ways that make them mutually constitutive. I take a practice theoretical lens to each of the three studies in this dissertation to: a) focus on the specific actions of both teacher educators and facilitators, b) understand how their actions come to constitute the work of doing improvement, and c) how the work of improvement constrains and enables the actions they take.

I also take a process philosophical, or process theoretical, approach to understand how particular types of work in launching an improvement network unfold. Process theorizing bears a family resemblance to practice theory in that it is concerned with performance, but foregrounds temporality and how social life and organizational life is constantly being produced and

constantly changing (Langley et al., 2013). Process theorists argue that traditional ways of viewing organizational change treat organizations as static by default, and thus conceptualize organizational change as being discrete events. In this frame, studies of organizational change focus only on these discrete events and look at discrete features of organizations at two different time points, something process scholars call a "weak process" ontology (Langley & Tsoukas, 2016, p. 3). Instead, process theorists advocate for a strong process ontology that views organizations not as static, but as constantly changing and being (re)produced moment-to-moment and over time. They argue that stability is not default in organizations, but is effortfully produced; for process theorists, change produces stability and stability enables change (Tsoukas & Chia, 2002). I engage in process theorizing to make sense of how the performance of launching a teacher preparation networked improvement community evolves and unfolds. Rather than viewing the network as having discrete moments where change occurs, I conceptualize the work of launching a NIC as constantly in flux, thus affording me opportunities to see how different processes in network initiation emerge.

Although practice theory and process philosophy serve as the broad frame, I use to examine enactment by attending to individuals' constantly evolving actions, each study brings in complementary theoretical frames that help to answer specific questions I pose. In the first study, I seek to understand how members in a teacher preparation improvement network come to reach a shared aim, highlighting the tensions that emerged, were engaged, and around which members made settlements. I bring in activity theory to conceptualize tensions as sources of transformation (Engestrom et al., 1999) to understand how engaging core tensions around the network's direction afforded network members opportunities to settle these tensions and move towards a shared aim statement across sites. In the second study, I seek to understand how

facilitators and facilitation practices shape the network's direction as part of the process of generating a shared theory of improvement. I incorporate conceptualizations of power and positioning from practice and process theorizing (Hardy & Thomas, 2016; Watson, 2017) to understand how facilitators' practices shape teacher educators' practices and how they were positioned to drive the improvement work forward. In the third study, I aim to unveil how the process of generating shared measurement tools unfolded and how teacher educators participated in that process. I draw on design-based research to understand the process of generating shared measurement tools as a design process (Cobb, 2003; Edelson, 2002) and how practitioners, in this case teacher educators, are engaged and engage in that process. Conceptualizing and studying the development of shared measurement as a design process affords insight into how facilitators and practitioners came together to iteratively construct measurement tools. I also draw on cultural-historical activity theory (Engestrom et al., 1999) to conceptualize the materiality of the work of designing shared measures, and how the focal tools and objects of the design process change in ways that shape how people participate.

All three studies of this dissertation are concerned with understanding the enactment of core processes of initiating an improvement network. All three use practice theory and process philosophy as an overarching frame to direct my attention to the situated actions of the individuals who take part in the process. By examining their enactment in this way, I generate insight into how the work of initiating an improvement network unfolds. I also generate opportunities to critically interrogate the practices of doing improvement work such that improvement-focused scholars can identify what improvement practices work for what contexts and what participation practices might be elicited or anticipated in their own contexts. The focus on unveiling practices and processes also serves to help build a range of techniques, strategies,

tools, and actions that leaders of and participants in improvement efforts can employ. Together, this line of research reveals the invisible work of enactment entailed in the launching NICs, which may have implications for the successful enactment of this form of partnership work that can lead to educational improvement. I now turn to describe the setting in which I gained insight into these practices and processes, offering a description of the improvement network I studied. I follow this description of the setting by providing an overview of the data I collected from this network, and the general analytic approach I took to analyze these data.

Improvement Setting

This dissertation takes place in a networked improvement community across eight University of California teacher preparation programs that all have a post-baccalaureate teacher preparation program. This NIC is focused on improving the preparation of teachers to build on multilingual students' strengths. This network began its initiation in 2018 as part of the California Teacher Education Research and Improvement Network (CTERIN), a center funded by the University of California Office of the President to study and improve teacher education practice at scale. CTERIN, and the NIC specifically, emerged through an interest in launching cross-wide collaborative efforts across the UC system as a response to critiques of teacher preparation as siloed (Cochran-Smith & Villegas, 2015). The NIC began by attempting to identify a shared problem of practice to work on using California Commission on Teacher Credentialing survey data from graduates of each UC teacher preparation program. This survey, administered as a part of the credentialing process, asked program completers about their preparedness to teach across a range of subjects and problem areas, including their preparedness to work with families, teach science, work with students to address special learning needs. In April of 2018, CTERIN members, including myself, met with teacher preparation program

directors across the UC to review these survey data and identify a problem to work on that would be the focus of an improvement network. Program directors narrowed the potential problems to four: variation in preparing candidates to support special needs; variation in preparing multiple-subject candidates to teach science; variation in preparing candidates to work with families and communities; and variation in preparing candidates to support English learners. After consulting with teacher educators at their home institutions, CTERIN members—at this point largely consisting of program directors—decided to focus on the problem of preparing candidates to support English learners based on the data and the conversations at the previous meeting. They then asked program directors to gauge the interest of teacher educators (TEs) at their campus to work on this problem. Program directors responded that there was interest from their colleagues and plans to move the network forward began. I note here that CTERIN agreed to focus on this problem, but other campuses identified different problems on which they wanted to work. It was at the level of CTERIN members and principal investigators that the decision to choose a particular problem came to be negotiated.

CTERIN then invited all interested teacher educators across the UC to join the network and decided to hold monthly meetings with interested TEs beginning July 2018 and held a two-day in-person convening at UCI in September 2018. The monthly meetings continue through August 2021. This dissertation focuses on the launch of the NIC and spans the period from the July 2018 meeting to the February 2019 meeting.

Data and Analytic Approach

I note here that I served as the network's primary improvement facilitator and was thus primarily responsible for designing the improvement activities teacher educators engaged in and leading the meetings that teacher educators attended as part of this network. I took on the dual

role of improvement facilitator and researcher, concerning myself first with leading the improvement work and then documenting and collecting data from the process. During rare moments, I modified specific activities to ensure data collection, such as asking participants to share their thinking over our videoconferencing tool's chat function rather than having them share their thinking in the videoconferencing tool's breakout rooms feature.

Data collected and used for this dissertation consist of audio and video recordings of all monthly network meetings and of the two-day convening, as well as memos and notes generated from those meetings and artifacts produced during those meetings, such as sticky notes, diagrams, and other visual representations. Data also consist of audio and video recordings and artifacts from one-on-one or small-group meetings with teacher educators that occurred between monthly network meetings. These meetings were typically used to get TEs' feedback on improvement artifacts or tools that were then shared with the rest of the network at monthly meetings. Finally, data consist of memos written about the processes of initiating the network and artifacts that were generated outside the context of individual or network-wide meetings, such as fishbone diagrams, driver diagrams, or measurement tools (Bryk et al., 2015).

Consistent with taking practice and process theoretical lenses, analysis across the three studies were interpretive and generally focused on examining teacher educators' and facilitators' spoken contributions in context as insight into their actions and how those contributions changed over time. All three studies utilized process coding (Saldaña, 2015) to generate insight into individual actors' actions and leaned on memos to situate these actions within the specific improvement activity and the improvement network more broadly. To gain insight into how these situated actions evolved over time in each study, I used narratives as analytic devices to understand how the processes unfolded, how actions changed, and how improvement activities

evolved (Langley, 1999). Each study, however, includes techniques and strategies that are unique to the specific questions asked. I describe the specific questions by study here, and then turn to provide a synopsis of each.

1) How does the process of generating a shared network aim statement unfold in a teacher preparation improvement network?
    a) How do tensions emerge in the process of generating a shared aim statement?
    b) How do teacher educators engage with and settle these tensions en route to a shared aim statement?
2) How does the process of generating a shared theory of improvement unfold in a teacher preparation improvement network?
    a) How are facilitators positioned in the process of generating a shared theory of improvement?
    b) How do facilitators produce power in the process of generating a shared theory of improvement?
3) How does the process of designing a shared measurement tool unfold in a teacher preparation network?
    a) What was the process of designing a shared tool for measurement for improvement?
    b) How did teacher educators engage in the process of designing a shared tool for measurement for improvement and how did that engagement change as the process unfolded?

Study Overviews

In the first study, I focus on unveiling the practices of teacher educators as they engage in the process of generating a shared aim statement. I examine how teacher educators construct, engage with, and settle on tensions between language acquisition and multilingualism stances to produce a shared aim. I use data collected from July 2018 to October 2018 and analyze these data to examine interactions among teacher educators and improvement facilitators to unveil the practices that they engaged in to produce a shared aim. Participants for this study consist of 49 teacher educators across eight teacher preparation programs as well as three facilitators who were part of CTERIN. Data for this study include audio and video recordings of three 90-minute videoconference meetings, audio–video of a two-day in-person convening, and improvement artifacts such as fishbone and driver diagrams. I found that teacher educators engaged in a range of practices to construct a tension between language acquisition and multilingualism and, eventually, to center multilingualism in the network's aim and peripheralize language acquisition using the network's driver diagram. Teacher educators engaged in the practices of aspirationalizing, dualizing, recentering, rerouting, clarifying, tuning, and converting as they settled the tension and came to agreement on a shared aim. These practices make visible that the process of generating an aim statement is a complex and complicated process that requires negotiation and a recognition that some perspectives are foregrounded, and others are backgrounded.

In the second study, I examine positioning and the production of power in the process of generating a shared theory of improvement in the form of a driver diagram, focusing on the practices and positioning of the facilitators in this process. In this study, I conceptualize power as practices that shaped practices elsewhere, and positioning as the location of people relative to

others and the capacity to engage in practices that shaped others' practices elsewhere. I use data collected from the September 2018 convening to the November 2018 meeting. I analyze these data first by process coding and constructing a narrative, the codes and narratives to unveil facilitators' practices and how they came to shape teacher educators' engagement in the process of generating a shared aim. Additionally, I use backstage-frontstage theory to understand facilitators' positioning in the process of generating a shared theory of improvement. I found that facilitators had systematic and advantageous positioning in and between backstages (i.e., work that occurred without teacher educators present) and frontstages (i.e., monthly network meetings with teacher educators). As they moved in and between both backstage and frontstage, facilitators engaged in the practices of *inscribing, checking, briefing,* and *inviting critiques*, each of which shaped TEs' participation and positioned them in particular ways. Unveiling how power and position come to shape the generation of a shared theory of improvement highlights how facilitators are positioned to engage in practices that made some improvement network members' commitments and contributions durable while making others ephemeral. This study has implications for how improvement facilitators carry out their work and begin a conversation around improvement facilitation practices and their impact on the unfolding of improvement work.

In the third and final study, I examine the process of designing a shared measurement tool for monitoring improvement work. Despite enthusiasm from education scholars and practitioners around the use of data for improvement, how practical measurement tools are designed is unclear and under-examined. This study seeks to unveil one approach to designing these measures and how practitioners participate in that process. In addition to practice and process theory, I use design-based research to frame this as a design process and to focus on what a process model for

designing measures looked like. I also draw on cultural-historical activity theory to understand how the focal objects and tools (and how they changed over time) shaped and reshaped the nature of TEs' engagement in this process. To gain insight into this process, I analyze data collected from October 2018 to February 2019. I analyze these data by primarily generating process codes and categorizing them to gain insight into both the design process as well as how TEs engaged in that process. The first finding consisted of a design process model that highlighted the iterative nature of the process and the two distinctive phases that constituted the process. The first phase centered around the use of the survey and the second phase centered around the use of improvement data generated from the survey. The second findings consisted of TEs' practices that changed as they moved from one phase to the next. In the first phase, TEs engaged in the practices of *augmenting* and *editing* the survey. In the second phase, TEs engaged in the practices of *benchmarking* and *contextualizing* improvement data that were generated from the survey. These findings offer one approach, via a design process model, to generating practical measures with practitioners. This approach, and the specific activities that comprise it, can be tested and interrogated. Findings also offer a window into how practitioners engage in that process and can afford insight—primarily to those leading measurement design efforts—into the range of participation practices and how design activities can be designed to constrain and enable particular practices.

Attending to how networked improvement science is taken up and enacted has the potential to reveal the strategies, techniques, and tools that are conducive to launching and sustaining improvement networks. By better understanding how the processes that comprise a NIC unfold, improvement-focused research can begin to grapple with methodological questions

to improve the ways scholars and practitioners work together to solve complex educational problems.

References

Barletta, B., Comes, D., Perkal, J., Shumaker, R., Wallenstein, J., & Yang, B. (2018). Networks for school improvement: A review of the literature. Columbia University Center for Public Research and Leadership.

Barnhart, T., & van Es, E. (2015). Studying teacher noticing: Examining the relationship among pre-service science teachers' ability to attend, analyze and respond to student thinking. *Teaching and Teacher Education, 45*, 83-93.

Bryk, A. S., & Gomez, L. M. (2008). Ruminations on reinventing an R&D capacity for educational improvement. *The future of educational entrepreneurship: Possibilities of school reform*, 181-206.

Bryk, A. S., Gomez, L. M., & Grunow, A. (2011). Getting ideas into action: Building networked improvement communities in education. *Frontiers in Sociology of Education,* 127-162. Springer, Dordrecht.

Bryk, A. S., Gomez, L. M., Grunow, A., & LeMahieu, P. G. (2015). *Learning to improve: How America's schools can get better at getting better*. Harvard Education Press.

Burkhardt, H., & Schoenfeld, A. H. (2003). Improving educational research: Toward a more useful, more influential, and better-funded enterprise. *Educational Researcher, 32*(9), 3-14.

Cobb, P., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiments in educational research. *Educational Researcher, 32*(1), 9-13.

Coburn, C. E., Penuel, W. R., Geil, K. (2013). Research-practice partnerships at the district level: A new strategy for leveraging research for educational improvement. New York: William T. Grant Foundation.

Coburn, C. E., & Penuel, W. R. (2016). Research–practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher, 45*(1), 48-54.

Cochran-Smith, M., & Villegas, A. M. (2015). Framing teacher preparation research: An overview of the field, Part 1. *Journal of Teacher Education, 66*(1), 7–20.

Darling-Hammond, L. (2006). Constructing 21st-Century teacher education. Journal of Teacher Education, 57, 300–314. http://doi.org/10.1177/0022487105285962

Darling-Hammond, L., & Bransford, J. (Eds.). (2007). *Preparing teachers for a changing world: What teachers should learn and be able to do.* John Wiley & Sons.

Datnow, A. (2002). Can we transplant educational reform, and does it last? *Journal of Educational Change, 3*(3), 215-239.

Dinkelman, T. (2003). Self-study in teacher education: A means and ends tool for promoting reflective teaching. *Journal of Teacher Education, 54*(1), 6-18.

Donovan, M. S. (2013). Generating improvement through research and development in educational systems. *Science,* 340, 317–319.

Edelson, D.C. (2002). Design research: What we learn when we engage in design. *The Journal of the Learning Sciences, 11*(1), 105-121.

Edwards, A. R., Sandoval, C., & McNamara, H. (2015). Designing for improvement in professional development for community college developmental mathematics faculty. *Journal of Teacher Education, 66*(5), 466-481.

Engeström, Y., Miettinen, R., & Punamäki, R. L. (Eds.). (1999). *Perspectives on activity theory.* Cambridge University Press.

Feiman-Nemser, S. (2001). From preparation to practice: Designing a continuum to strengthen and sustain teaching. *Teachers College Record, 103*(6), 1013–1055.

https://doi.org/10.1111/0161-4681.00141

Feldman, M. S., & Orlikowski, W. J. (2011). Theorizing practice and practicing theory. *Organization Science, 22*(5), 1240-1253.

Feygin, A., Nolan, L., Hickling, A., & Friedman, L. (2020). Evidence for networked improvement communities: A systematic review of the literature. American Institutes for Research.

Goldhaber, D., Liddle, S., & Theobald, R. (2013). The gateway to the profession: Assessing teacher preparation programs based on student achievement. *Economics of Education Review*, 34. http://doi.org/10.1016/j.econedurev.2013.01.011

Grossman, P., & McDonald, M. (2008). Back to the future: Directions for research in teaching and teacher education. *American Educational Research Journal, 45*(1), 184-205.

Gutiérrez, K. D., & Penuel, W. R. (2014). Relevance to practice as a criterion for rigor. *Educational Researcher, 43*(1), 19-23.

Hammerness, K. M. (2006). From coherence in theory to coherence in practice. *Teachers College Record, 108*(7), 1241–1265.

Hannan, M., Russell, J. L., Takahashi, S., & Park, S. (2015). Using improvement science to better support beginning teachers: The case of the building a teaching effectiveness network. *Journal of Teacher Education, 66*(5), 494-508.

Huang, M. (2018). 2016-2017 impact report: Six years of results from the Carnegie Math Pathways. Carnegie Foundation for the Advancement of Teaching.

Joshi, E., Redding, C., & Cannata, M. (2021). In the NIC of time: How sustainable are networked improvement communities? *American Journal of Education, 127*(3), 369-397.

Kennedy, M. (2016). Parsing the practice of teaching. *Journal of Teacher Education, 67*(1), 6–17. https://doi.org/10.1177/0022487115614617

Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management Review, 24*(4), 691-710.

Langley, A., & Denis, J. L. (2011). Beyond evidence: the micropolitics of improvement. *BMJ Quality & Safety*, 20(Suppl 1), i43-i46.

Langley, A., Smallman, C., Tsoukas, H., & Van de Ven, A. H. (2013). Process studies of change in organization and management: Unveiling temporality, activity, and flow. *Academy of Management Journal*, *56*(1), 1–13.

Langley, A., & Tsoukas, H. (Eds.). (2016). *The SAGE handbook of process organization studies*. Sage Publications.

LeMahieu, P. G., Grunow, A., Baker, L., Nordstrum, L. E., & Gomez, L. M. (2017). Networked improvement communities. *Quality Assurance in Education, 25*(1), 5-25.

Mery, G., Dobrow, M. J., Baker, G. R., Im, J., & Brown, A. (2017). Evaluating investment in quality improvement capacity building: a systematic review. *BMJ Open, 7*(2), e012431.

Merseth, K. K. (2011). Update: Report on Innovations in Developmental Mathematics--Moving Mathematical Graveyards. *Journal of Developmental Education, 34*(3), 32.

Penuel, W. R., Allen, A. R., Coburn, C. E., & Farrell, C. (2015). Conceptualizing research–practice partnerships as joint work at boundaries. *Journal of Education for Students Placed at Risk*, 20(1-2), 182-197.

Proger, A. R., Bhatt, M. P., Cirks, V., & Gurke, D. (2017). Establishing and sustaining networked improvement communities: Lessons from Michigan and Minnesota. Regional Educational Laboratory Midwest.

Rohanna, K. (2018). Preparing schools to successfully participate in networked improvement communities: A case study of year 1 of a math instructional network. University of California, Los Angeles.

Russell, J., Bryk, A., Dolle, J., Gomez, L. M., Lemahieu, P., & Grunow, A. (2017). A framework for the initiation of networked improvement communities. *Teachers College Record, 119*(5), 1-36.

Rust, F. O., & Clift, R. T. (2015). Moving from recommendations to action in preparing professional educators. In E. R. Hollins (Ed.), *Rethinking Field Experiences in Preservice Teacher Preparation* (pp. 47–69). New York, NY: Routledge.

Saldaña, J. (2015). *The coding manual for qualitative researchers* (3rd ed.). Sage Publications.

Thornton, M. E., Barakat, M., Grooms, A. A., Locke, L. A., & Reyes-Guerra, D. (2020). Revolutionary perspectives for leadership Preparation: A case of a networked improvement community. Journal of Research on Leadership Education.

Tseng, V. (2012). Partnerships: Shifting the dynamics between research and practice. New York, NY: William T. Grant Foundation.

Tsoukas, H., & Chia, R. (2002). On organizational becoming: Rethinking organizational change. *Organization Science, 13*(5), 567-582.

Venable, T. C. (1951). The attack on teacher education. *Journal of Education, 134*(2), 48-48.

Zeichner, K. (2010). Competition, economic rationalization, increased surveillance, and attacks on diversity: Neo-liberalism and the transformation of teacher education in the US. *Teaching and Teacher Education, 26*(8), 1544-1552.

Zeichner, K. (2012). The turn once again toward practice-based teacher education. *Journal of Teacher Education, 63*(5), 376-382.

Zeidler, D. L. (2002). Dancing with maggots and saints: Visions for subject matter knowledge, pedagogical knowledge, and pedagogical content knowledge in science teacher education reform. *Journal of Science Teacher Education, 13*(1), 27-42.

CHAPTER 2

Study 2. Examining the Practices and Tensions of Generating an Aim Statement in a Teacher Preparation Networked Improvement Community

Introduction

Networked improvement science has emerged as a prominent approach to implementation in education (Coburn et al., 2013). This approach claims to challenge traditional conceptions of implementation, where researchers produce knowledge about interventions and practitioners simply implement them with fidelity, often at scale (Datnow, 2002; Penuel et al., 2015). Instead, much like other forms of research-practice partnerships, those who engage in networked improvement science intend to upend the "translation model" of education implementation by bringing together researchers, practitioners, and other stakeholders to jointly address common problems of practice. They intend to do so by using measurement to gauge improvement on a problem; engaging in iterative cycles of testing to learn about changes; and working in networks called networked improvement communities (NICs) to learn about addressing problems across settings (Bryk et al., 2015). Over the last several years, research on NICs in education contexts have contributed to our understanding of how to improve recruitment in teacher preparation (Martin & Gobstein, 2015), new teacher support and development (Hannan et al., 2015; Author, 2019), and community college developmental mathematics learning and teaching (Author, 2015). While NICs exhibit promise as an approach to improving problems of practice, inquiry into how they come to be enacted is critical for understanding how they are taken up in practice, particularly because they have been positioned as a solution to issues of implementation at scale (Bryk et al., 2015). We argue for examining the

implementation of networked improvement science approaches to interrogate research claims about their value for jointly addressing problems of practice.

To make progress on understanding the implementation of NICs, we propose examining the practices that constitute their enactment. Attention to practices can unveil the often-invisible techniques, strategies, and decisions that comprise the work of doing collaborative improvement and research-practice partnerships more broadly (Coburn & Penuel, 2016). In this study, we focus our examination on the practices of convergence in launching a NIC. Convergence is a core feature of improvement efforts and research-practice partnerships (Bryk et al., 2015; Coburn & Penuel, 2016). Identifying shared problems of practice affords stakeholders opportunities to pool together their respective expertise and resources, as well as learn from one another to accelerate improvements. At the same time, gaining convergence and establishing shared direction in organizations has proven to be a process fraught with tensions and contradictions (Engeström, 1999; Jay 2013). When engaged productively, grappling with tensions and contradictions are critical in moving partnerships and organizations toward their goals (Bang & Vossoughi, 2016; Jay, 2013; Penuel et al., 2015). We argue that to understand implementation of networked improvement efforts, scholars must examine the practices of reaching convergence.

To examine convergence in a NIC, we focus on one core process of network initiation: the development of a shared aim (Russell et al., 2017). In NICs, an aim statement specifies what will be improved, by how much, and by when. The process of generating an aim statement is typically described in ways that make the process seem trivial. For example, Russell and colleagues' (2017) proposed framework for initiating a NIC states that during the launch of a NIC, "the initiation team identified the NIC's focal problem, low success rates in developmental math courses, by beginning with a larger concern: that of low graduation rates in community

colleges" (p. 15). Similarly, LeMahieu and colleagues (2017) write that "the team then establishes a specific aim with a deadline for its accomplishment [...] With that aim in mind, the network identifies actionable interventions" (p. 15). We argue that convergence on a shared network aim is more complex and fraught with tensions than the ways it has been described previously. Additionally, aim statements are intended to serve as north stars, guiding the creation of theories of action and outcome measures (Bryk et al., 2015). Unveiling how aim statements are produced is crucial given that it serves as a critical juncture for how improvement efforts unfold. Our task in this paper is to make visible how practices emerge, evolve, and unfold in the construction of a shared aim to understand how network initiation comes to be implemented.

To examine implementation, we draw on social practice theory, a lens that foregrounds the mutually constitutive relationship between structure and agency (Feldman & Orlikowski, 2011). We take this lens to examine the process of constructing an aim statement in a NIC consisting of teacher educators (TEs) from eight teacher preparation programs. This NIC's aim focused on improving the preparation of teachers to build on multilingual students' strengths, an important practice that research identifies as central to preservice teachers' developing a beginning repertoire of practice (Darling-Hammond & Bransford, 2005; Lucas & Villegas, 2013) and is identified in policies that govern teacher preparation in the state where this improvement effort took place (California Commission on Teacher Credentialing, 2016). We examine how participants in this network came to settle on this aim by asking three questions:

1) How did participants in a networked improvement community construct and engage with a central tension en route to a shared aim?
2) How did participants in a NIC reach a settlement pertaining to the central tension?

3) How did network participants' engagement in the process of producing a settlement lead to the construction of a shared aim?

We first contextualize this study within teacher preparation by articulating what bringing networked improvement science to teacher preparation programs affords the field of teacher preparation. We then offer an overview of the problem space: improving the preparation of teachers to support multilingual students, using practice theory to conceptualize the enactment of the NIC. We then turn to describe the research context and analytic methods, followed by the central findings of the study. We conclude by discussing our findings within the broader landscape of research-practice partnerships and improvement-focused research.

Networked Improvement and Teacher Preparation for Linguistically Diverse Learners

Teacher education scholars have articulated a number of outcomes for teacher preparation, such as preparing candidates to teach particular content and developing content knowledge for teaching; understanding learners and their histories, assets, and communities; and developing practices for reflection and improvement, (e.g., Darling-Hammond & Bransford, 2005; Kennedy, 2016; Philip et al., 2019). Additionally, individual teacher preparation programs articulate a number of outcomes to which they are committed (e.g., Sandoval et al., 2020; Hammerness, 2006). What is unclear, however, is how teacher preparation programs organize themselves to understand whether they have accomplished any particular outcome and how they identify areas for improvement. Teacher preparation research has generated unique insight into specific activities for accomplishing these aims. For example, some research identifies the power of video to help teachers develop a vision of instruction and to learn reflective practices (Author, 2017; Santagata & Yeh, 2016). However, critiques of research designs in teacher preparation highlight that current research focuses on examining candidates' experiences relative to specific

activities within a single course using one source of data (Cochran-Smith & Villegas, 2015). Some studies have sought to examine data across multiple points within teacher preparation programs to examine program coherence (Sandoval et al., 2020; Hammerness, 2006). However, networked improvement intends to collect these data to promote continuous, disciplined program improvement using multiple sources of data over multiple time points, in concert with iterative testing, and in collaboration with practitioners across settings around a shared aim. We seek to understand how a networked improvement approach comes to be enacted in teacher preparation.

This study is situated within a NIC focused on improving how teacher candidates are prepared to support multilingual students. Both research and teacher preparation policy identify learning to teach linguistically diverse learners as a central outcome of teacher preparation (Darling-Hammond & Bransford, 2005; Jimenez-Silva et al., 2014; Lucas & Villegas, 2013). In California, for example, the Commission on Teacher Credentialing (2016) identifies as a central outcome developing English language proficiency among K-12 students who speak languages other than English. However, critical, social justice-focused scholars challenge the focus on language acquisition, arguing that this stance produces linguistic and cultural erasure; instead, teacher preparation programs can develop future teachers who value multilingualism and linguistic diversity (Lucas & Villegas, 2010; Martinez et al., 2017). We highlight this tension—between language acquisition and multilingualism—because in prior research, we found that this was a central tension around which TEs engaged (Sandoval & van Es, 2020). Through TEs' engagement with this tension, the NIC came to focus on how to improve the preparation of candidates to leverage multilingual students' assets, thus taking a multilingualism framing to the work, and positioning language acquisition as an inequitable system that candidates must learn to navigate. We examine how the network landed on this aim by making visible how TEs

constructed, negotiated, and came to a settlement. Understanding these practices will contribute to research by unveiling the complex, hidden work of initiating shared improvement work.

Theoretical Framework

We take a practice theoretical lens to guide our examination into practices that constituted the construction of a shared aim. Practice theory is grounded in three principles: 1) situated actions and agency are central to the production of social life; 2) dualisms—such as structure and agency—are rejected as a way of theorizing; and 3) phenomena exist in relation to one another "through a process of mutual constitution" (Feldman & Orlikowski, 2011, p. 1242). For practice theorists, "practices" refer to the mutually constitutive relations between action and structures, where actions produce or modify structure and structure constrains and enables action.

Unveiling TEs' practices of participation in the process of generating a shared aim requires attention to tensions that emerge in the process of convergence and how engagement with tensions unfold over time. Thus, we use practice theory to theorize how tensions act as sources of transformation towards convergence and how practices and organizations broadly are constantly emerging, evolving, and unfolding.

Tensions as Sources of Transformation

Tensions and contradictions among stakeholders and organizations serve as critical sources of transformation and change (Engestrom et al., 1999; Langley et al., 2013). To successfully reach convergence and sharedness among disparate individuals, teams, and organizations, tensions must be surfaced, engaged, and settled. In this way, tensions serve as "driving patterns of change" (Langley, 2013, p. 1). For example, Jay (2013) examined a hybrid organization—one that consisted of partnerships with a number of other organizations—focused on reducing energy use in a community. In carrying out its goals, the organization was faced

with a series of tensions centering on its public service mission and its need to be financially self-sustaining. For instance, the organization offered homeowners free energy audits, paid installation of energy efficient measures, and financing for these installations. However, homeowners signed up for free audits only to solicit bids on the suggested measures from outside contractors. Thus, the organization was forced to grapple with what it counted as successful: while free energy efficiency audits helped to reduce the community's energy consumption, it received little income to help sustain such a service. This led to a paradox that forced the organization to grapple with what Jay (2013) calls its "organizational identity," (p. 140) resulting in the organization embracing its public service mission and redrafting its mission statement to emphasize its educative services, such as free energy efficiency audits. In this case, the grappling with this paradox forced the organization to change how it had been operating, placing emphasis on one aspect of its identity and backgrounding other aspects.

We position engagement with tensions as central to the work of reaching convergence and sharedness, particularly to allow disparate individuals, teams, and organizations to move forward. Having made central the role of tension-engagement in producing organizational direction, we turn to conceptualizing the constant emergence, evolution, and unfolding of practices in the production of organizations.

Organizations as Constantly Becoming

To understand how practices emerge and unfold over time, we draw on process organization studies to investigate how tension-engagement evolves *en route* to the construction of a network aim. This perspective views organizations as: a) comprised of a series of constantly unfolding processes; and b) made up of and situated within structures that constrain and enable action that simultaneously maintain, reinforce, modify, or transform structures (Giddens, 1984;

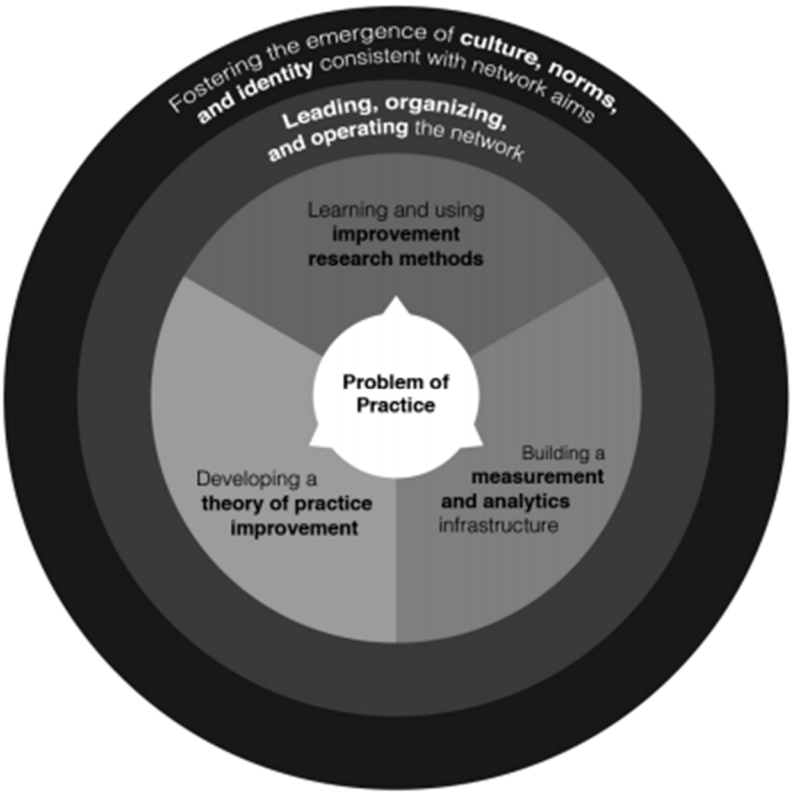
Langley et al., 2013). In line with this perspective, we also view practices, and practices that produce organizations, as constantly becoming and unfolding. In Tsoukas and Chia's (2002) theorizing of organizational becoming, organizations are effortfully produced through constantly changing practices. Tsoukas and Chia (2002) illuminate this effortful production of organizations and stability using an example of an acrobat on a tightrope. Although the audience sees the acrobat maintaining stability on the tightrope, the acrobat is constantly shifting their weight to produce stability. This orientation attends centrally to the temporal progressions of *practices* rather than objects (Langley et al., 2013). Thus, we focus our study on how participants' practices change in the settlement of a tension and the production of an aim.

We use practice theory as a framework for investigating practices that teacher educators engage in to establish a network-wide aim, with a focus on tensions as sources of transformation and practices and organizations as constantly evolving. We bring these ideas together to illuminate a) TEs' evolving practices in constructing and engaging with a central tension; and b) the practices TEs engaged in to produce a settlement around this tension. We turn to describe the setting within which this study takes place.

Context of the Improvement Work

This study takes place within the initiation of a NIC made up of eight teacher preparation programs across a large, statewide university system. The initiation of a NIC entails a range of activities for creating the conditions to engage in iterative, disciplined cycles of testing using improvement measures (Russell et al., 2017). These activities are summarized in Russell and colleagues' (2017) framework for initiating networked improvement communities (see Figure 1.1). We situate this study within the initiation of a NIC by focusing on the construction of a *common aim*, a critical first step in the development of a theory of practice improvement.

Figure 1.1. Framework for Initiating a NIC (Russell et al., 2017)



In the spring of 2018, the California Teacher Education Research and Improvement Network (CTERIN) launched a NIC in an effort to promote collaboration across these universities' teacher preparation programs. The launching of the NIC, spearheaded by CTERIN as the network's hub, began at a meeting of teacher preparation program directors in spring of 2018. To help the group identify a shared focus for improvement, the authors brought data

displays of end-of-year program data collected by the California Commission on Teacher Credentialing to the program director meeting. Using these displays, and through a series of conversations with TEs at their campuses, the directors collectively identified meeting the instructional needs of English learners as a shared problem of practice.

With the problem identified, TEs from each campus were invited to join the network to work on this problem. Program directors invited instructors and supervisors to become members of a local site team who would attend both virtual and in-person meetings, as well as experiment with new practices and survey candidates throughout the academic year to collect data on the impact of these practices on preservice teachers' preparation. Teacher educators (TEs) across site teams occupied different roles, some of them primarily located at the university, with others situated inside schools and serving as part-time lecturers or supervisors.

In the summer of 2018, the facilitators held two remote, hour-long meetings, in July and August, to begin to understand how the broad problem was understood and came to be manifest at each site. All site-team members were invited to participate in these meetings. These meetings were largely attended by directors from each program. Simultaneously, the facilitator conducted a literature scan—an early step in using improvement science—to more deeply understand the problem space. Based on what was learned from the literature scan and from initial conversations, the problem statement was revised, switching out the term "English language learners" to "multilingual students" in an attempt to reflect a history in educational institutions of positioning students' learning English as being deficit (Garcia, 2009) and to reflect perspectives that teacher educators voiced in the early discussions.

In the next phase of work, the CTERIN hub focused on defining the network's aim statement, a theory of action for guiding the design of changes, and a set of instruments for

developing a system of measurement for improvement (Bryk et al., 2015; Russell et al., 2017). The context for this work was a two-day convening organized by the two authors at the authors' home campus, in September of 2018. Each campus was encouraged to bring a team of TEs, with representation from their single and multiple subject programs. Though the main purpose of the convening was to generate an aim statement and theory of improvement, it also served to develop a collective will toward the network's efforts and building relationships across sites.

After the convening, members agreed to meet remotely for 90 minutes every month throughout the academic year. During the October 2018 monthly meeting, network members agreed to an initial aim and a theory of improvement. Between the in-person convening and the October meeting, the facilitator asked two TEs from different campuses to offer feedback on the aim and theory of improvement because they had expressed different perspectives that were objects of discussion in the in-person convening.

We note here that membership and participation varied across sites over the course of the four meetings. The initial two summer meetings were attended largely by directors, with some instructor participation. Of the 21 teacher educators who came to one or both of the July and August meetings, 12 were directors. Attendance at the convening was much higher, with each campus team consisting of two to five teacher educators. One campus, the host site, had 12 TEs in attendance at the convening, though five did not attend the second day due to scheduling conflicts. Additionally, another effort supported by CTERIN focused on the preparation of graduate students as teacher educators, the Early Teacher Educator (ETE) Fellow program, was also taking place at the host site at the same time as the convening. Each campus nominated graduate students for the ETE fellows program. The fellows had parallel programming during the convening. As organizers of the meeting, we identified segments to include them as part of the

ETE program experience. In total, 49 TEs and 16 graduate students attended over the course of the two-day convening. Teacher educators' and graduate students' participation in the network was voluntary. They were not compensated for their participation, although CTERIN paid for all participants' travel expenses to the convening.

Over the course of these four sets of meetings (July through October), the facilitator used the tools of improvement science to support the network generating an aim statement. During the July and August meetings, the facilitators asked TEs to generate insight into why candidates were not prepared to teach multilingual students. For the in-person convening, the facilitators generated a *fishbone diagram* around which network members generated critiques and revisions. Finally, the central tool used to articulate the aim and theory of improvement was a *driver diagram*, a visual tool that uses primary and secondary drivers to make conjectures that connect specific activities, experiences, and changes to the aim (Bryk et al., 2015). We now turn to describe our roles in the launching of this network, the data we collected, and our analytic approach for understanding how network participants established a shared aim.

Methods

We begin by describing our positionality given the central role we played in shaping the unfolding of the NIC. In particular, the first author was the primary improvement facilitator, leading the design of each meeting and working closely with the second author to prepare for network meetings. Additionally, the first author was responsible for representing teacher educators' views in network documents, such as fishbone and driver diagrams. The second author serves as a co-principal investigator for CTERIN, the funded center that aims to develop a state-wide system for inquiry on teacher preparation through cross-site research collaboration across the university system. In this NIC, both authors participated in the dual roles of

researchers and facilitators, starting from the establishment of the network's initial problem statement. Thus, the authors made clear to TEs who volunteered to join the network that we sought to help them work to improve their programs, while also documenting the process of improvement in order to study it. Participants all granted their consent to participate in the study.

In terms of the substantive focus of this particular NIC—examining and improving the preparation of teacher candidates to support multilingual learners—we acknowledge that we did not have experience or expertise on language learning, multilingualism, and multiliteracy. This made us even more conscious of the need to center the voices of teacher educators who brought expertise to the NIC. At the same time, we note that our roles as facilitators shaped how the work unfolded and the practices teacher educators engaged in to reach a shared aim statement. In particular, we designed and enacted the specific improvement activities in which teacher educators engaged. Additionally, we were primarily responsible for creating the visual improvement tools around which teacher educators engaged and which were used to guide the direction of the improvement work. We attend to this by situating teacher educators' participation within the improvement activities that we designed and facilitated.

Having described our positionality in this network, we turn to provide a detailed description of the participants and the data we collected before describing the analytic approach we used to unveil teacher educators' practices en route to generating a shared aim.

Participants & Data Sources

The focus of our investigation begins with the two monthly meetings in summer of 2018 and ends with our monthly meeting in October 2018 because these meetings were primarily concerned with establishing the aim statement and theory of action. Data consist of video and audio recordings of the four network meetings, three of which took place over Zoom and the

September in-person convening. Table 1.1 provides a summary of teacher educators' participation by campus at each meeting. In the section describing our analytic approach, we describe how we accounted for the variation in TEs' participation.

Table 1.1 Participation by Campus Over Time

	July	August	Sept Day 1	Sept Day 2	October
Campus A	4	6	12	7	7
Campus B	2	0	3	2	1
Campus C	1	1	2	2	2
Campus D	0	1	2	2	0
Campus E	0	1	3	3	2
Campus F	1	2	4	4	3
Campus G	1	3	5	5	1
Campus H	1	1	2	1	1
Graduate Fellows (All Campuses)	0	0	16	16	5
Total	10	15	49	42	23

Data also consisted of four audio and video recordings of what we call *feedback meetings* with individual teacher educators that took place in between scheduled network meetings. These feedback meetings were scheduled by the facilitator to ensure TEs' perspectives were represented in the network's documents and planning. Additionally, we collected data in the form of five audio-recorded debrief and planning meetings among the facilitators of the network. All audio and video recordings were transcribed, and the transcriptions served as the primary

documents for analysis. Lastly, we analyzed artifacts in the form of written memos from facilitators; visual improvement science tools, namely a fishbone diagram and driver diagram; emails between the facilitators and teacher educators in the network; and presentation slides for each meeting, which included memos for decisions made about how to facilitate meetings.

Analytic Approach

We adopted an interpretive approach to data analysis, seeking to unveil the practices that TEs engaged in as part of their participation in the network. In a previous study, we unveiled tensions that emerged in the production of a shared aim and how the language acquisition-multilingualism tension came to be central (Sandoval & van Es, 2020). Our analysis extends that work to unveil practices teacher educators engaged in around this tension. Analysis occurred in four phases, which we describe in detail below.

Phase 1

In the first phase, we segmented the data into improvement-focused activity structures to trace the emergence and negotiation of tensions. These activity structures included: framing and understanding the problem to be addressed; developing and interrogating a shared understanding of the problem; identifying and scoping the outcome to which the network is oriented; and identifying a shared aim statement and accompanying theory of action (Bryk et al., 2015).

To identify practices, we began by analyzing participants' spoken *contributions*—comments that individual teacher educators made either verbally or textually. Through an iterative analytic process (Srivastava & Hopwood, 2009), informed by conversation analysis (Goodwin & Heritage, 1990) and ethnographic microanalysis (Erickson, 1996), we coded each contribution as actions as TEs worked to generate an aim statement. We used process coding (Saldana, 2016), to identify TE's actions in relation to the improvement activities.

Because we sought to understand TEs' practices for engagement with tensions during the phase of defining an aim statement, we focused our analysis on how they engaged with the tension between multilingualism and language acquisition. Specifically, we sought to understand how TEs contributions were shaped by the nature of the improvement activities, as well as how their contributions shaped the direction of these activities (Erickson, 1996).

Once we reviewed all the contributions and initial codes, we generated memos around each teacher educator's contribution and the local framings of those contributions as it pertained to the central tension between multilingualism and language acquisition. In the example above, we generated three codes: "changing language development/acquisition to language loss, connecting category on language acquisition to use of the term multilingualism," and "noting that language development comes with primary language loss." Our memo around this contribution centered on how the TE connected the category of language acquisition to the use of the term "multilingualism," highlighting a contradiction between the two.

Phase 2

In the second phase of data analysis, we examined how situated contributions and their accompanying local framings evolved from meeting to meeting. To do this, we used the codes and analytic memos that we generated in the previous phase to construct characterizations focused on how TEs discussed the tension between language acquisition and multilingualism in each meeting. Using the example presented in the previous phase, we noted in our memo how TEs *performed agreement* in reframing the network's central problem during the activity focused on identifying an outcome. Additionally, our memo surfaced how we saw no evidence of *performed opposition* to some TEs wanting to reframe the problem (Goodwin & Heritage, 1990). This resulted in the production of analytic memos that focused on: a) TEs' commitments to or

preferences for particular settlements around the language acquisition-multilingualism tension, as expressed in contributions; and b) disagreements or disapprovals of other participants' contributions around the tension or pertaining to the local framing broadly. We then reviewed these memos to identify specific interactions that served as turning points, because such moments suggested shifts in the local framing.

To determine turning points, we first identified TEs' expressed disagreements, disapprovals, or rejections. We then examined whether the subsequent contributions expressed approval of the proposed disagreement or countered the disagreement and shifted the conversation back to the original position or introduced a new topic. We defined a contribution as a turning point if the subsequent contributions were taken up as objects of discussion by the group. After identifying turning points, we traced the evolution of TEs' contributions and these contributions' local framings, looking for changes in how TEs performed agreement or disagreement, particularly relative to the existing problem framing.

Phase 3

In the third phase, we developed a narrative. Narratives are frequently used in process theorizing to generate insight into the unfolding nature of practices and actions (Langley, 1999). We used the narrative as an analytic device to make visible practices that served a common purpose (e.g., bringing back to the center of the conversation a focus on the problem framing) and to name those practices (e.g., recentering). These narratives allowed us to then identify a set of practices that TEs engaged in throughout the process of generating a shared aim. We then applied social practice theory as a metatheoretical lens (Feldman, 1995) to make sense of the practices (i.e., situated contributions) and how they evolved and drove changes in the local framing. We identified three anchoring phases of the process of generating the aim statement—

tension emergence, settlement production, and durability production—that served as markers for identifying what and how practices changed. Using the narrative method provided insight into how practices drove movement from one phase of the process to the next, while enabling us to identify how movement between phases shaped practices.

Phase 4

One question that arose in our analysis concerned whether and how variation in participants' attendance across meetings may have impacted engagement with the central tension and the settlement on an aim statement. In this last phase of analysis, we returned to the data to track TEs' attendance across meetings. We found a high rate of attrition occurred between the in-person convening and the October monthly meeting, with 21 fewer TEs attending the October monthly meeting. Twelve of these were graduate student fellows who attended segments of the convening as part of a ETE Fellows program. An additional seven were TEs from the host campus who attended the first day of the convening. We also reviewed email responses to meeting invitations to track how many TEs had scheduling conflicts. Ten of the TEs who did not participate in follow-up meetings noted scheduling conflicts.

Because TEs and facilitators shifted the network's focus to center multilingualism and peripheralize language acquisition, we also reviewed meeting data to identify which TEs expressed a language acquisition stance to track their attendance at meetings and if it changed over time. We identified three TEs who took such a stance. One TE, Laura, participated in the July meeting and attended the first day of the convening. She did not attend the second meeting, due to a scheduling conflict. She also did not participate in the October meeting. The second TE, Janet, attended both days of the in-person convening but did not attend the October meeting. The

third TE, Alicia, attended the August meeting, both days of the convening, and the October meeting. Thus, a TE who adopted a language acquisition stance was present at each meeting.

We also note that even when all members of a collaboration agree on a shared problem, tensions emerge in the early stages of collaborative work, as a team seeks to define the scope of and examine the problem, as well as specify the goals and outcomes of a collaborative effort (Bang & Vossoughi, 2016; Engestrom & Sannino, 2010). Our analysis aims to understand how networks navigate and negotiate these tensions as they move to settle on a shared network aim. It is on this process where we focus our analysis.

Findings

Our analysis revealed particular practices teacher educators engaged in and how those practices evolved over time in producing a shared network aim. To organize these practices and how they shifted, we break the aim construction process into three phases: tension emergence, settlement production, and producing durability. In the first phase, we found that TEs engaged in *aspirationalizing and dualizing.* In the second phase, we found that TEs engaged in *recentering* and *rerouting*. And in the third phase, we found that TEs engaged in *tuning, clarifying,* and *converting.* A summary of these practices, organized by phase, are presented in Table 1.2. These practices highlight how network members came to engage in and settle tensions that are constructed from attempting to reach the kind of sharedness motivated by networked improvement science approaches. Additionally, these practices highlight how the settlement of tensions come to be inscribed in the aim and its accompanying driver diagram. We now turn to describe and provide evidence for each of these practices, organized by phase.

Table 1.2. Summary of Teacher Educators' Practices.

Phase	Central practices
Phase 1: Tension Emergence	Dualizing: constructing language acquisition and multilingualism as being in tension with one another
	Aspirationalizing: imagining problems that center what schools *can* focus on instead of what they currently have to focus on, in this case, language acquisition
Phase 2: Settlement Production	Recentering: resurfacing the problem framing in order to interrogate it
	Rerouting: changing the problem and its framing
Phase 3: Inscribing Settlements	Tuning: making adjustments and modifications to the driver diagram without changing its framing
	Clarifying: defining terms and identifying who does and does not fit within the term "multilingual"
	Converting: transforming and repositioning the original problem framing around language acquisition into a set of processes, procedures, systems, and structures that are meant to be navigated

Tension Emergence

We characterize the phase of "tension emergence" as a series of interactions that produced and made central the tension between language acquisition and multilingualism. This tension began to emerge in August 2018, during a network meeting where TEs were asked to provide feedback on a fishbone diagram. This diagram was generated by the first author using contributions generated from TEs during the previous monthly network meeting in July and by scanning the literature on preparing candidates to teach multilingual students. At the August meeting, facilitators asked TEs to review the diagram privately and then share what critiques

they generated one-by-one. We found that three of the 16 TEs present at the meeting engaged in the first practice, *aspirationalizing the problem*—what we define as contributions that expressed hope for working towards new models of schooling. Our analysis revealed that these contributions were made in isolation from one another due to the facilitators' decision to have each person share rather than having an open-ended discussion.

TEs brought this tension to the center stage at the two-day in-person convening in September 2018. During an activity centered around the fishbone diagram on Day 1, five of the 12 small-groups—and 15 of 44 TEs in attendance—engaged in conversation directly pertaining to the language acquisition-multilingualism tension. We found that TEs primarily engaged in two practices: *dualizing* a tension between language acquisition and multilingualism and *aspirationalizing* the problem. These practices resulted in the production of a tension between language acquisition and multilingualism that required settlement. We highlight a conversation between Patrick and Laura, supervisors and instructors at their respective programs. Patrick began by commenting on the use of the phrase "multilingual students" in the problem statement:

> Patrick: [...] Guadalupe Valdez says she's hesitant to use 'emergent multilinguals' because that's a promise we don't know how to—we don't have models institutionally...we've structured English acquisition. […]
>
> Laura: Are you saying that you're agreeing with the label of multilingual students, or frame our problem like that, or you would change that?
>
> Patrick: I think that ought to be the goal—
>
> Laura: the overarching goal to create—multilingual students, which includes dual-language programs, dual-immersion programs

Patrick: Yeah, biliteracy all the way through. Yup. And I feel like I love using the [English Language Development] frameworks to teach language arts and to teach English teachers. But I feel like as a system we don't know how to prepare—[...]

Laura: We don't have the structures in place [for multilingualism and multiliteracy], yeah, I agree with you 100%.

Patrick: I think we reinforce that in schools, for sure, we institutionalize that in schools, but we also have a chance to change it. You know, we have our chance to—

Laura: we have the chance to change it, but then you have to have the personnel to do that [...] we don't have the infrastructure [...]

Patrick: There's an aspiration that's embedded in all this that is worthwhile [inaudible] and that's a self-reinforcing thing, right?

Laura: I think what we're doing now is substituting the word multilingual students with the word English learners, and I agree with the overarching goal is to have multilingual students, but I think the way it's phrased here, we're subbing that out for what we're really talking about English language learners.

Our analysis of this exchange revealed engagement in two practices that characterized the tension-emergence phase: the *dualizing* of language acquisition and multilingualism and the *aspirationalizing* of the focal problem. First, Patrick engaged in aspirationalizing by articulating what he perceived *ought* to be the goal of the network—promoting multiliteracy and multilingualism. Patrick articulates how existing models and structures of schools are geared towards language acquisition and, instead, viewed this network as a "chance to change it," remarking that "there's an aspiration that's embedded in all this." Rather than adhering to the

existing problem framing, which Laura insists is "about English language learners," Patrick challenged it to center aspirations for multilingualism.

Other TEs also engaged in the practice of dualizing and aspirationalizing the problem. Mick, a graduate student who taught courses for his local teacher preparation program, engaged in constructing tensions in his small group. He remarked that the fishbone had two causes that he interpreted to be contradictory: "a bias towards Standard English" and "a lack of understanding from teacher preparation programs of how to teach academic language." For Mick, having the two causes in the fishbone diagram proved "confusing" and "difficult to balance," which sparked agreement from others at his table. A TE at a different table also engaged with these practices, commenting that she worried "about the separation of cultural responsiveness and culturally sustaining when we talk about English language development," remarking that "we don't want to lose the beauty of that." In this case, the TE remarked that focusing on "English language development" would harm the work of cultural sustenance and responsiveness that she described as "having beauty." By positioning "English language development" as being in opposition to cultural responsiveness and cultural sustenance, the teacher educator engaged in dualizing, while the expressed desire to preserve the "beauty" of language and culture served to aspirationalize the problem. In these contributions, TEs talked about language acquisition and multilingualism in ways that positioned them as being in opposition to one another, making visible that TEs' construction of this tension was central to the work of reaching sharedness in this network.

In these contributions, TEs positioned language acquisition and multilingualism as being in opposition to one another, making visible that TEs' construction of this tension was central to the work of reaching sharedness in this network.

We characterized the tension emergence phase as the production of the language acquisition-multilingualism tension. In particular, we highlighted two practices that produced this tension: *aspirationalizing* and *dualizing*. Within an activity structure focused on interrogating the fishbone diagram, TEs' conversations centered on making the problem aspirational and on constructing language acquisition and multilingualism as being in opposition to one another. We now turn to examine how TEs produced a settlement around this tension.

Producing a Settlement

On Day 2 of the in-person convening, TEs' participation focused primarily on engaging the tension between language acquisition and multilingualism. TEs did so in ways that made multilingualism the dominant framing of the improvement work, leading to the construction of a first draft of an aim statement and driver diagram that centered around multilingualism. Thus, the defining feature of this phase is the production of a settlement in which TEs responded directly to language acquisition stances by centering multilingualism as an alternative and preferred framing of the network. To produce this settlement, TEs engaged in the practice of aspirationalizing, but also *recentered* and *rerouted* the problem.

To illuminate these practices, we focus on an activity in which teacher educators were asked to identify a focal outcome. The intended design of this activity focused on orienting TEs to identifying a shared but broad, unspecified outcome—e.g., an outcome titled "Language Development and Acquisition"—that would then be used to guide the generation of specific aim statements that identified what measures would be improved, by how much, and when. To identify this shared, broad outcome, TEs were asked to sit in small groups of four to five, with TEs from two campuses represented at each table. The group was then presented with five categories of outcomes that were generated from the August meeting, where facilitators asked

TEs to brainstorm what "success for the network would look like." During the activity at the in-person convening, facilitators asked TEs to interrogate and modify these outcomes in small groups. Afterward, facilitators asked each group to share their main takeaways.

During the whole-group conversations, TEs' practices shifted from dualizing in relation to the problem framing to recentering and rerouting the problem in order to settle the tension to focus on multilingualism. We first highlight how TEs engaged in *recentering* the problem, which we define as bringing back to the center of the conversation the challenges with how the network's focal problem was framed. Despite the activity structure being framed as identifying a shared, desired outcome, a number of TEs expressed that the problem framing—which went unmodified after Day 1—made it difficult for them to choose any of the outcomes presented.

One TE, Esmeralda, remarked that she and her group "had framed the problem differently," stating that "we are all teachers of language" and that "language does not equal English." A colleague at her campus, Madeline, agreed, saying:

> Well, I only felt like when we frame it that way, it changed the first two categories [of outcomes]. So, differentiation, we were kind of like... it's not a little group of people that you're differentiating for that... everything is about all of them. All of our students are multilingual, whether it's, you know, academic language versus language with their peers, that they have multiple languages [...] Also, language development and language acquisition shifts when the only language being acquired is not English. We weren't really sure what to do with the first two categories after rethinking the question.

Madeline and Esmeralda expressed issues with aligning the categories with how they "had framed the problem," bringing back to the center the issues TEs articulated with the focal problem, namely that the problem centered on students acquiring a dominant language, English,

rather than centering on promoting multilingualism and cultural and linguistic sustenance. For both of these TEs, the categories meant something drastically different and were largely incompatible with how they framed the problem.

Another TE at their table, Charlotte, participated in the practice of recentering the problem by also aspirationalizing it, remarking that the group saw "multilingualism as the norm, or the aspirational norm" and that the categories "looked very different once we looked through that lens." Esmeralda's contributions similarly indicated that she was engaging in the practice of aspirationalizing, particularly her comment that "we are all teachers of language" and that "language does not equal English." These contributions highlight how TEs sought to reframe the problem from improving systems of language acquisition to a problem that seeks to reorient what schools *ought* to be trying to accomplish, in this case multilingualism.

Following this group's share-out, the rest of the tables summarized what they had discussed. As the facilitator began to summarize and make revisions to the existing outcome categories, Esmeralda again recentered the problem: "there's no opportunity to refine the question? I think we're proposing a refining of the question." In addition to recentering the problem, Esmeralda also sought to *reroute* the problem to more centrally focus on multilingualism and push the framing of the problem around language acquisition to the margins. Esmeralda clarified, "we're proposing the change in the question […] that the problem is a lens that looks at monolingualism as the status quo […] I think maybe a lot of us, you kind of see a push back against the status quo." The other teacher educators at her table continued:

> Charlotte: Well, I've just one thing I wanted to emphasize that we talked about was that we're not thinking only of transforming the instruction for a particular group of students, but for all students. So that the English--what--what came from originally the state

definition of an English learner […] is no longer seen as, there's something about them has to change so that they get to this desired state, which is to be full English proficient, right […] So how do we transform the teaching of all students […]

Facilitator: Yeah. So how would you frame that? How would you, if you were to revise that statement, you know, things that we can sort of explore and play our way into and I think we're totally like, this is totally up for debate. Right? But how would you frame that to best--to best represent what it is we're trying to work on?

Esmeralda: [whispering] I think you just did. [Charlotte and Esmeralda laugh]

Facilitator: Is it really transforming teaching for all students? Because—

Esmeralda: What this group is saying, what does it mean to transform the teaching of language and culture in K-12 schools? So that's all students.

Charlotte: So that we're designing--re-designing language instruction.

The exchanges highlight how Charlotte and Esmeralda both rerouted the problem from focusing on "something about the [English language learner] has to change" towards focusing on "transforming the teaching of language and culture in K-12 schools" for all students. Charlotte and Esmeralda's contributions make visible how they interpreted the framing of the problem and sought to reroute this framing that would then shape the rest of the improvement work.

Charlotte and Esmerelda's rerouting of the problem proved to be a turning point in how network participants engaged the language acquisition-multilingualism tension. Following these exchanges, the remainder of the whole-group conversation centered on advocating for this new framing and how to engage in improvement work given the change in framing. Contributions during this whole-group conversation that surfaced the language acquisition stance were met with contributions from TEs that rerouted the network's framing towards multilingualism. For

example, a teacher educator, Rachel, surfaced a conversation she had with Laura the day prior, noting to the group that Laura was attending to "the problem that she perceives as existing out in the schools." Rachel mentioned that Laura pushed back on the use of "multilingual students," preferring "English language learners because that's what the teachers in the world know right now." After the facilitator remarked that "we can go over this language [...] forever" and attempted to push the group to "start creating a theory of improvement," Madeline responded by saying "we have different definitions of what multilingualism is." Madeline continued, saying that she defines multilingualism as students "speaking differently and different contexts" and needing to "unpack this" as a form of "code switching." Jennifer, a teacher educator at a different table, agreed with Madeline, saying "how you look at multilingualism is how I look at multilingualism also." Jennifer continued, "So that African American student, are they considered multilingual? I don't think so according to what is the accepted definition. But in that regard [...] I would venture to say that [in] California, it is multilingual, I mean it's code-switching." These exchanges highlight how teacher educators at the convening rerouted language acquisition stances to recenter multilingualism. Rachel's surfacing of Laura's comment about focusing on language acquisition because "that's what the teachers in the world know right now" were followed by comments from Madeline and Jennifer that made visible a preference for broadening language to include dialects and ways of speaking, what they call multilingualism.

We highlight these practices of recentering and rerouting to make visible how practices shifted in ways that resulted in foregrounding multilingualism and peripheralizing language acquisition. When facilitators made attempts to continue the convening without reframing the network's central problem to foreground multilingualism, TEs engaged in practices that brought *back* to the center interrogations of the problem framing. They did so alongside participants'

attempts to reroute the network's central problem from one that focused on supporting multilingual students in acquiring English as a second language to a problem that focused on promoting multilingualism and multiliteracy in schools. These practices not only shaped the settlement that emerged, but also rearranged the activity structures in which TEs found themselves. This settlement, however, was not made explicit until it became inscribed in the network's organizing visual representation: a driver diagram. We now turn to describe the practices TEs engaged in as this settlement came to be inscribed into the network's aim.

The Inscription of the Settlement into an Aim

After reaching a settlement, the participants sought to inscribe this settlement into the network's shared aim statement and driver diagram. In this phase of producing a shared aim statement, TEs' practices shifted from recentering and rerouting the problem towards the practices of *tuning, clarifying,* and *converting*. By *tuning*, we refer to how TEs presented tweaks, modifications, and additions to the driver diagram. Rather than challenging the framing of the diagram or the network's direction broadly, TEs offered adjustments to the diagram, leaving the premise largely unchallenged, with notable exceptions that led to TEs repositioning language acquisition stances within a multilingual-focused network framing. By *clarifying,* we refer to how TEs sought definitions and attempted to reduce ambiguity in the driver diagram. We viewed this practice of clarifying as a way to identify the local framing that was constructed, in part, through the presentation of the driver diagram. Lastly, *converting* refers to how TEs transformed the language acquisition framing that they problematized in previous phases into a central component of the driver diagram that positioned systems of language acquisition as something to be navigated.

We first highlight how teacher educators engaged in tuning the driver diagram. As a final activity of the in-person convening, TEs were asked to generate possible aim statements in relation to the positions they took previously to define the problem. The facilitators then categorized these aim statements. The four categories facilitators generated were labeled: "learning about and leveraging multilingual students' assets and strengths," "understanding deeply multilingual students and their culture, communities," "building trust and relationships with multilingual students' communities," and "designing instruction." Facilitators used these categories of aim statements to generate a first draft of the driver diagram with an aim statement that read: "Leveraging Multilingual Students' Strengths and Assets." They then solicited feedback on the driver diagram from Esmeralda in a one-on-one interview. Esmeralda approved, remarking that the diagram was "the essence of what we hope the work could be."

The facilitators presented this draft at the network's October 2018 monthly video conference meeting and engaged teacher educators in an activity focused on soliciting critiques and suggestions for revision. During this activity, a number of TEs engaged in the practice of tuning the driver diagram. In the first segment of this activity, facilitators asked TEs to write in the video conference platform's chat feature what critiques they had of the driver diagram or changes they would make. We highlight contributions that illuminate the practice of tuning:

> Charlotte: How about "sociocultural" assets along with linguistic & sociolinguistic?
>
> Patrick: Wondering if it's useful to specify that "sociolinguistic" and perhaps sociocultural" assets don't just include "proficiency in L1" or "schooling in English" but also translanguaging and hybrid practices— otherwise can overlook huge array of "strengths and assets" that aren't about being proficient in an L1 or L2, but in real multilingual living, navigating, negotiating.

Each of these contributions were suggestions for modifications to the driver diagram, such as adding terms to particular drivers, as Charlotte did in suggesting adding "sociocultural" to the secondary driver labelled "identifying linguistic and sociolinguistic assets." These suggestions did not challenge the framing of the driver diagram, nor did they challenge the framing of the problem broadly the way these same TEs had at the in-person convening. We viewed these suggestions as situated within a new framing around multilingualism, while also viewing the suggestions as operating within the framing presented to TEs. We call this situated, constrained act of suggesting the practice of *tuning*.

TEs also engaged in the practice of *clarifying*, which we define as the raising of questions that concerned the definitions or conceptualizations of particular words, phrases, or other components of the driver diagram. These contributions were primarily made in the chat function:

> Valerie: How are we defining "community"?
>
> Patrick: I am curious what Charlotte and others might consider sociocultural assets.
>
> Charlotte: Sociocultural assets" often described as "funds of knowledge" or knowledge embedded in daily lives and practices of communities. Also how are we defining "multilingual students" - per original intro by [the first author], and comments about placements. Would native-English speakers in Spanish or Mandarin immersion qualify as "multilingual"? This is an important question post-Prop 58 for many of our placements
>
> Madeline: My understanding of how we defined multilingual is that it would include [students] whose [first language is not] English that are learning [a second language]. It would also include speakers of multiple dialects, African American English, etc. This term pushes on the idea that English is the only language being taught/learned in schools.

TEs seeking definitions of terms was situated within the new framing that emerged through the sharing and reviewing of the driver diagram. TEs engaged in the practice of *clarifying* in attempts to make explicit the framing of the driver diagram in this moment, particularly as it pertained to who counts as a "multilingual student." Charlotte asked who was included within the term "multilingual student" and Madeline, who sat with Charlotte during the second day of the in-person convening, responded that it included those learning English along with those who speak different dialects. This signaled a different kind of framing than what Charlotte and Madeline had pointed out was present during the in-person convening around "monolingualism" and centering the idea that "language equals English." The practice of clarifying, then, consists of seeking definition within a new framing around multilingualism.

Finally, TEs engaged in the practice of *converting*, taking the old problem framing centered on language acquisition and transforming it as processes, practices, and systems that teacher candidates must learn to navigate. We first highlight contributions and exchanges from the October monthly meeting that highlight how TEs brought back the issue of language acquisition to reposition it within the new framing.

> Charlotte: I think it's really important that we include that statement about positionality that I saw in the driver diagram, I liked that one because native English speakers, I agree that it's, it's a good thing to make our norm be multilingualism [...] But on the other hand, I think we don't want to lose the fact that not everyone learning another language […] has the same social capital […] it's different to be learning French than Spanish, seen from a sociopolitical lens. And so, I think that's an important understanding for our candidates to have the sociopolitics and the social positioning of languages and their speakers.

Charlotte expressed her approval of the new framing around multilingualism but brought back a concern around how particular students are positioned in schools depending on what language they are meant to be acquiring. Another TE, the second author of this study, responded:

> [… At a meeting of the deans and teacher preparation program directors] there was this idea of sort of, like, we want to, we want to be in the place that we imagine we want to be and not be so constrained by like what the system constrains around us. Yet at the same time, that system is sort of what operates on the practicing teachers and schools. […] So how do we help candidates move in those spaces?

Here, the second author began to position issues around monolingualism and language acquisition as systems that "constrains us" and "operates on the practicing teachers and schools." The question around "how do we help candidates move in those spaces?" indicates a move to position the old problem framing as something that must be navigated in the new, multilingual-centric framing of the improvement network. Another TE, Veronica, also offered a contribution that sought to position language acquisition as a system to be navigated:

> [As the second author] was describing teachers working with candidates to help them as they're becoming aware of these things. And they go into a system, how do they advocate and become part of that voice? […] There's ways to work within the system that helps advocate without feeling like you aren't pushing the wrong buttons, if that makes sense. I don't know if there's a way to plant seeds that as their comfort, and knowledge of the system they are [in] grows, they'll feel more empowered to do the things they can do.

Veronica's engagement in the practice of converting primarily takes the form of suggesting a focus on helping candidates "advocate" and "work within the system that helps advocate." Together, these exchanges make visible how the practice of converting resulted in the production

of language acquisition as durably peripheralized within the network's aim statement, now framed around multilingualism. Following this meeting, the facilitators added a third primary driver titled "navigating systems" with secondary drivers that were labelled "understand and navigate English language development standards," "navigating local school constraints," "push back on inequitable structures," and "awareness of monitoring and placement structures."

Together, these practices in inscribing the settlement—tuning, clarifying, and converting—represented a shift in TEs' actions and the framing that situated their actions. These shifts in practices from one phase to the next illuminate how TEs came to produce an aim that foregrounded multilingualism and peripheralized language acquisition.

Our findings highlight the dynamic nature of practices that constitute the process of constructing a shared aim statement in a NIC. In particular, we revealed how TEs' participation practices evolved—from dualizing and aspirationalizing to recentering and rerouting to then tuning, clarifying, and converting. We make visible the evolution of these practices in order to understand how TEs across multiple teacher preparation programs produced a shared aim.

Discussion

We position the insight generated in this study as contributing to improvement-focused scholarship by making visible stakeholders' practices that constitute the implementation of networked improvement science. Prior research on articulating the phases of initiating NICs articulated the need to generate aim statements but have fallen short of naming this process as complex and fraught with tension (e.g., LeMahieu et al., 2017; Russell et al., 2017). We make this process visible in the context of a teacher preparation NIC, examining how teacher educators engaged in negotiating a central tension en route to establishing a shared network aim.

We identify two implications for this study. First, our study reveals the nature of the *practices* that network participants engage in and how those practices evolve over time as participants surface and elevate tensions, engage them to reach a settlement, and finally inscribe them into tools that are central to networked improvement science as an approach to improving problems across sites. Second, we contend that this study reveals how, through these practices, particular perspectives become foregrounded while others are backgrounded. Because coming to sharedness, and to a shared aim more specifically, is central in networked improvement, we propose that those responsible for leading the launch of NICs ought to be attentive to *how* the network's framing foregrounds some perspectives while backgrounding others. We also see this as contributing to a theory of implementation when it comes to launching NICs, highlighting how disparate teams, individuals, and organizations reaching sharedness requires negotiating, foregrounding, and backgrounding. We discuss each of these implications in detail.

Evolving Practices in Processes of Convergence

Convergence is a core process in networked improvement science. In NICs, the focal problem, problem analysis, aim, theory of action, and improvement measures are all meant to be shared by individuals from different organizations (Bryk et al., 2015). Reaching sharedness and moving work forward across different people from varied organizations requires engaging with contradictions and tensions that emerge in the process of convergence (Engestrom et al., 1999; Langley et al., 2013). Our study reveals TEs' practices in engaging tensions and contradictions in reaching a shared aim. We view these practices as an important theoretical contribution pertaining to the implementation of network initiation processes. To date, we have found no previous research that examines *how* participants in a NIC come to reach a shared aim. Scholars of other forms of research-practice partnerships conceptualize the importance of examining how

convergence is achieved in partnership work. For example, Bang and Vossoughi (2016) conceptualize the careful engagement with tensions and contradictions as critical for "propelling new cycles of expansive learning and agency" (p. 182) in participatory design research. For these scholars, points of contention and disagreement are underreported in design work in contrast to forms of agreement. They highlight the importance of tracing interactions that are characterized by what they call "disunity" (p. 185) for understanding social change making. However, there exists little empirical work on engagement with tensions in partnership work. Our study focuses on how a network's aim was constructed and *how* tensions were engaged in the process. We seek to motivate the need to focus on examining convergence through engagement with tensions to improvement-focused research to build the field's knowledge of how networks reach an aim.

Practically, we argue that unveiling practices that result in the production of an aim statement in a NIC can help those responsible for facilitating and leading improvement work design activities and experiences that are conducive to reaching a shared aim. For example, our study revealed that teacher educators engaged in dualizing aspects of the problem and aspirationalizing the problem to imagine a problem framing that upends what existing systems of schooling are being held accountable to accomplish. We contend that those responsible for leading improvement ought to be sensitive to the possibility of these practices and create opportunities for participants in a NIC to a) interrogate and reframe the problem statement, and b) identify contradictions and tensions that exist in the particular problem space in which a network chooses to operate. Building a knowledge base of the kinds of practices that network participants engage in can help improvement facilitators anticipate how their network's participants engage and design activities in order to successfully reach an aim.

Backgrounding and Foregrounding in Reaching Network Aims

The second implication of this study concerns the ways in which practices that produce convergence in a NIC result in the backgrounding of some perspectives (i.e., language acquisition) and the foregrounding of others (i.e., multilingualism). Reaching convergence and solving shared problems typically requires establishing a framing of the problem that brings some people's expertise to the center while pushing others to the periphery (Mehta, 2015). Although we found no studies of how convergence occurs in the launching of a network, we note that those engaged in research-practice partnerships have articulated how problem frames can diverge and how converging on a particular frame in positioning particular researchers or practitioners as more centrally "responsible for designing and implementing solutions" (Penuel et al., 2013, p. 244). Our empirical study highlights one way in which reaching convergence results in the peripheralizing of some perspectives, in this case those concerned with language development and acquisition, while centering others, such as those centrally concerned with multilingualism and multiliteracy. Some research-practice partnership scholars, particularly those engaged in activist, social justice-focused design-based research projects address this challenge by making explicit that commitments to social justice serve as criteria for identifying potential partners (Bang & Vossoughi, 2016; Vakil et al., 2017). Other types of partnerships, however, seek to engage a wider range of stakeholders, organizations, and institutions for producing large-scale change (Bryk et al., 2015; Fishman et al., 2013). It is particularly important for these types of RPPs to understand *how* some perspectives and commitments may be pushed to the periphery as a result of settling on a problem framing and an aim statement. For practitioners of improvement, having activities explicitly aimed at unveiling whose expertise is centered and

whose expertise is backgrounded in an aim statement may be helpful in making decisions about how to reframe the network's aim or who to include in improvement work.

Conclusions, Limitations, and Directions for Future Research

In examining how TEs surface, engage with, and produce settlements for tensions in the production of an aim, we came to recognize that facilitators play a significant role in shaping the ways in which improvement work unfolds. This raises critical questions that ought to be taken up in future research. What are the practices of improvement facilitators and how do they shape the practices of those participating? How do improvement facilitators' practices produce non-participation and exits from network participants? Who is positioned to inscribe commitments, values, and insights into network documents that organize future network activities? These questions concern issues of power in improvement networks and addressing them will generate much-needed insight into the ways in which power is produced in the work of doing improvement. They also concern the dispositions, practices, and development of improvement facilitators, and how those shape improvement work. An attention to improvement facilitators and their development has implications for how participants are engaged and how their voices are leveraged in improvement efforts.

Our study also relied on TEs volunteering their time to participate in the network. Although facilitators sought varied perspectives in constructing the network's aim, there may be disparities in whose perspectives were represented. This raises important questions for future research. For example, what are the power relations that shape how some network members participate while others do not? How does the initial composition of the network's constituents—their commitments, backgrounds, and the logics of the institutions from which they come—shape how the network unfolds? These questions are of central concern to those leading NICs,

particularly because NICs rely on prospective members to make an active decision to choose to participate in these networks (Bryk et al., 2015, p. 150). Future research ought to attend to how the network initiation shapes whether and how people participate in the network.

Our study sought to unveil the practices and processes that constitute a core phase of improvement work—establishing a shared aim—in order to begin a much-needed line of research focused on the implementation of improvement networks. To improve how improvement networks come to be implemented, improvement-focused scholarship must attend to how improvement in education unfolds in practice. Similar to how improvement science advocates for practitioners to unveil and interrogate their systems' processes and practices, we call on improvement-focused researchers to interrogate the enactment of improvement.

References

Bang, M., & Vossoughi, S. (2016) Participatory design research and educational justice: Studying learning and relations within social change making. *Cognition and Instruction, 34*(3), 173-193.

Bryk, A. S., Gomez, L. M., Grunow, A., & LeMahieu, P. G. (2015). *Learning to Improve: How America's Schools Can Get Better at Getting Better.* Harvard Education Press.

California Commission on Teacher Credentialing (2016). California teaching performance expectations.

Coburn, C. E., & Penuel, W. R. (2016). Research–practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher, 45*(1), 48-54.

Coburn, C.E., Penuel, W.R., & Geil, K.E. (2013). Practice partnerships: A strategy for leveraging research for educational improvement in school districts. William T. Grant Foundation.

Cochran-Smith, M., & Villegas, A. M. (2015). Framing teacher preparation research: An overview of the field, part 1. *Journal of Teacher Education, 66*(1), 7-20.

Darling-Hammond, L., & Bransford, J. (Eds.). (2005). *Preparing teachers for a changing world: What teachers should learn and be able to do.* John Wiley & Sons.

Datnow, A. (2002). Can we transplant educational reform, and does it last? *Journal of Educational Change, 3*(3-4), 215-239.

Edwards, A. R., Sandoval, C., & McNamara, H. (2015). Designing for improvement in professional development for community college developmental mathematics faculty. *Journal of Teacher Education, 66*(5), 466-481.

Engeström, Y., Miettinen, R., & Punamäki, R. L. (Eds.). (1999). *Perspectives on Activity Theory.*

Cambridge University Press.

Engeström, Y., & Sannino, A. (2010). Studies of expansive learning: Foundations, findings and future challenges. *Educational Research Review, 5*(1), 1-24.

Erickson, F. (1996). Ethnographic microanalysis. *Sociolinguistics and Language Teaching,* 283-306.

Feldman, M.S. (1995). *Strategies for Interpreting Qualitative Data*. Sage Publications.

Feldman, M. S., & Orlikowski, W. J. (2011). Theorizing practice and practicing theory. *Organization Science, 22*(5), 1240-1253.

Fishman, B. J., Penuel, W. R., Allen, A. R., Cheng, B. H., & Sabelli, N. (2013). Design-based implementation research: An emerging model for transforming the relationship of research and practice. *National Society for the Study of Education, 112*(2), 136-156.

García, O. (2009). Education, multilingualism and translanguaging in the 21st century. *Social justice through multilingual education,* 140-158.

Goodwin, C., & Heritage, J. (1990). Conversation analysis. *Annual Review of Anthropology, 19*(1), 283-307.

Hammerness, K. (2006). From coherence in theory to coherence in practice. *Teachers College Record, 108*(7), 1241.

Hannan, M., Russell, J. L., Takahashi, S., & Park, S. (2015). Using improvement science to better support beginning teachers: The case of the building a teaching effectiveness network. *Journal of Teacher Education, 66*(5), 494-508.

Jay, J. (2013). Navigating paradox as a mechanism of change and innovation in hybrid organizations. *Academy of Management Journal, 56*(1), 137-159.

Jimenez-Silva, M., Gomez, L., & Cisneros, J. (2014). Examining Arizona's policy response post

Flores v. Arizona in educating K–12 English language learners. *Journal of Latinos and Education, 13*(3), 181-195.

Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management Review, 24*(4), 691-710.

Langley, A., Smallman, C., Tsoukas, H., & Van de Ven, A. H. (2013). Process studies of change in organization and management: Unveiling temporality, activity, and flow. *Academy of Management Journal, 56*(1), 1-13.

LeMahieu, P. G., Grunow, A., Baker, L., Nordstrum, L. E., & Gomez, L. M. (2017). Networked improvement communities. *Quality Assurance in Education, 25*(1), 5-25.

Lucas, T., & Villegas, A. M. (2013). Preparing linguistically responsive teachers: Laying the foundation in preservice teacher education. *Theory Into Practice, 52*(2), 98-109.

Martin, W. G., & Gobstein, H. (2015). Generating a networked improvement community to improve secondary mathematics teacher preparation: Network leadership, organization, and operation. *Journal of Teacher Education, 66*(5), 482-493.

Martinez, D.C., Morales, P.Z., & Aldana, U.S. (2017). Leveraging students' communicative repertoires as a tool for equitable learning. *Review of Research in Education, 41*(1), 477-499.

Mehta, J. (2015). *The Allure of Order*. Oxford University Press.

Penuel, W. R., Allen, A. R., Coburn, C. E., & Farrell, C. (2015). Conceptualizing research–practice partnerships as joint work at boundaries. *Journal of Education for Students Placed at Risk*, *20*(1-2), 182-197.

Penuel, W. R., Coburn, C. E., & Gallagher, D. J. (2013). Negotiating problems of practice in research–practice design partnerships. *National Society for the Study of Education*

Yearbook, 112(2), 237-255.

Philip, T. M., Souto-Manning, M., Anderson, L., Horn, I., J. Carter Andrews, D., Stillman, J., & Varghese, M. (2019). Making justice peripheral by constructing practice as "core": How the increasing prominence of core practices challenges teacher education. *Journal of Teacher Education, 70*(3), 251-264.

Russell, J. L., Bryk, A. S., Dolle, J., Gomez, L. M., LeMahieu, P., & Grunow, A. (2017). A framework for the initiation of networked improvement communities. Teachers College Record, 119(7), 1-36.

Sandoval, C., van Es, E. A., Campbell, S. L., & Santagata, R. (2020). Creating coherence in teacher preparation: examining teacher candidates' conceptualizations and practices for equity. *Teacher Education Quarterly, 47*(4), 8-32.

Sandoval, C., & van Es, E. (2020). Complexifying the process of generating an aim in a teacher preparation networked improvement community. *Conference proceedings of the 2020 International Conference of the Learning Sciences.*

Santagata, R., Lee, J., & Sandoval, C. (2019). Practice Partnerships in Mathematics Teacher Education. In *International Handbook of Mathematics Teacher Education: Volume 3* (pp. 183-210). Brill Sense.

Santagata, R., & Yeh, C. (2016). The role of perception, interpretation, and decision making in the development of beginning teachers' competence. *ZDM, 48*(1-2), 153-165.

Srivastava, P., & Hopwood, N. (2009). A practical iterative framework for qualitative data analysis. *International Journal of Qualitative Methods, 8*(1), 76-84.

Tsoukas, H., & Chia, R. (2002). On organizational becoming: Rethinking organizational change. *Organization Science, 13*(5), 567-582.

Vakil, S., McKinney de Royston, M., Suad Nasir, N. I., & Kirshner, B. (2016). Rethinking race and power in design-based research: Reflections from the field. *Cognition and Instruction, 34*(3), 194-209.

van Es, E. A., Cashen, M., Barnhart, T., & Auger, A. (2017). Learning to notice mathematics instruction: Using video to develop preservice teachers' vision of ambitious pedagogy. *Cognition and Instruction, 35*(3), 165-187.

CHAPTER 3

STUDY 2. Examining Power and Positioning in the Facilitation of Constructing a Shared Theory of Improvement

Introduction

Research-practice partnerships, and networked improvement communities in particular, have emerged as potentially powerful ways of bridging the research-practice gap in order to advance educational equity (Coburn et al., 2013). These approaches foreground collaborative efforts among researchers and practitioners to address challenges educators face. In doing so, they counter dominant paradigms in educational research that typically privilege researcher over practitioner knowledge, as well as long-standing challenges of implementation of evidence-based interventions (Farrell et al., 2021; Joyce & Cartwright, 2020). Networked improvement science, in particular, advocates for education stakeholders to pool together expertise from a range of institutions to solve problems of practice through disciplined inquiry and measurement for improvement (Bryk et al., 2015). Because these efforts have proved promising in addressing educational problems of practice, large amounts of resources have been expended to support the development of capacity to launch and sustain these networks (Feygan et al., 2020; LeMahieu et al., 2017).

For implementation of networked improvement communities (NICs) to succeed, the processes that constitute these networks must be interrogated. Aligned with Langley and Denis' (2011) call for researchers to examine the "micropolitics of improvement" in healthcare, I argue that examining the enactment of improvement efforts affords insight into what take-up of improvement methodologies looks like in practice. Additionally, I argue that examining the micropolitics and take-up of improvement methodologies are laden with power dynamics and

differential positioning that shape how the improvement work unfolds. In that vein, I align this study with other scholars immersed in partnership work, such as Bang and Vossoughi (2016), Philip, Bang, and Jackson (2018), and Vakil and colleagues (2017), who highlight how power dynamics and positioning come to shape partnership work broadly and call on partnership research to examine how issues of power and equity are lived in these partnerships. For these scholars, power dynamics and positioning shape the specific outcomes that partnerships work towards and the activities that they design and engage in to reach those outcomes. Power dynamics and how stakeholders are positioned also shape whose perspectives and experiences are foregrounded and whose are backgrounded.

Although seminal improvement-focused scholarship does not explicitly call attention to issues of power dynamics, Bryk and colleagues (2015) note that a typical process in networked improvement communities is how membership and participation in these NICs change as network aims and theories of action come to be defined. Improvement-focused scholars claim that stakeholders who participate in identifying the network's direction as the network begins to form often leave after the network's direction has been decided, and other stakeholders who find the network's direction compelling join once the direction has been established. I argue that attending specifically to power dynamics and positioning in shaping the network's direction in the first place is critical for understanding how the work of NICs come to be defined and whose voices shape the work.

Central texts explicating the underlying motivation and theory of networked improvement science do not attend to power dynamics or issues of equity and social justice. However, some practitioners of improvement science have articulated how NICs offer a suitable organizational approach to addressing inequities in schools (e.g., Carnegie Foundation for the

Advancement of Teaching, 2017; Fernandez, 2016; Meyer, 2016). Additionally, NICs claim to upend longstanding, traditional relations between schools and researchers, in which researchers are positioned as responsible for developing and testing interventions and those working in schools are meant to implement these interventions with fidelity. For improvement-focused and research-practice partnership scholars, this approach positions practitioners and communities as having little to no expertise and removes their agency from shaping how the work of schooling is carried out (Henrick et al., 2017; Wentworth et al., 2017). Instead, networked improvement science intends to position researchers and practitioners alongside one another as well as alongside improvement facilitators in order to identify and address problems together in ways that are sensitive to local contexts (Bryk et al., 2015). However, these claims raise questions about how this constellation of stakeholders are arranged and work together, how ideas are generated, and whose ideas come to be taken up and centered in NICs. There exists an opportunity to address these questions by attending to how power relations and positioning come to live in the implementation and processes of enacting networked improvement efforts. In this vein, I make the distinction between *improvement for equity* and *equitable improvement*. The former, improvement for equity, refers to how the tools and methodologies of networked improvement science are used or are suitable for addressing inequities that are produced in educational settings (e.g., disparities in student performance or experience). The latter, equitable improvement, refers to the power relations and the varied ways people are positioned that exist in the processes of doing improvement. This study centers on equitable improvement by focusing on the enactment of a NIC to unveil the power relations and positioning that constitute this approach to educational innovation and improvement.

This study is situated inside a NIC focused on improving teacher candidates' capacity to build on multilingual students' strengths relative to a specific process in initiating improvement networks: constructing a shared theory of improvement using a driver diagram. In improvement science, driver diagrams are visual tools that articulate a number of conjectures for achieving a particular aim. These diagrams are frequently articulated as being an initiative's guiding document, "function[ing] as design principles to guide improvement efforts" (Bryk et al., 2015, p. 76). We focus on the construction of a shared theory of improvement because it represents a core building block in establishing improvement efforts (Russell et al., 2017). I scope this study on the process of generating a theory of improvement as a way to gain insight into the enactment of an improvement network to reveal power dynamics and positioning that constitute these efforts. Thus, I locate this study as part of a growing body of work that examines how improvement networks are enacted, a body of work that includes Joshi and colleagues' (2021) examination of sustainability of changes generated by improvement networks after external supports have been removed, as well as Russell and colleagues' (2020) study of adaptation routines in a networked improvement community.

Generating a shared theory of improvement also serves as a point of convergence. In NICs, the diagram is designed to give network participants who come from different institutions a common language as they build toward a solution to a shared problem (Bryk et al., 2015). This process of engaging in joint activity and constructing joint work is required to move partnership work forward (Penuel et al., 2015), thus it is critical to examine how NICs come to establish shared work and shared aims. Convergence in the context of efforts to improve education typically requires that some perspectives are foregrounded while others are peripheralized (Mehta, 2015). The production of a driver diagram, then, serves as a critical juncture and, we

argue, shapes whose perspectives are foregrounded and whose are peripheralized and how people participate in the network as a result.

This study is also concerned with facilitation practices that constitute the process of generating a driver diagram and the power dynamics and positioning that comes with engaging in facilitation for improvement. A core tenet of improvement science is provisionality, where improvement artifacts and improvement work generally are constantly under scrutiny and revision from stakeholders. This tenet is expressed in improvement texts as "definitely incomplete and possibly wrong" (Bryk et al., 2015, p. 79; Russell et al., 2017, p. 28), a phrase meant to capture that improvement work is constantly subject to change. In networked improvement science, much of the responsibility for leading teams through engaging in and with provisionality in improvement work falls on the "network hub" (Bryk et al., p. 157). This hub consists of stakeholders with expertise in improvement science. These stakeholders are tasked with leading improvement efforts across sites, in particular through enlivening an ethic of provisionality; however, despite playing what appears to be a major role in leading continuous improvement efforts and ensuring provisionality, the work of improvement facilitation is undertheorized and under researched in education. Some scholarly work on facilitation has emerged in the use of continuous improvement in healthcare. For example, Harvey and Lynch (2017) offer a broad view of the work and role of improvement facilitators, documenting a number of possible strategies that facilitators can employ in leading continuous improvement efforts in healthcare. Although not specific to improvement facilitators, Lucas and Nacer (2015) provide a framework for the development of "improvers," articulating learning, influencing, resilience, creativity, and systems thinking as central dimensions of the competencies needed to lead improvement. I draw inspiration from research on improvement in healthcare to bring a

focus on facilitation to improvement work in education with an eye toward examining the power dynamics and positioning that emerge in the work of facilitation. I make visible in this study how facilitation practices come to shape how teacher educators participate in a networked improvement community and are positioned to make durable some perspectives while making ephemeral other perspectives. I argue that the work of facilitation is laden with power dynamics and differential positioning that has consequences for what improvement networks work on and who comes to participate in them.

To study power dynamics, positioning, and facilitation in the process of generating a theory of improvement, I draw on social practice theory and process theoretical perspectives to conceptualize power as an effect of practice and process rather than conceptualizing power as an object that someone holds, and positioning as access to particular practices (Feldman & Orlikowski, 2011; Foucault, 1986; Watson, 2017). In this vein, the research questions guiding this study are rooted in examining the processes and practices that constitute the enactment of "constructing a shared theory of improvement," attending closely to the ways in which practices and processes produce power and how people are positioned relative to these practices and processes. The questions are as follows:

1. How do facilitators produce power through the process of constructing a shared theory of improvement?
2. How are facilitators positioned to produce power in the process of constructing a shared theory of improvement?

To situate the study, I provide an overview of social practice and process organizational perspectives to frame how I conceptualize power and positioning in the improvement process. I then describe how my conceptualization of power and positioning come to shape the approach I

take to studying this NIC, offering a description of the specific improvement setting as well as the analytic approach I take to analyzing data generated from this NIC. I follow by presenting findings chronologically, highlighting throughout how facilitators were positioned and the practices that they engaged in as a result of, and to (re)produce, their positioning. I conclude by situating the findings on facilitators' positioning and practices within the broader landscape of improvement-focused and research-practice partnership scholarship.

Theoretical Framework

I draw on social practice theory and process organizational theory to conceptualize power and positioning. Social practice theory conceptualizes social life as constituted by a) situated action; b) transcending dualisms, such as that of mind vs. body; and c) processes of mutual constitution, in which phenomena exist only in relation to one another (Feldman & Orlikowski, 2011). Process organizational perspectives extend this and include a focus on how practices emerge and unfold over time, viewing organizational life as always becoming and organizational change as occurring constantly and moment-to-moment (Langley, 1999; Tsoukas & Chia, 2003). By taking a social practice and process theoretical lens to this study, I broadly conceptualize the production of power as *practices that shape practices elsewhere*, drawing on work from Watson (2017). Additionally, we conceptualize positioning as *access to practices that shape practices elsewhere.* By taking this view of power and positioning, I seek to gain insight into the practices facilitators engage in and how facilitators are positioned in the process of generating a theory of improvement. I now turn to describe each of these components of the theoretical framework in detail.

Power as Practices That Shape Practices Elsewhere

Central to practice theorizing is that phenomena are mutually constitutive and exist only in relation to one another. For example, practice theory views structure and agency as being recursive, where structures constrain and enable individuals' agency and individuals exercising agency simultaneously produce, reproduce, modify, or combat structures. Although phenomena are relational, practice theorists make clear that relations of mutual constitution are not equal relations, and it is within these unequal relations of mutual constitution where power circulates (Feldman & Orlikowski, 2011). For practice theorists, the exercising of agency and engagement in practice *is* power, thus positioning all agentic actors as being capable of producing power while recognizing that some actors are more agentic than others. For example, Abad's (2020) ethnographic study of a college and career readiness program included a recounting of a high school senior who wore basketball shoes to a college scholarship interview despite advice from a staff member in the program to wear "church shoes." In Abad's retelling of this account, the student did so as an act of resistance. Although traditional notions of power would focus on how the staff member and the interviewer for the scholarship program "held" power in this scenario, a practice theory view of power attends to how the high school senior exercised agency and produced power by resisting what was prescribed, while also attending to how the staff member produced power by telling the student what to wear (Foucault, 1986).

For practice theorists, then, all engagement in practice is the production of power. However, other conceptualizations of how power comes to be produced through practice have emerged as a way to offer a more specific account of power in practice theory, noting how viewing all practice as power enables imprecise and ambiguous analyses of power. In line with centering practice in their scholarly work, Watson (2017) highlights the "ability of some

practices to orchestrate and align others" (p. 177) as one way of viewing how practices come to produce power. In particular, Watson identifies how practices of *inscription*, in which representations of relations come to order and organize others' actions at a later time and at a different place, come to shape others' practices at other times and places. Drawing on Latour's (2005) theory of the actor-network, this ordering of actions occurs through assemblages of human and non-human actants in networks in ways that "enable action in one locale to shape action over distance in another (or many) locales" (p. 178). In this conceptualization of power, power is *produced* through the engagement in practices that have the capacity to then shape others' practices in different locations at different times.

Process philosophers' conceptualization of power similarly foregrounds the recursive relationship between inscription and action. Process philosophers broadly foreground viewing social life and organizations as constantly becoming, changing, and emerging, rather than viewing them as static and stable except for particular events that "spark" change (Tsoukas & Chia, 2002). Conceptualizations of power, then, center process and how processes are effortfully produced, upheld, combatted, or modified. Similar to Watson, Hardy and Thomas (2016) use process philosophy to argue that power is produced through the recursive relationship between what they call *unowned processes* (which are self-sustaining and carried forward independent of individuals' actions) and *owned processes* (in which actors set parameters for processes to evolve and form the basis of emerging and evolving processes). Specifically, they argue that power is generated through the *production of known objects*. For process philosophers, objects becoming known refers to how these objects become recognizable—in that community members agree that these objects exhibit "common features and meanings"—and in turn, shape practices in different spaces and at different times. This production of known objects, frequently expressed

in the form of tools, occurs through the inscription of social relations such that they endure through space and time (Latour, 1986).

In this study, I take up practice and process theorists' view of power to conceptualize it as an effect of situated actions that constrain and enable situated actions "elsewhere" across time and space. I note, however, that Watson's conceptualization of power-through-practice does not assume that all actors have equal access to practices that shape others' practices. I now turn to describe a conceptualization of *positioning* in relation to the production of power through practice.

Positioning as Access to Practices That Shape Practices Elsewhere

In each of the conceptualizations of power generated from practice and process theory, some individuals are afforded (or afford themselves) more or less capacity to act in ways that engage practices and inscribe relations that in turn shape others' actions at a later time and in a different place. Watson (2017) conceptualizes this differential positioning using actor-network theory to illuminate how some actors are systematically in more advantageous positions within the network. Actors who are positioned advantageously are closer to particular practices and objects that can shape other actors' practices within that network or that will eventually find themselves in that network. Watson argues that those who are systematically and advantageously positioned to act in ways that shape others' actions and inscribe relations can leverage those practices and relations to pursue their own goals, such as "shifting their location amidst power relations" (p. 174) to better position themselves even further. Watson offers a caveat, however, noting that no one person has control over all relations.

Process theorists similarly view how some individuals are better positioned to access the production of known objects, but also offer a conceptualization of "subject positions" (Hardy and

Thomas, 2016, p. 477). For Hardy and Thomas, subject positions refer to how, within these networks of relations, some actors' voices are amplified, and actions elevated while others' voices are silenced and have limited opportunities to act. For them, some actors within these networks are authorized to speak and act while others are not. This subject-positioning changes based on the emergence and displacement of what they call "dominant discourses" (p. 477). Hardy and Thomas refer to discourses as collections of interrelated texts and practices that systematically form the objects of which they speak, drawing on Foucault's (1972) conceptualization of discourses. Within these discourses some ways of speaking and acting are normalized and valued over others, making these discourses "dominant." As dominant discourses emerge and become displaced, individuals within these communities or networks are (re)positioned and their capacity to speak and act changes.

Finally, I conceptualize positioning for this study using Goffman's (1959) theorizing of positioning in stages, namely backstages and frontstages. To understand how practices emerge through presentations of oneself in everyday life, Goffman notes that actors are frequently engaging in changing performances that are for varying audiences (frontstage) while engaging in practices that occur to put on the performance (backstages). Goffman uses the analogy of shows to illuminate the relationship between frontstages and backstages. Goffman describes audiences as being subjected to performances from stage actors, in which they are dressed and behave in particular ways for this audience. At the same time, actors are engaged in backstages where there exists "suppressed facts" and where the performance is "painstakingly fabricated" (p. 69). Goffman's theorizing of frontstages and backstages concern how individuals move in and between these two locations.

Ringel (2018) extends this conceptualization of backstage-frontstage positioning to examine how information about organizations is transformed through the processes of communicating about organizations and the audiences' interpretations of what is then communicated. In their study of transparency in an organized political party, Ringel illuminated how the party demanded transparency from the government and other elected officials and, as it came to take seats in local government, sought to enact transparency by recording and broadcasting all meetings and interactions that party members had with one another while in office. However, in an attempt to be transparent, party members became frustrated and soon generated backstages, first informally (i.e., making nonverbal signals to one another during live broadcasts and over emails) and later, formally (i.e., meetings that occurred outside of broadcasts). Through examining this political party and its practices as members became elected officials, Ringel conceptualized how the backstages and frontstages are related and entangled with one another in ways that produce failed efforts to draw boundaries between the two. Ringel's use and conceptualization of frontstages and backstages modifies Goffman's backstage-frontstage dynamic by arguing that backstages and frontstages can be spatially dispersed and can be performed through information and communication technologies such as phone calls, broadcasting, and the internet. In the case of the political party Ringel examined, frontstages included live broadcasts and recordings, while backstages occurred during these broadcasts and via email. I use this conceptual framework of backstage-frontstage to theorize the location of practices that shape practices elsewhere and individuals' position relative to those practices.

Taken together, these bodies of work frame this study by conceptualizing power and positioning this way to understand how facilitators in a teacher preparation NIC were positioned to produce power via engaging in practices that shaped TEs' practices in the process of

generating a shared driver diagram. Conceptualizing positioning and power in this way affords insight into how facilitators are positioned to shape how teacher educators participate in improvement, making visible the systematic and advantageous positioning of facilitators in improvement efforts broadly. I now turn to describe the methods I employed to understand how power was produced through the process of constructing a shared driver diagram.

Methods

This study is an in-depth examination of the interactions and facilitation practices that constitute a teacher preparation networked improvement community focused on improving candidates' capacity to build on multilingual students' strengths. I focus on the facilitator because of the central role they are intended to play in a NIC for supporting members to develop a shared aim for their work (Bryk et al., 2015).

I organize this section by first describing the research setting and the network and its genesis. Then, I articulate my positionality within this network, making visible my role as facilitator and researcher, as well as the data that were collected as part of my facilitation of this network. Finally, I describe my analytic approach to examine how power was produced through the construction of a shared theory of improvement using a driver diagram.

Research Setting

This study takes place within the initiation of a networked improvement community made up of seven teacher preparation programs across a large, statewide university system. The initiation of a NIC entails centering a shared problem of practice, developing a theory of improvement, and developing a shared system of measurement (Russell et al., 2017). This study is situated within the process of constructing a shared theory of improvement using a driver diagram, a core tool of networked improvement science (Bryk et al., 2015).

In the spring of 2018, the California Teacher Education Research and Improvement Network (CTERIN) began the initiation of a networked improvement community to promote collaboration across these universities' teacher preparation programs, in response to calls in research to improve research and knowledge base of pedagogies of teacher education and to engage in more cross-site collaborations to allow teacher preparation programs to learn from one another (Grossman & McDonald, 2009). Teacher preparation research has been criticized as being too siloed and being centrally concerned with examining one activity in one course with one set of candidates in one program (Cochran-Smith et al., 2015). Cochran-Smith and colleagues call for cross-program collaborations to generate insight into teacher preparation programs. CTERIN sought to extend this call by focusing on cross-program collaboration for *improvement* at scale. This study is motivated by this focus on collaboration given that efforts to improve educational systems are frequently laden with power dynamics in which some perspectives are foregrounded and others are backgrounded (Mehta, 2015).

In the spring of 2018, CTERIN sought to launch a cross-program improvement effort, starting with a conversation with directors from the system-wide teacher preparation programs using data collected from each program as part of the state credentialing process. The directors collectively noticed variation in responses to several survey items, and ultimately narrowed their focus to a particular item asking candidates how well their program prepared them to "meet the instructional needs of English learners." Directors then gauged interest from teacher educators at their home programs around their willingness to work on this problem; teacher educators across eight sites agreed. Once the focal problem was identified, CTERIN and program directors invited teacher educators to volunteer their time to join the network.

To start the 2018-19 academic year, 44 teacher educators volunteered to participate in the process of constructing the network's theory of improvement. Teacher educators came from seven teacher preparation programs. TEs across the seven sites occupied different roles, some of them primarily located at the university, others situated inside schools and serving as part-time lecturers and supervisors. Additionally, there were three facilitators. The primary facilitator is the first author of this study and brought to the network experience participating in and leading networked improvement efforts. A second facilitator served as a principal investigator of CTERIN and supervised the primary facilitator at their home campus. A third facilitator was an undergraduate student research assistant at the other facilitators' campus.

Teacher educators began to participate in the initiation of the network during the summer of 2018 by attending two remote, hour-long meetings focused on developing a shared understanding of the problem. TEs then participated in a two-day convening focused on generating an aim and theory of improvement in September 2018. After the convening, members agreed to meet remotely for 90 minutes every month throughout the year. Subsequent meetings centered on receiving feedback from members on a proposed aim and theory of improvement using a driver diagram, a visual tool that uses primary and secondary drivers to make conjectures that connect specific activities, experiences, and changes to the aim (Bryk et al., 2015). Between September and November, the facilitator led a process of generating and sharing drafts of a driver diagram and soliciting participant feedback. Between the September convening and the October videoconference, facilitators used insights generated by TEs to generate and solicit feedback from TEs on a draft of the driver diagram. This diagram was then taken to the October meeting where TEs were collectively asked to provide feedback on the diagram. Following the October meeting, facilitators generated another draft of the driver diagram and asked one TE to

review the revisions facilitators made. At the November meeting, members agreed to the network's theory of improvement. Previously, I examined how teacher educators constructed and engaged with tensions en route to the production of a shared network aim (Sandoval & van Es, 2021). Examining the process of producing a shared aim revealed that teacher educators viewed language acquisition and multilingualism as being contradictory to one another. For TEs in this network, "language acquisition" referred to systems of schooling that foregrounded developing English language proficiency among English language learners, while multilingualism centered creating learning environments that honored the diverse languages students bring to classrooms and sought to validate them by allowing students to participate in schools with whatever language they spoke. This tension has frequently been cited in teacher preparation literature (Lucas & Villegas, 2010; Martinez et al., 2017). The present study builds on our prior work by examining the power dynamics that emerged in the concurrent and entangled process of generating a shared theory of improvement and how these power dynamics came to be made durable in the development of a tool for visualizing a shared theory of improvement, a driver diagram.

Positionality

I served as the primary improvement facilitator of this network. I came to CTERIN with five years of experience participating in and leading continuous improvement efforts, receiving training specifically on initiating and leading networked improvement communities in education. In this NIC, I participated in the dual role of researcher and facilitator. I made clear to teacher educators who volunteered to join the network that I sought to help them work together to improve their programs, while also documenting the process of improvement in order to study it.

As part of CTERIN, the study received IRB approval and all teacher educators agreed to participate.

Participants and Data Sources

The focus of my investigation into the construction of a shared, network theory of improvement using a driver diagram began with an in-person convening in September 2018 and ends with a monthly meeting in November 2018. Data consisted of video recordings of network meetings, which sought to include all interested teacher educators; four audio and video recordings of feedback meetings with individual teacher educators; and five audio-recorded debrief and planning meetings among the facilitators of the network. All audio and video recordings were transcribed, and the transcriptions served as the primary documents for analysis. Lastly, I analyzed artifacts in the form of written memos recorded from the primary facilitator, during and between meetings; visual improvement science tools, namely a fishbone diagram and driver diagram; and presentation slides for each meeting, which included memos that captured decisions about how meetings would be facilitated. A detailed summary of the data collected for this study can be found in Table 2.1.

Table 2.1. Data Sources by Meeting Context

Context	Topics	Data
September convening (1.5 days)	Interrogating and scoping the network's outcome; brainstorming possible aim statements	Video recording of convening; audio recordings of small-group and whole-group conversations; presentation slides; debrief meeting
October video-conference meeting (90 minutes)	Reviewing categories of aim statements; interrogating and suggesting revisions for a draft of the network's driver diagram	Video conference recording and "chat" feature content; field notes; meeting transcript; presentation slides; memos; driver diagram drafts
November video-conference meeting (90 minutes)	Interrogating and suggesting revisions for a second draft of the network's driver diagram; clarifying the definition of terms and phrases used in the driver diagram.	Video conference recording and "chat" feature content; field notes; meeting transcript; presentation slides; memos; driver diagram drafts
Four feedback meetings (approximately 30 to 60 minutes each)	Individual meetings with teacher educators to solicit feedback on drafts of the driver diagrams; occurred in between meetings	Video conference recordings; memos; driver diagram drafts; meeting transcripts
Five debrief and planning meetings	Meetings among facilitators to debrief and plan for monthly meetings with teacher educators	Audio recordings of meetings; memos; meeting transcripts

Analytic Approach

Consistent with the framing of this study using practice and process theoretical perspectives, the analytic approach centered on the actions of network members, with a focus on facilitators' actions. To gain insight into actions, I relied on and examined facilitators' and teacher educators' situated talk. I drew on Gee (1992) to understand the situated nature of TEs'

verbal and textual (written) contributions, particularly Gee's conceptualization of talk as situated within activity systems, which order and draw relations among social activities. Within these activity systems, Gee articulates how "norms, rights, and obligations for speaking and acting" exist within particular activities. To complement and make more concrete Gee's approach to examining talk, I drew on Erickson (1996) to situate contributions by examining them in relation to local framing and tasks, where talk is constrained and enabled by the local framing and tasks, while local framing and tasks are simultaneously produced, reproduced, and modified by talk. I position this focus on talk, and how talk is situated in relation to tasks and activities more broadly, as aligned with my conceptualization of power as being produced when practices shape others' practices elsewhere. Specifically, by focusing on talk as situated within tasks and simultaneously situating tasks, I seek to gain insight into how talk and tasks enacted by some people in turn constrain and enable others' actions. For example, during network meetings in October and November, facilitators asked teacher educators to review drafts of the driver diagram silently before sharing their comments with the rest of meeting attendees. I generated a memo highlighting how facilitators could have asked TEs to share their thoughts in the whole group, sparking questions about how facilitators chose to take these particular actions and drawing my attention to how TEs participated as a result.

The focus on situating and situated talk serve as a broad approach to how I analyzed data. Specific analytic activities occur in three phases. In the first phase, I analyzed facilitators' and teacher educators' talk to construct a narrative of events over time in relation to the iterative process of generating a driver diagram. In the second phase, I coded the narrative for practices that teacher educators and, more centrally, facilitators engaged in throughout the process. The third phase emerged from insights generated in the first two phases and focused on how the work

of generating a driver diagram occurred in and between backstages and frontstages. I turn to describe each of these in detail.

Phase 1

In the first phase of analysis, I constructed a single narrative across all meetings that constituted the production of a driver diagram. Constructing narratives affords insight into how events unfold and are useful as analytic devices for examining sequences while maintaining enough detail and subtlety around interactions and situations (Langley, 1999). To construct this narrative, I first coded and generated memos around transcripts of network-wide meetings in September, October, and November. In this initial coding phase, I used process coding to focus on teacher educators' and facilitators' contributions (Saldaña, 2015). Coding focused on participants' contributions—both verbal and textual, the latter of which consists of written chat comments in video conferences—around identifying the network's aim and driver diagram. Consistent with a practice and process theoretical lens, I attended to the *situated* nature of these contributions by making note of the local framings and tasks within which the contributions were made, as well as the version of the driver diagram to which TEs responded. For example, during the October meeting, facilitators presented a first draft of the driver diagram. I situated this within a) the facilitators' framing of this presentation, in which they showed TEs how they constructed the diagram; and b) the process of generating the draft of the diagram more broadly, including how facilitators sought to represent TEs' commitments into the diagram. I applied a similar approach to analyzing memos generated from individual feedback meetings, debrief and planning meetings, and design memos from the facilitator around the driver diagram.

I then reviewed codes and memos across meetings to create a draft of the narrative, which spanned events from September to November 2018. Reviewing the codes and memos allowed

me to see contributions and practices across meetings and events. Rather than categorizing them, the codes were used to help construct a narrative of events that unfolded over time. In crafting this narrative, I wrote through how contributions and practices evolved to produce a shared driver diagram, using direct quotes to ground this narrative in specific evidence.

Phase 2

In phase two, I again engaged in process coding, this time around the narrative and to attend to teacher educators' and, more importantly for this study, facilitators' practices. Additionally, I generated memos pertaining to teacher educators' contributions situated within the activities and participation structures that facilitators designed and led (Erickson, 1996; Gee, 1992). I also generated memos about the practices facilitators engaged in throughout this narrative, making note of the ways in which particular actions were situated within structures that made those actions recognizable and familiar. As part of this memo generation, I generated insight into how power dynamics were emerging by noting how facilitators' actions shaped teacher educators' actions. I paid close attention to how facilitators launched teacher educators into particular tasks (e.g., reviewing the driver diagram silently and, when prompted, writing their thoughts in the videoconference platform's chat function) and how teacher educators in turn responded, looking for moments when TEs followed along with facilitators' instructions and when they did not. Alongside looking for these moments, I generated memos about how teacher educators could have responded differently but did not. For example, I noted how teacher educators could have offered resistance to privately reviewing the diagram and later writing their comments on the chat, but instead chose to follow the facilitators' instructions. Teacher educators did not resist facilitators' instructions in any of the meetings I analyzed.

The next pass at analyzing the narrative focused on examining the production of power through making relations and discourses durable or ephemeral. To do this, I generated memos around teacher educators' contributions and how they came to be taken up in the driver diagram. For example, one teacher educator during a feedback meeting offered a suggestion to a second draft of the driver diagram to add content around "accountability and monitoring regimes." Facilitators responded in the moment by adding a secondary driver entitled "awareness of monitoring and placement procedures." I also generated memos about TEs' contributions around whether or not they served as evidence that TEs' contributions were taken up and were represented in subsequent versions of the driver diagram. For example, facilitators shared the first draft of the driver diagram in a feedback meeting with a teacher educator to ask for her feedback; the teacher educator remarked that the driver diagram included "everything we hoped the work could be." Comments like these served as evidence that the facilitators were successful in representing certain TEs' commitments.

I also generated memos pertaining to facilitation practices in the production of a driver diagram, looking for how actions were patterned in ways that began to make them look routine and were situated within a particular approach to facilitating improvement work. To do this, I reviewed process codes I generated around the narrative and concurrently reviewed meeting transcripts, transcript process codes, and presentation slides to gain further insight into facilitators' actions and how they unfolded over time. I annotated presentation slides and memos that were generated in the construction of those slides to understand how facilitators designed and led particular activities and added process codes to meeting transcripts around facilitation activities. I reviewed the meeting transcript and presentation slide codes together with the narrative and its codes to examine how practices unfolded and changed over time. I saw a pattern

of facilitation practices that resembled cycles of revision and creation, where facilitators created a draft of a driver diagram, solicited critiques and revisions around the diagram, made revisions, and returned to teacher educators to solicit critiques and revisions. Within these cycles of revision, facilitators were positioned in particular ways that shaped how TEs participated and to what TEs were responding during these cycles. To understand these cycles, I turned to backstage-frontstage dynamics (Goffman, 1959), which was central to the third phase of analysis.

Phase 3

To understand how the cycles that emerged in phase two related to power and positioning, I used to Goffman's (1959) backstage-frontstage theory to identify practices that occurred in and in between backstages and frontstages. Locating practices in and between these dynamic stages provided a useful heuristic to see how and where power was produced, affording insight into how facilitators had access to particular stages that enabled them to engage in practices that shaped teacher educators' practices. This phase of analysis, then, entailed taking another pass at the narrative by coding for and generating memos around whether practices were enacted in the backstage or the frontstage, as well as how these practices moved between these two stages. In particular, I examined where, in relation to backstages and frontstages, facilitators engaged practices that shaped TEs' practices and how facilitators' movement in and between these stages produced drafts of the driver diagram. After locating practices in and between these stages, memos were then generated about the positioning of facilitators and teacher educators relative to these stages, particularly with regards to the production of the driver diagram as a process of inscribing relations and commitments. These memos were used to help gain insight

into who is systematically advantageously positioned to produce durability and, in turn, shape practices elsewhere.

Findings

Analysis revealed two findings pertaining to how power was produced in the process of constructing a shared driver diagram and how network facilitators and teacher educators were positioned throughout this process. The first set of findings concern how facilitators were systematically and advantageously positioned to engage in practices in frontstages, backstages, and at the boundaries of frontstages and backstages. The second finding concerns how facilitators engaged in three sets of practices as they moved between frontstages and backstages: *inscribing, briefing,* and *inviting critiques* (See Table 2.2).

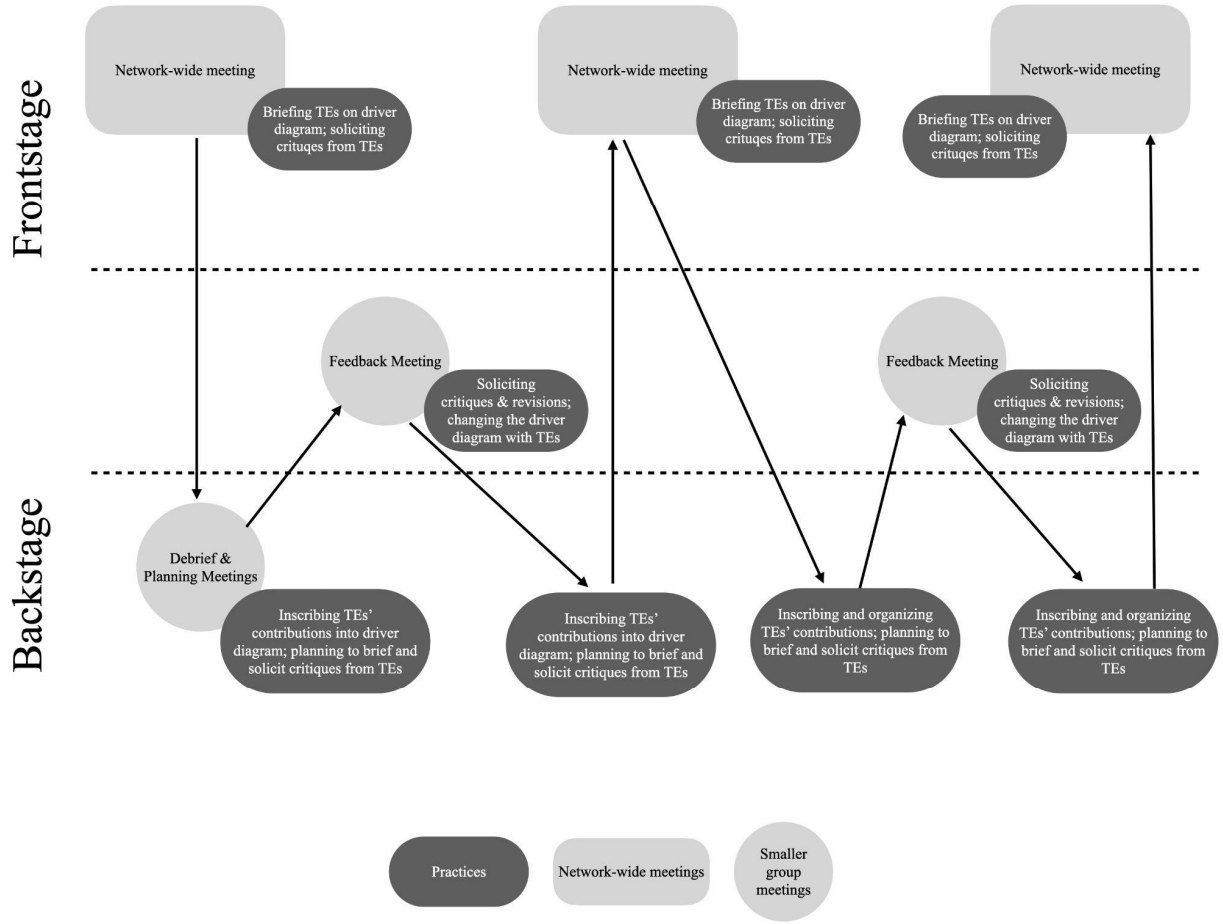
Table 2.2. Practices by Location

	Backstage	Boundary	Frontstage
Inscribing	Organizing TEs' contributions Incorporating participants' language Choosing not to inscribe TEs' contributions	Brainstorming changes to the driver diagram with TEs in real time	
Briefing	Writing scripts for presenting drafts Generating visuals to highlight modifications	Explaining that draft was generated from previous conversations with TEs	Detailing how draft was generated using TEs' contributions Asking TEs to focus on changes to current draft
Soliciting critique	Developing prompts for TEs Organizing TEs' participation Selecting which TEs should check driver diagram	Checking driver diagrams with TEs	Inviting contributions from TEs in particular ways at particular times Responding to contributions from TEs

These sets of practices occurred iteratively and together consisted of facilitators' attempts to create a driver diagram that represented teacher educators' perspectives and preferences. These practices occurred in different locations—backstages, frontstages and at the boundaries. Figure 2.1 represents the location of these practices over the course of constructing the driver diagram. I organize these findings around these three sets of practices, highlighting how facilitators'

positioning as they engage in each practice and how their engagement in these practices produces power via shaping TEs' practices.

Figure 2.1. Practices In and Between Backstages and Frontstages



Inscribing

The first set of practices concerns how facilitators engaged in *inscribing,* referring to how they sought to codify teacher educators' commitments and preferences into drafts of driver diagrams. Through engaging in practices of inscribing TEs' commitments and preferences, facilitators privileged some TEs' participation and perspectives over others. Additionally, facilitators were uniquely positioned in the network to engage in the practice of inscription, affording them opportunities to work in and between backstages and frontstages to codify their

commitments and preferences. This positioning mattered for whose perspectives were eventually made durable and whose were made ephemeral.

Inscribing emerged as a practice from the facilitator's concern with representing perspectives made dominant by TEs. Drawing on data from a debrief meeting that occurred immediately following the in-person convening in September 2018, I show how this backstage context afforded the facilitator the capacity to decide what gets represented in the driver diagram and, in turn, shape the NIC's guiding theory of action.

At the end of the convening, TEs had challenged the network's existing framing, which they viewed as being focused on language acquisition, to center multilingualism as the paradigm to guide language instruction (see Sandoval & van Es, 2021). After the convening ended, the facilitators retreated to an office space to discuss how the meeting unfolded. The primary facilitator expressed frustration that the meeting did not "move the work forward," later remarking about teacher educators' commitments to multilingualism that English language acquisition was "sort of the reality, and like at some point, what's within our locus of control." For the facilitator, TEs' commitments to multilingualism initially posed an obstacle to moving improvement work forward given that TEs had expressed their stances as aspirational. The primary facilitator saw language acquisition as being "within [facilitators'] locus of control" and conducive to advancing the improvement work because of its attention to existing systems rather than aspirations. During the debrief, however, the primary facilitator turned to examine how to reconcile teacher educators' commitments to multilingualism and the need to move the work forward: "I'm like, OK, how would I sort of get them to meet to a point where they don't feel like they have to sacrifice those things." I highlight this turn to make visible how the facilitator came to treat the process of generating a driver diagram as centrally about representing TEs'

perspectives. This in turn led the facilitator to be oriented towards inscribing commitments to multilingualism in the driver diagram. At this point, the facilitators were positioned in the backstage to make decisions about how the process would unfold without teacher educators' input. Facilitators' positioning and subsequent unilateral decision to center TEs' perspectives on multilingualism is an instance in which power came to be produced through facilitators' actions, shaping how TEs would be positioned and engaged in the process of generating a theory of improvement. Following the convening and this debrief meeting, facilitators began to engage in the practice of *inscribing,* in which facilitators collected, reviewed, and organized contributions from TEs and sought to codify them in drafts of the network's driver diagram.

In another instance, following the convening, facilitators reviewed notes from teacher educators that came from an activity in which facilitators asked TEs to generate possible aim statements for the network. Facilitators then organized these notes into four categories, derived from language in TEs' notes: learning about and leveraging multilingual students' assets and strengths; understanding deeply multilingual students and their culture and communities; building trust and relationships with multilingual students' communities; and designing instruction (see Figure 2.2). These categories were then used to create a first draft of the driver diagram (Figure 2.3). Here, the facilitators engaged in the practice of inscription by codify and making durable TEs' commitments to multilingualism using a driver diagram. These activities also occurred in the backstage, where no TEs were present while preparing an artifact that would be presented to teacher educators at a later time. The facilitators were advantageously positioned to engage in the practice of inscribing given their access to backstages, and did so by codifying commitments to multilingualism, the dominant perspective among TEs expressed at the

convening. This also served to constrain and enable TEs' participation by shaping what they were responding to, thereby producing power via practices that shape others' practices.

Figure 2.2. Categorized Notes from Teacher Educators

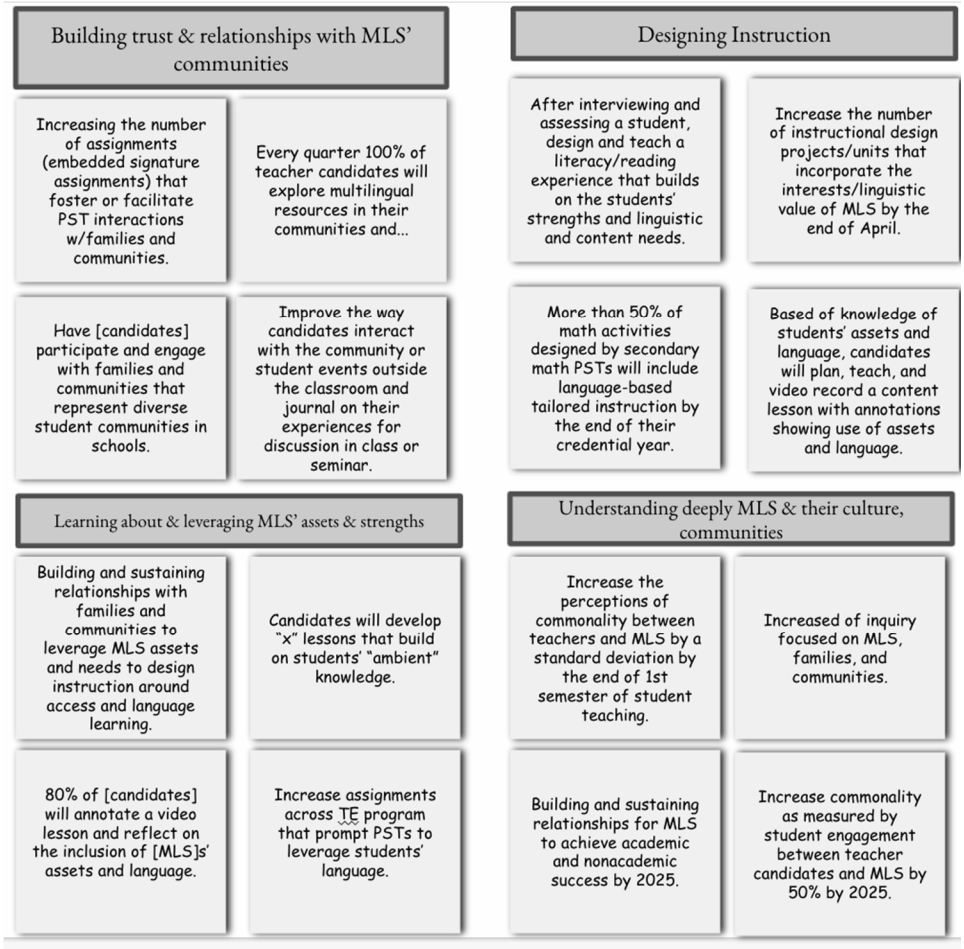
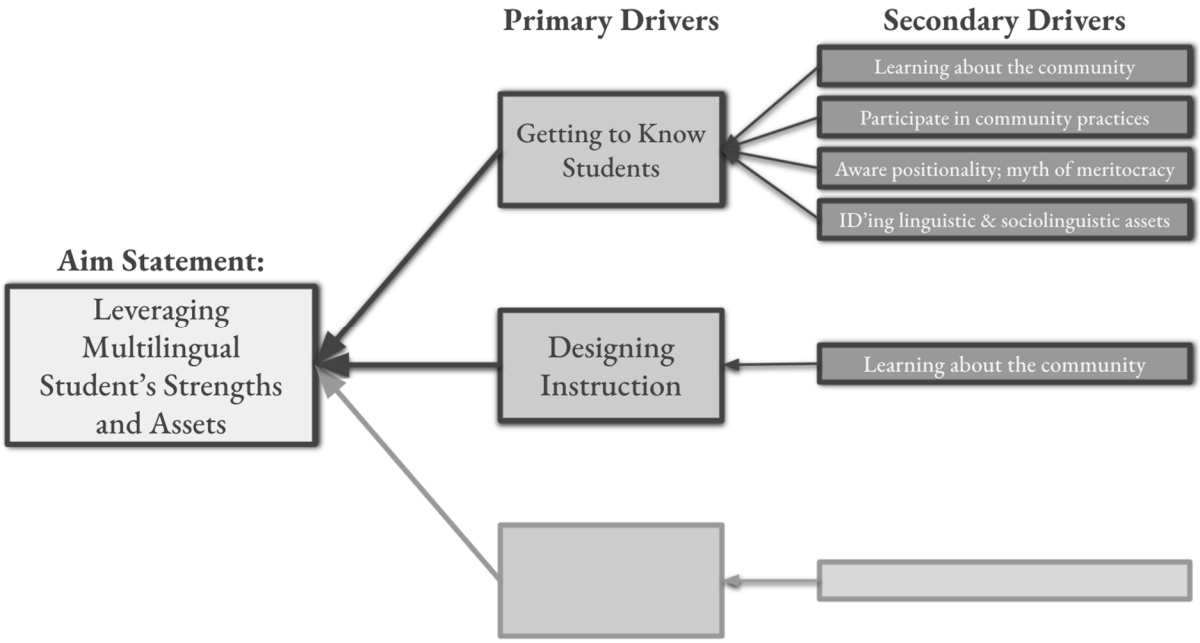


Figure 2.3. Draft 1 of Network Driver Diagram



Facilitators also engaged in the practices of inscribing between backstages and frontstages—what I refer to as the boundary—to construct the driver diagram, elevating some TEs' perspectives in the process. To illustrate, I draw on a feedback meeting with Patrick, a TE who had expressed at prior meetings a focus on multilingualism as an aspiration for teacher educators. This feedback meeting took place between the October and November network meetings and was used by facilitators to check a second iteration of the driver diagram that was generated using contributions during the October all group meeting. In this conversation, the facilitators sought to inscribe the perspectives of TEs who centered multilingualism and backgrounded language acquisition, and engaged in the practice of inscribing by suggesting and making modifications to the diagram with the TE. At the start of the discussion, the primary facilitator oriented Patrick to the changes in the driver diagram and asked Patrick for "general feedback" on the diagram. Patrick found the changes acceptable, but offered a suggestion:

> I wonder if adding to navigating English Language Development standards is also the—I don't know if it's accountability or monitoring regimes [...] But because the standards exist imbricated in this larger structure of, you know, English under monitoring and support and reclassification, that I feel like preservice teachers don't have to know the whole system. They just have to know it exists...

Here, Patrick offered a suggestion for revising the second draft of the driver diagram, specifically around the new primary driver entitled "Preservice Teachers Navigating Systems" and accompanying secondary drivers, around adding content around "accountability and monitoring regimes." Facilitators chose to use this suggestion to inscribe Patrick's comments into the driver diagram in real time:

> Facilitator 1: Yeah, so maybe, maybe that's like, maybe that's its own secondary driver...that sort of feels like another part of this. It's like another one. It's like, around. I mean, it's also somewhat related to pushing back on them. Well, it's not really pushing back in, like an awareness of.
>
> Patrick: Yeah, yeah.
>
> Facilitator 2: Monitoring process. Monitoring and assortment.
>
> Facilitator 1: Yeah, it's like monitoring and placement. Structures, right.

In these exchanges, facilitators are brainstorming and constructing ways to inscribe Patrick's comments into the driver diagram in real time. Facilitator 1's comment that "maybe that's its own secondary driver" shows the facilitator attempting to turn Patrick's contribution directly into a component of the driver diagram. Facilitator 1 and 2 exchange ideas for the language of the driver diagram revision incorporating Patrick's contributions. These exchanges make visible how

facilitators engaged in the practice of inscribing and, importantly, how they privileged Patrick's perspectives such that they were inscribing his comments into the diagram in real time.

In addition to facilitators engaging in inscribing in the above case, facilitators were positioned to *not* engage in the practice of inscribing some ideas in other cases, and thus afforded them the capacity to make some TEs' comments ephemeral. For example, prior to the October monthly meeting, facilitators held a feedback meeting with Janet, a TE who had expressed commitments to language acquisition because of how schools currently operate. During this meeting, Janet expressed a concern that the driver diagram—derived from TEs' commitments to multilingualism—was "too one-sided" towards "knowing" students with little focus on instruction. Janet remarked that the diagram was "too focused on the sociocultural component" and would later remark that as a teacher, she would need to rely on English language development standards to help understand what "language issues" K-12 students have in order to "develop their language goals." Janet then offered a critique of the aim statement, offering skepticism towards the focus on leveraging multilingual students' assets. Janet wondered "why is it important to leverage [multilingual students' assets]?" Janet did not express that doing so was unimportant; rather, she suggested that working on leveraging multilingual students' assets served some broader end goal: "Is there a goal or something [for which] I'm leveraging this because I need to improve student learning […] why is that aim statement important?"

Janet's contributions centered on attending to practices in schooling as they exist now, and as represented in state credentialing standards that shape her instruction as a teacher educator, with a focus on language acquisition in which students have "language issues" and "language goals," contrasting with the network's strengths-based perspective on multilingualism. Following this meeting, the facilitators chose not to incorporate Janet's suggestions into the driver diagram,

due at least in part to the monthly meeting occurring just two days after meeting with Janet, and also to a shared commitment to multilingualism based on the contributions TEs made at the convening. This series of interactions represented a breakdown in the emergent cycle between soliciting critiques of the driver diagram and revising it afterwards, and thus, how power is enacted in facilitators' practices. Janet's comments became ephemeral as the facilitators generated and presented the driver diagram to the network-wide meeting in October that did not include her contributions and constrained TEs' capacity to take up Janet's contributions for discussion. In choosing to leave Janet's comments out of the next iteration of the driver diagram, the facilitators produced power by inscribing some TEs' commitments to multilingualism into a draft of driver diagram while leaving out Janet's contributions, shaping the object around which TEs would engage and, by extension, future interactions in the network. Unlike their incorporation of Patrick's comments, facilitators did not attempt to inscribe Janet's comments into the driver diagram in real time, contributing to Janet's comments becoming ephemeral. Importantly, facilitators were also uniquely positioned to make these decisions given their access to backstages and their capacity to choose whether or not to inscribe these comments after this feedback meeting and before the network meeting in October.

In this section, I make the claim that facilitators engaged in the practice of inscribing, presenting evidence from various meetings to show how this practice came to be performed. By engaging in inscribing in this way, facilitators produced power by drafting a central organizing tool in network initiation and also shaped the diagram in ways that constrained and enabled TEs' capacity to react to TEs' contributions at a later time. In addition to facilitators engaging in inscribing, they also presented the driver diagram in frontstages in particular ways that

constrained and enabled TEs' participation. I now turn to describe how they did so by engaging in the practice of *briefing* in the next section.

Briefing

Unveiling and interrogating facilitators' actions revealed how facilitators engaged in the practice of *briefing* en route to the production of a shared aim. Briefing refers to how facilitators presented drafts of driver diagrams and related artifacts with teacher educators that set the parameters for how TEs could engage or direct their attention. Rather than merely presenting the driver diagram as-is, facilitators brought in key artifacts or offered specific context to situate the diagram. This work of situating, which spanned backstages and frontstages, highlights how facilitators produced power by determining what objects TEs engaged with and what information was deemed necessary or important to convey to TEs.

To show facilitators' engagement in briefing, and how that shaped TEs' participation, I present evidence from the October network meeting, which I characterize as occurring in the frontstage due to TEs' presence and their position as an audience. I return to the moment where facilitators presented teacher educators with TEs' own statements, organized into four categories and, later on, how those categories were used to construct a driver diagram. As the facilitators shared TEs' aim statements, the primary facilitator remarked:

> What we did with these, is we created these categories. We saw that many articulated the actual theory of action [...] The wording of proposed aim statements were very similar in a lot of ways, they fell in different categories, but they seem to be sort of in service of one [category]. And so based on those two things, we created a draft of a driver diagram. And we created this based on all of your thoughts. And we also got some feedback from specific people who are and are not here with us right now. We specifically created this

> for your critique and your critical eyes to take a look at. So I'm going to walk us through about what we did and sort of how we got there. And hopefully, it's clear how we got what we got from your sticky notes.

The primary facilitator told TEs that these sticky notes and categories were used to generate a first draft of the driver diagram (Figure 2.3). In a memo that was created in the presentation document, the facilitators wrote that the purpose of presenting TEs' own aim statements in this way was to "build will" among TEs around moving forward using a driver diagram. By showing how facilitators engaged with TEs' aim statements and organized them into categories, facilitators sought to show how, specifically, they approached the work of representing TEs' views in the diagram. For facilitators, presenting TEs' contributions and how facilitators engaged with them served to garner support for the general direction that the diagram represented the network would take.

I surface how facilitators presented the driver diagram to TEs to illuminate how facilitators situated the driver diagram within the process through which facilitators created it. This was employed as a strategy to "build will" among TEs to show them that their ideas were taken up and incorporated into the diagram. This will-building strategy was employed so that the network can "move forward" and avoid lengthy discussions around the network's direction and framing. I use the term "briefing" to portray how facilitators did not just present a first draft of the driver diagram as they had constructed it, but also situated the diagram within the process through which facilitators used TEs' contributions to construct this draft of the driver diagram, all to achieve the goal of building will among TEs so that they would see their perspectives were taken up and be motivated to continue participating. The facilitators, then, produced power by briefing TEs to constrain and enable their participation in the process of constructing the driver diagram.

TEs no longer were asked to react to the driver diagram but were also tacitly faced with reacting to the process through which facilitators constructed the driver diagram. Facilitators could have focused TEs' attention solely on the driver diagram, but instead broadened their focus to include whether or not facilitators had represented TEs' own contributions.

Facilitators' engagement in briefing in this way also sheds light on how facilitators were positioned in and between backstages to shape how TEs came to participate in generating a shared driver diagram. Facilitators positioned themselves as responsible for pushing the network forward while keeping its members together, enabling them continued access to backstages so that they could generate artifacts that they could then bring to TEs in frontstages. Their ability to position themselves in the backstage also afforded them the capacity to construct a narrative around how the driver diagram was drafted, namely to emphasize to TEs that they had made an attempt to incorporate their contributions and their language in the driver diagram. This narrative around the process of constructing a driver diagram draft was then presented visually to TEs in the frontstage, making a point to trace the lineage of the driver diagram from the sticky notes TE had generated a month prior.

Facilitators also engaged in the practice of briefing when it came to the second iteration of the driver diagram (Figure 2.4). During the November meeting, facilitators highlighted the changes that were made from the previous iteration and asked TEs to offer their comments. This time, however, facilitators chose to spend less time with TEs on revising the driver diagram to focus on other improvement activities. The primary facilitator remarked at the beginning of the brief activity:

> We wanted to do another quick pass of [the driver diagram]. We've kind of gone through this process of bringing a driver diagram and changing it a few times. And we brought a

> lot of new ideas. So, I wanted to do another quick pass, I didn't want to spend too much time on this. If there's other ideas people have, feel free to add them in, after the fact, and shoot me an email or shoot me a message or with a group message or something. But I just wanted to go through a quick pass and think about some ideas you might have about our driver diagram, the second revision, and then we wanted to have a lengthier discussion about some of these definitions (in the diagram).

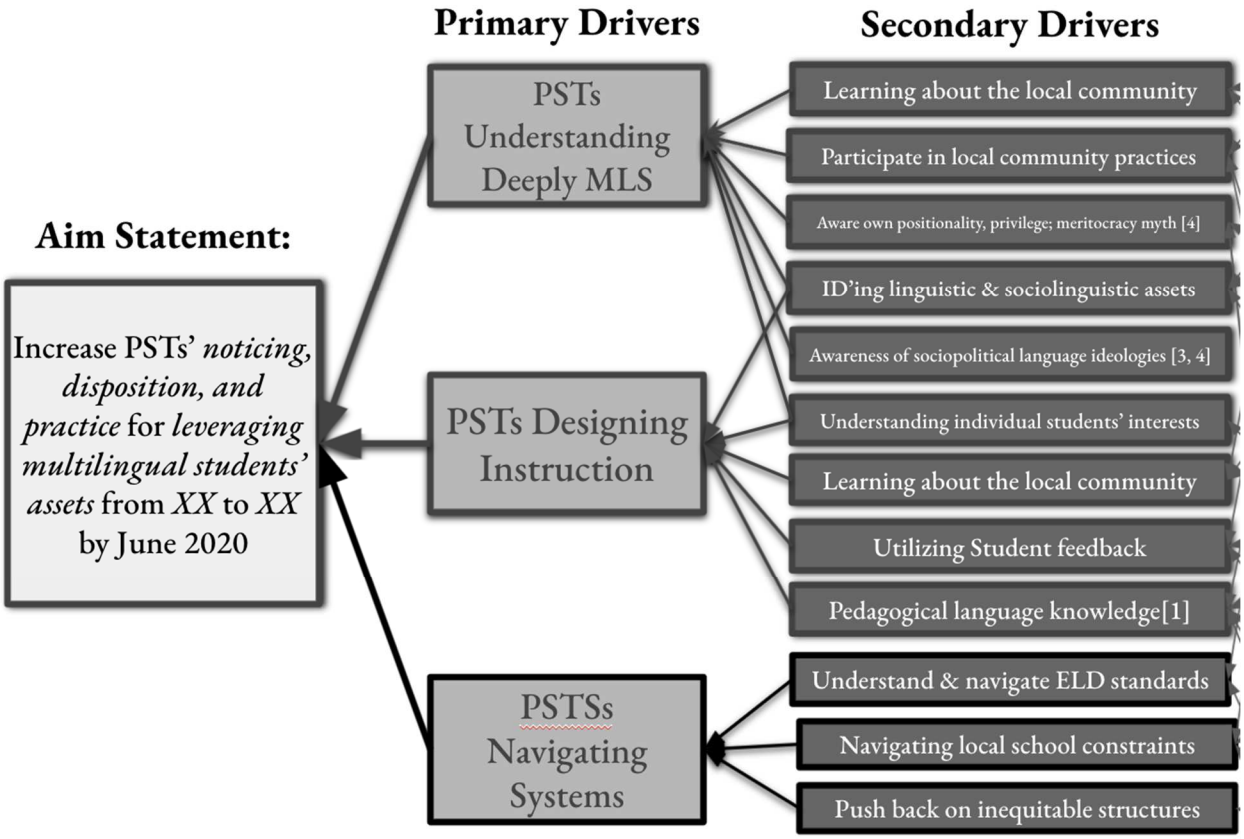
In the comment above, the primary facilitator noted that the network had "kind of gone through the process of bringing a driver diagram and changing it a few times" as a justification for not wanting to "spend too much time on this." Just as they had the month prior, facilitators situated the driver diagram within the process through which it was constructed, noting that it had already been through a number of iterations. Facilitators constructed a narrative around the diagram to prime TEs to engage with the driver diagram as a document that attempted to represent their views centering multilingualism. Additionally, the primary facilitator also directed TEs' attention to the addition of the primary driver around "navigating systems" and its accompanying secondary drivers:

> I'll point out the specific revisions that we've made, really, the big revision is around adding a third driver which is around preservice teachers navigating systems. And so, there was a lot of conversation in the chat box that we pulled together and from our open conversation last time [in October] around what do we do with English Language Development standards to which teachers are held and what do we do about the local school and the constraints that are at their placements and at their schools. People had talked about pushing back on, calling out inequitable structures and placements and courses and those sorts of things. And then in some subsequent conversations, people

have brought up the idea of preservice teachers being aware of monitoring and placement structures, maybe not necessarily things they can push back on. But being aware that these are things that really matter on the ground.

In this comment, the facilitator is pointing out the drivers that were added and connecting them to "our open conversation last time" to make visible to TEs how their comments contributed to the addition of drivers to the diagram. Here, the facilitators situated the addition of these drivers within the processes through which facilitators generated them to show how the revisions were derived from TEs' conversations. Connecting specific additions and modifications to the driver to what TEs said again aided to frame how facilitators wanted to engage with this driver diagram. Briefing TEs on additions and modifications to the diagram in this way made visible how facilitators produced power via shaping TEs' practices in the process of generating a shared driver diagram. It also made visible that facilitators were positioned in backstages that afforded them opportunities to construct a particular narrative around the driver diagram, similar to how they had constructed a narrative around the driver diagram in the previous network meeting. Facilitators also sought to direct TEs' attention to the specific changes rather than the driver diagram more broadly. In their presentation slides, facilitators used a large red arrow pointing to the new primary driver, "Preservice Teachers Navigating Systems," to focus TEs on the most significant addition to the diagram. By emphasizing to TEs the addition of this primary driver and accompanying secondary drivers in the frontstage, facilitators shaped how TEs participated in their engagement with the diagram. Additionally, the use of this arrow surfaces how facilitators planned in the backstage to focus TEs' attention, affording them the capacity to visually call out particular components of the diagram.

Figure 2.4. Draft 2 of Network Driver Diagram



Briefing also occurred at the boundary between backstages and frontstages, illustrating how facilitators constructed narratives not just for all TEs, but when checking in with individual TEs. For example, in a feedback meeting between facilitators and Esmeralda, a teacher educator who had expressed a commitment to multilingualism at the convening in September, the facilitators presented Esmeralda with the categories that they would later show TEs at the network meeting. Much like they did at the network meeting, facilitators sought to portray to Esmeralda how they generated a driver diagram using TEs' contributions. Facilitators met with Esmeralda because, as one expressed in a memo following the feedback meeting, she "was one of the people who had been more critical" of language acquisition framing and sought her "buy-

in" by codifying the conversation that Esmeralda's group had sparked at the convening. At the beginning of this feedback meeting, the primary facilitator remarked:

> I don't know if you remember but close to the end [of the convening], we asked people to brainstorm or think about some potential aim statements, right? Like, what would be an aim statement that we would sort of organize ourselves around? Do you remember that? And then we said, we would come back and type these all up and try to organize them. And so this, this right here was all the aim statements that people generated [...] So we took all of these, and then we organized them into a number of categories. So if you want to take maybe like 30 seconds to just skim through these sticky notes. That's how we tried to represent them.

These opening comments from the facilitator shaped what the meeting was to be understood as and shaped how Esmeralda participated in the meeting. Much like the network meetings, facilitators spent considerable time situating the driver diagram within the process through which it came to be generated, remarking that they "organized [TEs' aim statements] into a number of categories" as a way to "represent them." This attention to portraying to Esmeralda the process through which the driver diagram was constructed illustrates how facilitators sought to shape TEs' participation in the process of constructing a driver diagram and how they sought to frame TEs' engagement with drafts of the driver diagram. The production of power—the shaping of others' practices through practices—occurred through the facilitators' briefing of TEs to situate artifacts within the process of representing TEs' views in these artifacts intended as a way to garner their trust and, in turn, enable their participation in the network.

I shine a light on facilitators' engagement in briefing to portray how facilitators were positioned to strategically plan for presenting driver diagrams and other related artifacts to shape

TEs' participation, namely by focusing TEs' attention and offering context to TEs to convince them that facilitators attempted to take up their ideas. The capacity to strategically plan for presenting driver diagrams in this way was afforded to facilitators by their positioning across backstages and frontstages. Examining facilitators' briefing elucidates how facilitation practices are laden with power, and how access to producing power via facilitation practices was contingent on the ability to navigate between backstages and frontstages. Facilitators' briefing also helped to shape the specific activities that TEs would engage in to critique the driver diagram. I now turn to describe how facilitators engaged in the practice of *soliciting critiques* to illustrate how they organized TEs' participation in critiquing drafts of the diagram.

Soliciting Critiques

Facilitators shaped TEs' participation practices by designing and leading structured activities for TEs through a practice I term *soliciting critiques.* As was the case for the other two practices, facilitators were uniquely positioned in this network to a) plan for meetings and meeting activities in backstages, and b) execute these plans and lead these activities in frontstages. Additionally, facilitators were positioned to solicit critiques at the boundaries between backstages and frontstages, in particular by soliciting critiques from specific teacher educators in preparation for frontstages.

I first show how facilitators solicited critiques within the boundary between backstage and frontstage. Facilitators sought to check iterations of the driver diagram with particular TEs in feedback meetings that occurred prior to network meetings. As mentioned previously, these meetings served to ensure that TEs' perspectives, and the perspectives of others who took similar stances, were represented in the diagram. Therefore, the facilitators used the boundary context to "test out" whether the first draft of the driver diagram captured the commitments voiced by the

group. In the following exchange between Esmeralda and the primary facilitator, Esmeralda confirms that the draft was largely a successful attempt to codify these commitments:

> Facilitator: OK, what—what does your critical perspective, what does your critical eye tell you around this? Like, what would you say is missing?
>
> Esmeralda: [...] It's hard because you've got it down to words we all work with, and that means something to all of us. So, it's hard for me to be critical of it. It's like sort of the essence of what we hope the work could be. [...] I think the conversations we had before about power dynamics, about positionality, about entering a community aren't going to get nuanced [...] and you've distilled it to some of these pieces [...] So it's hard for me to be critical, I'm sorry [laughs]

The facilitators purposely sought to engage Esmeralda's "critical eye" because she was a central participant who rerouted the network's focus from language acquisition to multilingualism (Sandoval & van Es, 2021). By seeking to elicit critical views from her, facilitators attempted to "break" the driver diagram in order to surface revisions that needed to be made in preparation for the network meeting in October. Asking Esmeralda to engage her "critical perspective" on the diagram served as a way for facilitators to check whether the draft of the diagram had represented TEs' stances towards multilingualism. Esmeralda's remarks that it was "hard [...] to be critical" of the diagram and that it represented "the essence of what we hope the work could be" indicated to facilitators that they were successful in representing TEs' views around multilingualism, enabling them to continue to foreground multilingualism in the way that they had in this first draft.

I also note that facilitators' decision to select Esmeralda is evidence of facilitators' positioning to identify with whom they check the diagram. Choosing Esmeralda explicitly

because she foregrounded multilingualism at the September convening serves as evidence of facilitators' a) positioning to have access to make decisions about whose perspective was worth checking the diagram, and b) privileging of particular perspectives, in this case multilingualism, by checking the diagram with certain TEs and asking questions around the diagram intended to elicit those perspectives. This checking with selected teacher educators as a way to solicit critiques before the network meeting also served to shape the primary artifact, a driver diagram, with which other TEs would engage at a later time, constraining and enabling what perspectives were being surfaced in the diagram and how they in turn engaged with the diagram. It was through this work of checking the driver diagram with certain TEs that facilitators produced power, engaging in the practice of soliciting critiques in between backstages and frontstages to constrain and enable TEs' future participation.

Facilitators continued to engage in the practice of soliciting critiques in preparation for and during network meetings, namely by designing and leading activities in which TEs were asked to share suggestions for revision. During the October meeting, facilitators asked TEs to review the diagram by themselves and to silently generate suggestions for revision, guided by the following prompts:

> Is this the right aim?
>
> Are these the right drivers?
>
> What drivers would you add?
>
> Consider conversations in September, follow-up conversations

TEs were then asked to offer their critiques and responses to these prompts in the videoconference's chat function before beginning whole-group conversations. The facilitators designed this activity to first afford TEs space to review and reflect on the questions and the

driver diagram. Additionally, facilitators asked TEs to write their comments in the chat function to allow everyone to participate such that no one person could take up disproportionate amounts of space that could prevent others from sharing. The specific activities facilitators designed and led shaped TEs' participation in the process of generating a shared driver diagram by constraining *when* TEs expressed their thoughts (i.e., by asking TEs to first review the diagram and the prompts silently) and *how* TEs expressed their thoughts (i.e., using the chat function). This use of structured activities illuminates how facilitators produced power via developing and using prompts and limiting the manner in which TEs commented on the prompts. Additionally, the use of these structured activities served as evidence of facilitators' movement between backstages and frontstages—the activities that facilitators led were designed in backstages as ways to broaden participation among TEs and were then executed in the network meeting with TEs.

Having articulated three prominent facilitation practices that emerged in the process of generating an aim statement, their relation to power, and their location within backstages and frontstages, I turn to situate these findings within existing literature on improvement.

Discussion

A core tenet of improvement work is provisionality, in which improvement artifacts and improvement efforts broadly are viewed as always definitely incomplete and possibly wrong (Bryk et al., 2015). The findings here reveal how facilitators enacted provisionality in the process of generating a shared driver diagram. In particular, facilitators were systematically advantageously positioned (and positioned themselves) in and between frontstages and backstages in the process of generating a shared driver diagram for the improvement network. Facilitators were also positioned in these locations in ways that enabled them to produce power,

primarily through engaging in the practices of inscribing, briefing, and inviting critiques. Facilitators' engagement in these practices shaped how TEs came to participate in this process. For example, facilitators' engagement in the practice of inscribing constrained what artifacts TEs could respond to; the practice of briefing shaped how TEs viewed the diagram, its accompanying artifacts, and how they came to be generated; and the practice of inviting critique created specific activities that TEs engaged in that constrained and enabled particular forms of critiques and engagement with the diagrams. This production of power was entangled with the differential positioning among TEs and facilitators, where facilitators had access to locations that enabled them to inscribe and check the diagram.

I reiterate here that TEs were not "powerless" in this process. Previous studies identify practices TEs engaged in that shaped the network's direction and its focus (Sandoval & van Es, 2020; 2021). TEs were agentic and had the capacity to act in ways that may have limited the facilitators' access to particular locations of work or engagement in practices. In this study, I complement these findings by illuminating how improvement facilitators are positioned to produce power in the process of generating a shared aim.

This study revealed how facilitators in a teacher education improvement network came to produce power and came to (re)position themselves as part of the process of generating a theory of improvement using a driver diagram. Research-practice partnership (RPP) scholars frequently discuss the importance of establishing joint work and respecting partners' perspectives (Henrick et al., 2017; Penuel et al., 2015). However, this study highlights that this process is fraught with power dynamics and differential positioning. Much like practice and process scholars conjecture that doing improvement work in healthcare is riddled with power dynamics and micropolitics (Langley & Denis, 2011), this study makes visible how power dynamics and differential

positioning come to be lived in improvement networks in education. These findings also align with Mehta (2015) who claims that deciding on the direction of reform efforts in education is not an apolitical exercise but is subject to positioning some stakeholders as more central while others are positioned as more peripheral. In the work of initiating networked improvement communities, Bryk and colleagues (2015) conjecture that those who are responsible for launching networks are not always the ones who are responsible for carrying out improvement work in those networks. This study makes visible how this shift in participation and prioritized perspectives can unfold in starting networked improvement efforts.

Prior work has also examined the dynamic nature of problem framing in research-practice partnerships. In Penuel, Coburn, and Gallagher's (2013) study of problem negotiation in RPPs, they found that researchers and practitioners engaged in cultural exchange and operated in "trading zones" that required both to span boundaries and translate for one another. For Penuel, Coburn, and Gallagher, "framing" of problems was enacted in ways that saw practitioners and researchers engaging in processes of translation, so that problems were communicated in ways that made sense to the partners. In a previous study, I found how TEs came to shape problem framings that privileged multilingualism over language acquisition (Sandoval & van Es, 2020; 2021). This study expanded on the previous one by illuminating that facilitators positioned TEs who foregrounded multilingualism as more central and others within the network as more peripheral. This finding is consistent with prior research that the framing of problems is also about whose expertise is valued and whose expertise is backgrounded in the enactment of partnerships (Mehta, 2015). Although not explicitly stated as an issue of power or positionality, networked improvement science scholars call out how, as the network's direction comes to be defined, some network members may cease to participate and others may take their place (Bryk

et al., 2015). In this NIC, the framing of the problem shaped the outcomes to which facilitators oriented other network members and, in turn, constrained and enabled TEs' practices of participation in the NIC. Facilitators were central in this process, working to inscribe and codify TEs' preferences for particular problem and network framings and strategically checking whether they had adequately inscribed and codified these preferences in the network's driver diagram. Our study builds on existing research on the politics of problem framings and existing research on shifting network membership in NICs by showing *how* this particular network came to be framed and its direction solidified.

Other equity-focused scholars of RPPs, particularly those engaged in design-based research, make particular commitments and framings explicit from the outset in order to constrain and enable participation. For example, Vakil and colleagues (2016) emphasize the notion of politicized trust, where rapport among researchers and practitioners in partnership is built through a shared desire to operate within problem framings focused on social justice and anti-racism. Our network, however, reveals how arriving at a focus on social justice (in the form of centering multilingualism rather than language acquisition) in an improvement network unfolded when teacher educators who hold diverse perspectives come to participate in the process of shaping the network's direction. Rather than immediately positioning teacher educators who foreground multilingualism as central—as those who lead social justice-focused design-based research projects—this positioning emerged and was negotiated through interactions among and between teacher educators and facilitators.

This study also found how facilitators produced durability in a NIC via the iterative construction of a driver diagram. In particular, I found that the primary facilitator was systematically and advantageously positioned (Watson, 2017) to engage in practices for

producing durability through the construction of the driver diagram. The facilitators were positioned to move teacher educators' contributions between frontstages and backstages, affording them the capacity to make some contributions durable while making others ephemeral. Examining the position of the facilitator of partnership work is an area that has largely gone understudied in partnership literature. Frequently, research-practice partnership studies position facilitation decisions as methodological ones (e.g., Hoadley, 2004; Kirshner et al., 2018; Uchidiuno et al., 2017), particularly because these studies are oriented toward producing new knowledge about the problem of practice that organizes partnership work. Despite calls to study the strategies and techniques that are employed in RPPs, such as from Coburn and Penuel (2016) and Edelson (2002), there exists a dearth of research that seeks to unveil the practices of facilitation that shape the arrangements of these partnerships. This is particularly important in the context of networked improvement communities, where intermediary organizations—called "hubs"—are primarily responsible for facilitating improvement work, housing improvement, analytical, and technological expertise in order to do so (Bryk et al., 2015). Additionally, provisionality is a central tenet in the work of networked improvement, where improvement artifacts and improvement activities are subject to scrutiny and/or revision. Within this commitment to provisionality, improvement facilitators are positioned as being primarily responsible for leading improvement teams and ensuring that the direction of the network is codified in improvement artifacts and carried out through improvement activities. Facilitation, then, is critical work in revising the direction and enactment of educational improvement work broadly. Despite this, research on RPPs has focused primarily on analyzing project data that occurs in "frontstages," such as meetings where all participating stakeholders are present (e.g., Cannata et al., 2017; Farrell, Harrison, & Coburn, 2019; Penuel, Coburn, & Gallagher, 2013). I

contend that understanding power dynamics in RPPs requires examining practices and processes that occur in the backstage, such as planning partnership meetings and creating and revising documents that carry ideas and conversations from one meeting to the next.

Conclusion and Directions for Future Research

I conclude this study by reiterating the importance of examining the practices and processes that constitute partnerships, including the backstage processes that produce boundary spaces where researchers and practitioners meet. RPP scholarship often examines practitioners' participation and whether their school-based practice—instructional practice, leadership, etc.—is impacted by their participation in partnerships (e.g., Cobb & Jackson, 2015; Stein, Russell, & Smith, 2011). I contend, however, that those responsible for leading and studying research-practice closely examine the backstages where tasks are designed, meetings are planned, and ideas are frequently made durable. Prior research already exists on examining one way to make visible and manage these power relations: equity-focused, social justice-oriented design-based research projects that take these axiological commitments as parameters for finding potential partners (Bang & Vossoughi, 2016; Philip, Bang, & Jackson, 2018). However, even these partnership models only address the issue of dominant discourse displacement and emergence. Although RPP literature frequently discusses how joint work is established "in partnership" with practitioners (Penuel et al., 2015), I argue for an examination into the interactions that constitute the processes of establishing joint work to highlight whose perspectives are made durable and how they come to be made durable. Although research on the specific practices and processes that constitute doing improvement work in education is emerging (e.g., Joshi et al., 2021; Russell et al., 2020), the field would benefit from continued examination of backstage work in other central improvement processes.

Additionally, I note a tension that emerged in analyzing the role facilitators played in how the networked improvement community I studied came to foreground multilingualism and peripheralize language acquisition en route to attempting to enact improvement for equity. In teacher preparation, multilingualism is a stance typically associated with scholars who take critical, anti-racist, social justice lenses to their work (e.g., De Los Rios & Seltzer, 2017; Martinez, Morales, & Aldana, 2017). Teacher educators who offered language acquisition-focused contributions in this NIC, on the other hand, sought to examine how to better prepare candidates for existing systems of schooling. Language acquisition is typically the dominant perspective in schools and schooling, as evidenced by the prominence of English language development standards (California Commission on Teacher Credentialing, 2016; California Department of Education, 2014). Critical, anti-racist, and social justice lenses in education center on advocating for marginalized students by pushing back against inequities embedded in systems of schooling, in this case, language acquisition. At the same time, practice-focused perspectives are frequently pushed to the periphery in education research (Penuel et al., 2015). The tension between critical perspectives that seek to upend systems and pragmatic perspectives that seek to operate within those systems is one that is central to advocacy and improvement work (Hale, 2008). Future research on partnership work could more thoughtfully and explicitly attend to this tension and how groups from disparate organizations and varied roles come together to settle on similar tensions. Future research can also illuminate the specific roles facilitators play in navigating this tension between "existing systems" and social justice-focused educators' aspirations.

I end by revisiting how I conceptualized power as produced through practice and process. Traditionally, conceptions of power have centered on who has power and who does not have

power (Foucault, 1986). I contend that viewing power in this way reduces the range of possible responses to power relations to solely focusing on who is in "the room" and who holds formal authority and status. While who is at the table is an important question, this study reveals that just as important is *how* people are at the table. An exclusive concern with who occupies seats at the table is insufficient for understanding power relations because it ignores the interactions that might cause people to eventually leave the table once their perspectives become peripheralized. Conceptualizing power as being produced through practices and processes affords an interrogation into how actions, interactions, and discourses can be arranged and rearranged in order to address power relations. Simply bringing particular people with particular perspectives to the table does not guarantee that they will shape the practices and discourses of partnerships in meaningful ways. Attending to power in partnership work means attending to how people interact with one another in ways that bring the partnership to life.

References

Abad, M. N. (2020). “Are We Not What We Seem?”: Infrapolitical maneuvers in the era of college and career readiness. *Anthropology & Education Quarterly, 51*(3), 322-340.

Balogun, J., & Johnson, G. (2004). Organizational restructuring and middle manager sensemaking. Academy of Management Journal, 47(4), 523-549.

Bang, M., & Vossoughi, S. (2016). Participatory design research and educational justice: Studying learning and relations within social change making. *Cognition and Instruction, 34*(3), 173-193.

Bryk, A. S., Gomez, L. M., Grunow, A., & LeMahieu, P. G. (2015). *Learning to Improve: How America’s Schools Can Get Better at Getting Better.* Harvard Education Press.

California Commission on Teacher Credentialing (2016). California teaching performance expectations. https://www.ctc.ca.gov/docs/default-source/educator-prep/standards/adopted-tpes-2016.pdf

California Department of Education (2014). California English language development standards. https://www.cde.ca.gov/sp/el/er/documents/eldstndspublication14.pdf

Cannata, M., Redding, C., Brown, S., Joshi, E., Rutledge, S., & Joshi, E. (2017, April). How ideas spread: Establishing a networked improvement community. In annual meeting of the American Educational Research Association in San Antonio, TX.

Carnegie Foundation for the Advancement of Teaching (2017). How a networked improvement community improved success rates for struggling college math students. Stanford, CA: Author.

Cobb, P., & Jackson, K. (2015). Supporting teachers’ use of research-based instructional sequences. *ZDM, 47*(6), 1027-1038.

Coburn, C. E., & Penuel, W. R. (2016). Research–practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher, 45*(1), 48-54.

Coburn, C. E., Penuel, W. R., & Geil, K. E. (2013). Practice partnerships: A strategy for leveraging research for educational improvement in school districts. William T. Grant Foundation.

De Los Ríos, C. V., & Seltzer, K. (2017). Translanguaging, coloniality, and English classrooms: An exploration of two bicoastal urban classrooms. *Research in the Teaching of English, 52*(1), 55-76.

Edelson, D. C. (2002). Design research: What we learn when we engage in design. *Journal of the Learning Sciences, 11*(1), 105-121.

Erickson, F. (1996). Ethnographic microanalysis. In S.L. McKay & Hornberger, N. (Eds.) *Sociolinguistics and Language Teaching.* Cambridge.

Farrell, C. C., Harrison, C., & Coburn, C. E. (2019). "What the hell is this, and who the hell are you?" Role and identity negotiation in research-practice partnerships. AERA Open, 5(2), 2332858419849595.

Feldman, M. S., & Orlikowski, W. J. (2011). Theorizing practice and practicing theory. *Organization Science, 22*(5), 1240-1253.

Fernandez, L. (2016, April 21). Empathy and social justice: The power of proximity in improvement science. Carnegie Commons Blog. https://www.carnegiefoundation.org/blog/empathy-and-social-justice-the-power-of-proximity-in-improvement-science/

Feygin, A., Nolan, L., Hickling, A., & Friedman, L. (2020). Evidence for Networked Improvement Communities. American Institutes for Research.

Foucault, M. (1986). Disciplinary Power and Subjection. In Lukes, Steven, (Ed.) *Power*. New York: New York University Press.

García, O. (2009). Education, multilingualism and translanguaging in the 21st century. *Social Justice Through Multilingual Education*, 140-158.

Gee, J., Michaels, S., & O'Connor, M.C. (1992). Discourse analysis. In M.D. LeCompte, W.L. Millroy, & J. Preissle (Eds.), *The Handbook of Qualitative Research in Education*. Academic Press: San Diego, CA.

Goffman, E. (1959). *The presentation of self in everyday life.* New York: Anchor Books.

Goodwin, C., & Heritage, J. (1990). Conversation analysis. *Annual Review of Anthropology, 19,* 283-307.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. Univ of California Press.

Hale, C. R. (2008). *Engaging Contradictions: Theory, Politics, and Methods of Activist Scholarship*. Univ of California Press.

Hardy, C., & Thomas, R. (2016). Power and process: The production of "knowing" subjects and "known" objects. *The SAGE Handbook of Process Organization Studies*, 466-479.

Harvey, G., & Lynch, E. (2017). Enabling continuous quality improvement in practice: the role and contribution of facilitation. *Frontiers in Public Health*, *5*, 27.

Henrick, E. C., Cobb, P., Penuel, W. R., Jackson, K., & Clark, T. (2017). Assessing research-practice partnerships. William T. Grant Foundation.

Hoadley, C.M. (2004). Methodological alignment in design-based research. *Educational Psychologist, 39*(4).

Joshi, E., Redding, C., & Cannata, M. (2021). In the NIC of time: How sustainable are

networked improvement communities? *American Journal of Education, 127*(3), 369-397.

Joyce, K. E., & Cartwright, N. (2020). Bridging the gap between research and practice: Predicting what will work locally. *American Educational Research Journal, 57*(3), 1045-1082.

Kirshner, B., Pacheco, J., Sifuentes, M.S., & Hildreth, R. (2018). Rethinking "the Community" in university-community partnerships: Case studies from CU Engage. In Beyvan, B., & Penuel, W.R. (Eds.), *Connecting Research and Practice for Educational Improvement: Ethical and Equitable Approaches.*

Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management Review, 24*(4), 691-710.

Langley, A., & Denis, J. L. (2011). Beyond evidence: the micropolitics of improvement. *BMJ Quality & Safety*, 20(1), i43-i46.

Langley, A., Smallman, C., Tsoukas, H., & Van de Ven, A. H. (2013). Process studies of change in organization and management: Unveiling temporality, activity, and flow. *Academy of Management Journal, 56*(1), 1-13.

Langley, A., & Tsoukas, H. (2010). Introducing perspectives on process organization studies. *Process, Sensemaking, and Organizing, 1*(9), 1-27.

Latour, B. (1986). The powers of association. In (Ed.) Law, J. *Power, Action, and Belief.* Routledge: London, England.

Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-network Theory.* Oxford University Press.

LeMahieu, P. G., Grunow, A., Baker, L., Nordstrum, L. E., & Gomez, L. M. (2017). Networked improvement communities. *Quality Assurance in Education*, 25(1), 5-25.

Lucas, B., & Nacer, H. (2015). *The habits of an improver: thinking about learning for improvement in healthcare.* The Health Foundation.

Lucas, T., & Villegas, A. M. (2013). Preparing linguistically responsive teachers: Laying the foundation in preservice teacher education. Theory Into Practice, 52(2), 98–109.

Martinez, D. C., Morales, P. Z., & Aldana, U. S. (2017). Leveraging students' communicative repertoires as a tool for equitable learning. *Review of Research in Education, 41*(1), 477-499.

Mehta, J. (2015). *The Allure of Order*. Oxford University Press.

Meyer, A. (2016, Nov. 7). The potential of networked improvement to address systemic educational inequity. Carnegie Commons Blog. https://www.carnegiefoundation.org/blog/the-potential-of-networked-improvement-to-address-systemic-educational-inequity/

Penuel, W. R., Allen, A. R., Coburn, C. E., & Farrell, C. (2015). Conceptualizing research–practice partnerships as joint work at boundaries. *Journal of Education for Students Placed at Risk, 20*(1-2), 182-197.

Penuel, W. R., Coburn, C. E., & Gallagher, D. J. (2013). Negotiating problems of practice in research–practice design partnerships. *National Society for the Study of Education Yearbook, 112*(2), 237-255.

Philip, T. M., Bang, M., & Jackson, K. (2018). Articulating the "how," the "for what," the "for whom," and the "with whom" in concert: A call to broaden the benchmarks of our scholarship. *Cognition and Instruction, 36*(2).

Russell, J. L., Bryk, A. S., Dolle, J., Gomez, L. M., LeMahieu, P., & Grunow, A. (2017). A framework for the initiation of networked improvement communities. *Teachers College Record, 119(*7), 1-36.

Russell, J. L., Correnti, R., Stein, M. K., Bill, V., Hannan, M., Schwartz, N., ... & Matthis, C. (2020). Learning from adaptation to support instructional improvement at scale: Understanding coach adaptation in the TN Mathematics Coaching Project. *American Educational Research Journal, 57*(1), 148-187.

Saldaña, J. (2015). *The Coding Manual for Qualitative Researchers.* (3rd ed.) Sage Publications.

Stein, M. K., Russell, J., & Smith, M. S. (2011). The role of tools in bridging research and practice in an instructional improvement effort. *Disrupting Tradition: Research and Practice Pathways in Mathematics Education.* Reston, VA: National Council of Teachers of Mathematics.

Tsoukas, H., & Chia, R. (2002). On organizational becoming: Rethinking organizational change. *Organization Science, 13*(5), 567-582.

Uchidiuno, J., Clegg, T., Ahn, J., Yip, J., Bonsignore, E., Pauw, D., Beck, A., & Mills, K. (2017). Learning about learning through participatory design with families. In *Participatory Design for Learning*, 45-58. Routledge.

Vakil, S., McKinney de Royston, M., Suad Nasir, N.I., & Kirshner, B. (2016). Rethinking race and power in design-based research: Reflections from the field. *Cognition and Instruction, 34*(3), 194-209.

Watson, M. (2017). Placing power in practice theory. *The Nexus of Practices: Connections, Constellations, Practitioners*, 169-182.

Wentworth, L., Mazzeo, C., & Connolly, F. (2017). Research practice partnerships: A strategy for promoting evidence-based decision-making in education. *Educational Research, 59*(2), 241-255.

CHAPTER 4

Study 3. Understanding the Process of Designing a Shared Practical Measurement Tool in a Teacher Preparation Networked Improvement Community

Introduction

Continuous improvement has emerged as a prominent approach to addressing complex problems of practice in education (Coburn et al., 2013). These approaches advocate for practitioners to work collaboratively on shared problems using shared theories of action and grounded in shared data (Bryk et al., 2015). Networked improvement science, in particular, aims to bring together a range of organizations and stakeholders to address problems of practice through iterative cycles of inquiry using data.

Practical measurement is a core component of networked improvement science that disciplines practices of improvement (Bryk et al., 2015; Yurkofsky et al., 2020). Although data-driven decision making in education has been of concern to education researchers for some time (Mandinach & Schildkamp, 2021), a practical measurement approach situates the use of data within continuous improvement efforts. In networked improvement communities (NICs), practical measures address a central improvement question: how will we know whether a change is an improvement? Because of its focus on tracking improvement, practical measures intend to provide actionable and timely feedback to practitioners in ways that allow them to engage in disciplined cycles of inquiry. Practical measures take three forms in networked improvement science: outcome measures, process measures, and balancing measures. Outcome measures are aimed at gaining insight into what is meant to be accomplished; process measures provide more fine-grained insight and feedback about specific changes; and balancing measures are intended to track unintended changes to the system (Bryk et al., 2015, p. 138). This approach to

measurement stands in contrast to measurement for research, which is aimed at producing new, scholarly knowledge on efficacy, and measurement for accountability, which is aimed at allocating resources and making personnel decisions (Bryk et al., 2015). Additionally, measures within improvement efforts are shared by those who participate in these efforts in order to generate and spread learnings across sites, much like problem analyses and theories of action are shared in continuous improvement. By distinguishing practical measures from measurement for research and accountability, improvement-focused researchers highlight how issues of utility and practicality for practitioners come to be centered in selecting measures (Ing et al., 2020; Penuel et al., 2018).

To date, practical measures have been taken up in a wide range of educational improvement efforts and have been appropriated by other forms of research-practice partnerships. For example, one partnership focused on improving the quality of middle school mathematics instruction designed a set of practical measures at the level of classrooms to gain insight into students' experiences in whole-class discussions (Cobb et al., 2020; Jackson et al., 2016). These measures were designed initially with practitioners and, later, using classroom observations and cognitive interviews with students; they are employed as needed with practitioners (Jackson et al., 2016). Research on practical measurement has also focused on how existing data can be extracted and processed for generating practical measures (Ahn et al., 2021b; Krumm et al., 2015; Krumm et al., 2016), how data visualizations can be designed to afford practitioners opportunities to gain insight into their classrooms (Ahn et al., 2019; Ahn et al., 2021c), and the varied ways that practitioners interpret and use improvement data (Ing et al., 2020). Across these studies focused on the use and generation of practical measures, researchers have illuminated and emphasized the importance of a) collaborating with practitioners, b) attending closely to how

practitioners engage with data, and c) being sensitive to the contexts within which data are collected and utilized.

Central to the use of practical measurement is the shared use of these measures across teams and sites (Bryk et al., 2015). As part of this desire for using shared measures, networked improvement science foregrounds close collaboration between and among practitioners, improvement facilitators, and researchers to develop and use measurement to guide improvement efforts (Bryk et al., 2015; Feng et al., 2016; 2018; Krumm et al., 2017; Takahashi et al., 2019; Yeager et al., 2013). To date, research documents how networks leverage existing tools for improvement measurement purposes, appropriating measures that have already been developed and used to serve the purpose of improvement efforts (e.g., Krumm et al., 2016; Takahashi et al., 2019). The appropriation of existing measurement tools, however, raises questions about these tools' utility for driving and guiding improvement efforts given that they were not designed within the context of an improvement effort. Although repurposing existing measures for improvement requires less time and may be more seamlessly integrated into existing systems, designing practical measures for a particular improvement project affords closer alignment among network aims, theories of improvement, and improvement data. Designing measures can help offer more targeted information for specific questions that emerge in doing improvement work. For example, Jackson and colleagues (2016) developed a set of practical measures for improving whole-classroom mathematics discussions because existing measures collected by school districts did not offer fine-grained insight into classroom interactions. Therefore, researchers worked with practitioners to generate a short exit survey for students to report on whole-classroom interactions during math lessons, affording them a window into students' experiences during these discussions. This suggests that designing practical measures specific to

an improvement effort can provide practitioners with data that is more relevant and useful to them. Additionally, much like engaging in research with practitioners can generate useful and relevant insight for practice, designing these measures *with* practitioners generates improvement data that are useful and relevant to practice.

However, collaboration among researchers and practitioners in improvement efforts is not trivial. For example, a previous study we conducted revealed how reaching convergence on an aim statement was a process fraught with tensions that practitioners and facilitators had to navigate in order to move the improvement network forward (Sandoval & van Es, 2021). While reaching convergence and sharedness around an aim, theory of improvement, and measurement system is a central feature of networked improvement efforts, *how* participants in a network accomplish this convergence is unclear, particularly as it pertains to the development of practical measures. We argue that understanding and interrogating how stakeholders collaborate to generate shared practical measures enables the spread of practices for leading improvement teams through the process of designing measures; affords insight into the considerations that must be taken into account when designing practical measures; and allows for interrogation, refinement, and revision of practices for leading the design of practical measures. By examining the process of jointly designing practical measures, we also address a core concern expressed by Coburn and Penuel (2016), which is the need for more research on the strategies and techniques that constitute joint partnership work.

Our study specifically unveils and examines the practical measure design process in a teacher preparation networked improvement community across a large statewide university system. Our examination into this design process reveals strategies and techniques that are and can be employed to generate practical measures with practitioners, in this case, teacher educators at

teacher preparation programs. We also seek to unveil the design process and the participation practices of the teacher educators engaged in the design process. Attending to how teacher educators participate in this process can generate insight into how particular practical measurement design activities elicit particular forms of participation. Additionally, unveiling teacher educators' participation practices can aid those leading practical measurement design efforts to anticipate and design for particular forms of engagement in the process. Thus, our study seeks to address the following questions: What was the process for designing shared, practical measures and how did facilitators and practitioners in a networked improvement community engage in that process?

To address these questions, we first provide a description of the context and the problem space within which this network was situated, as well as how the network came to be initiated. We then articulate the lens we take to understanding the process of designing practical measures, drawing on design-based research and practice theory to center our examination on the practices and the processes that constituted the design of these measures. We follow with a description of the analytic approach we took to gain insight into the process and network members' participation practices. This analytic approach relied on conversations and interactions between and among practitioners and improvement facilitators. We then turn to present a process model of the design process in our findings, illuminating its iterative nature and two distinct activity systems that comprised the design process. We follow by highlighting the practices and tools that emerged in each of the two types of activity systems, making visible how both facilitators and practitioners engaged in the process. We end by situating the process model and practitioners' engagement practices within existing work on improvement measures in research-practice partnerships and, specifically, networked improvement communities.

Context of the Improvement Work

Our study on designing practical measures is situated within a teacher preparation improvement network consisting of eight teacher preparation programs across a large, statewide university system. This network began its launch in 2018 as part of the California Teacher Education Research and Improvement Network (CTERIN). The NIC operates across eight teacher preparation programs across a statewide university system. The process of designing practical measures that is under examination in this study occurred in the 2018-19 academic year as part of a broader improvement network initiation effort (Russell et al., 2017).

In the spring of 2018, CTERIN began the initiation of the network in an effort to promote collaboration across universities' teacher preparation programs. This network formed in response to critiques of teacher education research as operating at too small a scale, with studies frequently being conducted within singular courses and single sites (Cochran-Smith et al., 2015b). CTERIN's attempt to initiate an improvement network was also a response to calls for programs to become more coherent such that program activities are oriented towards the same outcomes and complement one another (Feiman-Nemser, 1990; Richmond et al., 2019). CTERIN viewed networked improvement science as a promising approach for addressing these challenges given its focus on shared aims and theories of action, while also providing tools and guidance for engaging in systematic program improvement.

The launching of the NIC situated CTERIN as the hub of the network and thus primarily responsible for facilitating improvement activities and building an improvement and analytics infrastructure (Bryk et al., 2015). In the spring of 2018, program directors met to identify a shared problem that could motivate the launching of a network (see Sandoval & van Es, 2020). CTERIN engaged directors in a conversation using data collected by the California Commission

on Teacher Credentialing in the form of an end-of-year survey administered to teacher candidates who had just completed their teacher preparation program. Using these data, program directors were concerned with low self-reported feelings of preparedness to teach English language learners. After a series of conversations with teacher educators (TEs) at their local campuses to gauge their interest on addressing this problem, program directors agreed to launch an improvement network on improving how candidates are prepared to work with English language learners. Teacher educators were then invited to join the network to work on this problem via monthly virtual meetings and an in-person convening. TEs across sites occupied a range of roles, some located primarily at the universities and others situated inside schools and serving as part-time lecturers or supervisors. In the summer of 2018, CTERIN and participating TEs agreed to meet on videoconference calls monthly for 90 minutes as well as hold a two-day in-person convening in September. Through a series of conversations and negotiations pertaining to the network's aim, teacher educators came to agree to an aim statement that focused on improving how candidates are prepared to build on multilingual students' strengths (Sandoval & van Es, 2020, 2021).

As CTERIN facilitators, we continued to lead monthly, 90-minute meetings with teacher educators following the generation of an aim statement in October, turning the network's attention to designing shared practical measurement tools. At the October monthly meeting, facilitators asked TEs to share what "success" would look like in preparing candidates to build on multilingual students' strengths. From here, facilitators met with a number of teacher educators to solicit ideas for what a practical measurement tool might look like. This process resulted in the decision to generate a short survey that could be used frequently with teacher candidates. Although the entirety of the design process lasted eight months, we scope our study

on a period of four months, from November 2018 to February 2019, where the survey was first designed, used, and iterated upon until it reached a point of stability where changes were no longer being suggested by teacher educators nor was the survey changed by facilitators. After February 2019, testing of the survey focused on identifying infrastructure and routines for regular collection and analysis, including a focus on testing visual representations of the data.

Theoretical Framework

To understand how facilitators led the design process and how teacher educators participated in that process, we draw on two overarching frames. First, we draw on theory from design-based research that conceptualizes how and what scholarly knowledge can be generated from engaging in and studying design work. Leveraging design-based research affords insight into how the design process unfolded and how that shaped teacher educators' participation in the process. Second, we draw on practice theory to unveil the practices that teacher educators engaged in throughout the process of designing practical measures. Understanding teacher educators' practices illuminates how practitioners engage in the design process and, importantly, generates insight for leaders of improvement work to use to anticipate, plan for, and elicit particular forms of engagement. We draw on one particular flavor of practice theory, cultural-historical activity theory (Engestrom et al., 1999), as a way to focus on the tools and objects that are central to the design efforts and how changes to the central tools and objects shift the design process and TEs' engagement in it.

Design-based Research

We first frame our study by bringing a design-based research lens. Design-based research is focused on engaging in cycles of design, enactment, analysis, and redesign (Cobb, 2003) and is centrally concerned with enactment in local settings and contexts and thus, are committed to

engaging in collaboration with practitioners to design artifacts that are useful for them (Design-based Research Collective, 2003).

To understand the process of designing practical measures, we draw on design-based research to conceptualize the insights that can be generated from engaging in design. Edelson (2002) articulated three broad categories of theory that can be generated from doing design research: domain theories, design frameworks, and design methodologies. Domain theories refer to theory pertaining to the specific problem space within which design research teams work. Design frameworks refer to the generalized design solution to a particular problem, typically referred to as design principles. Design methodologies refer to the procedures, processes, and practices that design teams engage in as part of their design work. We situate our study within a design methodologies frame to focus on the process through which practical measures are co-developed. For Edelson, a focus on design methodologies centrally concerns the tasks, objectives, processes, and participants (p. 115) of the design work and requires that researchers document the sequence of steps and actions that comprise the design process. For example, Ahn and colleagues' (2021a) developed design narratives to gain insight into the process and cycles of design in the context of a research-practice partnership focused on improving learning and teaching in middle school mathematics classrooms. These narratives offered thick descriptions of design cycles to unveil how prototypes unfolded and emerged in the design of tools for managing permissions and sharing of improvement data. We build on this work to better understand how teams tasked with designing practical measures engage in this process and the kinds of activities that facilitate these design efforts.

Practice Theory & Cultural-Historical Activity Theory

Practice theory provides a lens to understand how teacher educators engage in the process of designing practical measures. Practice theory conceptualizes social life as being comprised of situated actions and dualities, such as the mutually constitutive relationship between structure and agency (Feldman & Orlikowski, 2011). Practice theorists are centrally concerned with unveiling *practices*, which refer to the recursive relationship between actions and structures where actions produce, modify, combat, or uphold structure and structure simultaneously constrains and enables action. Additionally, practice theorists attend to how practices are dynamic and are constantly evolving; they argue that attending to the evolution of practices helps see how engagement in activities change over time (Tsoukas & Chia, 2002). A focus on practices and process helped us see how facilitators and teacher educators engaged and drove the design process, and how their participation in the process, and the process itself, changed over time.

As we reviewed and analyzed data, we found that shifts in the specific design activities coincided with shifts in the artifacts facilitators and TEs were using to move the design process forward. To understand how artifacts coordinated activity in the design process, we drew on cultural-historical activity theory (CHAT, Engestrom et al., 1999). Specifically, we used CHAT to understand how facilitators' and teacher educators' participation in design activities was entangled with and shaped by the specific tools and objects with which participants engaged. In CHAT, social and organizational life consist of constantly changing activity systems in which subjects in different roles engage with tools, are situated within a community guided by particular rules and norms and are oriented towards particular objects. CHAT offers a framework for understanding how objects orient people to particular actions and how tools mediate those actions. CHAT is centrally concerned with unveiling the relations among and between tools,

objects, and people within systems of activity and how the three constrain and enable one another.

We use CHAT to help us attend to how the object of design activities shifted over time and how that, in turn, shaped how facilitators and teacher educators engaged in these activities. Using CHAT helped us conceptualize these design activities as activity systems and how the shifting of objects and tools coincided with shifts in the design activities and stakeholders' participation within them. Specifically in our study, we narrow our focus on how facilitators' and teacher educators' engagement in activity systems oriented towards practical measurement design shifted as a result of the primary tools used in those activities. During design activities led by facilitators, teacher educators went from primarily interacting with drafts of surveys to interacting with improvement data displays collected from their teacher candidates. Our study conceptualizes these survey drafts and improvement data displays as tools that mediated interactions in our design-focused activity systems. In the design activities that constitute the design process, we show how the object of facilitators' design activities shifts from revising survey items to using data collected from the survey to test utility and practicality. Through this shifting of objects and tools in the evolving activity systems TEs engaged in, we found that facilitators' and TEs' practices changed. We used a CHAT lens to help us understand the relation between the objects, tools, and practices in which facilitators and TEs' engaged.

Methods

We first describe our positionality within this network given the central role we played as facilitators from CTERIN. The first author served as the network's primary improvement facilitator, leading the planning and facilitation of each meeting and, importantly for this study, leading the process of designing practical measures. In this role, the first author scheduled

meetings, created plans for each meeting to solicit TEs' thoughts and feedback, and developed prototypes of practical measurement tools, such as surveys and data displays. The second author served in a supervisory capacity, reviewing plans for upcoming meetings and acting as a thought partner in planning for the design of practical measures. The second author also played the role of a content expert. In improvement science, content experts are those who are deeply knowledgeable of the problem space within which improvement work resides, as well as the varied stakeholders that constitute the problem space, the roles those stakeholders play, and how stakeholders interact with one another (Proger et al., 2017).

Having described our positionality in this network, we turn to provide a detailed description of the participants and the data we collected before describing the analytic approach we used to unveil the design process facilitators led and TEs' practices en route to the design of practical measurement tools.

Participants & Data Sources

We bound our examination of the practical measurement design process from October 2018 to a network-wide meeting in February 2019. We focus our study on this time period to center our analysis on the design process of a short survey that served as the network's primary measurement tool. Before December, facilitators had generated early prototypes of a video-based practical measure to gain insight into candidates' development of dispositions and noticing for building on multilingual students' strengths. Facilitators presented these prototypes as concepts with no video attached to them and generated them from teacher educators' comments about what success looks like. Teacher educators in the network, however, thought the prototype was too ambitious and instead pushed for a focus on the primary drivers of the network's driver

diagram (Appendix A). After this feedback, facilitators created a prototype of a short survey (Appendix B) with items that were attached to each of the primary drivers.

Data collection for this study begins in December 2018 with the facilitators' meeting with a teacher educator at one of the network campuses to solicit feedback on the first draft of these items and extends through February 2019 after seven iterations of the survey. We stop here because no substantial changes were made to the survey for the rest of the year.

Data consist of recordings of six approximately 60-minute one-on-one meetings with teacher educators across four campuses, one 60-minute group meeting with three teacher educators at a single campus, one 60-minute meeting with a teacher candidate, and two network-wide 90-minute meetings. Additionally, data consist of seven versions of the practical measurement survey that the research team generated from conversations with teacher educators as well as memos and notes taken during meetings.

Three of the six one-on-one meetings with TEs were audio and/or video-recorded; transcripts were primarily used for analysis. For the other three meetings, detailed notes were taken as TEs offered their feedback. During the first four one-on-one meetings, TEs were asked to offer feedback on prototypes of the practical measure survey. For the final two one-on-one meetings, a TE at one campus, Jill, offered to administer the survey to her teacher candidates beforehand and facilitators agreed to have her test the survey. Facilitators presented data from this single administration to Jill as well as another TE at a different campus for their insight and to test the utility of the data generated from the survey. These data were also presented to a group of three TEs at Jill's campus for the same purpose.

The meeting with a preservice teacher candidate was audio recorded and was conducted as a cognitive interview, a tool common in the development of questionnaires (Willis, 2015) and in

design-based research (Adams et al., 2003). During this meeting, the first author asked the candidate to complete a second prototype of the survey while narrating their thoughts and reactions to each item out loud.

All five network-wide meetings were video recorded via Zoom, a videoconferencing platform. At the network-wide meeting in December 2018, 14 teacher educators across five campuses attended. During this meeting, two facilitators asked teacher educators to review a prototype of the survey and provide feedback. At the February 2019 network-wide meeting, 14 teacher educators across six campuses attended. During this meeting, two facilitators asked teacher educators to review data collected by one campus and offer insight about what they noticed and what feedback they had on the survey as a result of reviewing the data. Although facilitators led a January 2019 network-wide meeting, measures were not discussed during this meeting and thus this meeting is not included for analysis in this study.

Analytic Approach

Consistent with our framing of this study as being aligned with a focus on generating insight into design methodologies (Edelson, 2002), our analysis was centrally concerned with surfacing three components of the design process: activity systems, namely through tools and objects; facilitators' and teacher educators' practices in these activity systems; and how activity systems and practices changed over time. While using a CHAT lens helped us see the activity systems via the tools and objects, our practice theoretical lens helped us understand the practices stakeholders engaged in and our process theoretical lens helped us see how tools, objects, and practices evolved over time. Thus, our approach to data analysis was interpretive to surface the process through which the practical measurement survey was designed, the tools that were employed in the design process, the objects of parts of the process, the practices that facilitators and teacher

educators engaged throughout the process, and how the process, tools, objects, and practices evolved as the process unfolded.

We began our analysis by examining facilitators' and teacher educators' actions. To do so, we employed process coding, turning talk from teacher educators and facilitators into actions (Saldaña, 2015). Coding occurred line-by-line, resulting in 739 unique codes. As we coded for their actions, we generated analytic memos and a summary of the activity systems (Engeström et al., 1999), including emerging tools and objects, that comprised each meeting as well as the specific ways that facilitators and TEs participated within those activity systems. We generated these memos and summaries about the meetings' activity systems as a way to a) conceptualize the context within which facilitators and teacher educators were acting, aligned with our conceptualization of practice as consisting of *situated* action, and b) help us see the particular tools and objects that emerged and became central as the process unfolded. In addition to generating insights about potential patterns in facilitators' and teacher educators' actions, creating these memos afforded insight into how their actions were changing and how the activity systems themselves changed as the design process moved from reviewing survey items to reviewing data generated by survey items.

Concurrent with our coding, we also generated a running narrative as a way to gain insight into how the design process unfolded and emerged over time. Narratives are used in process and practice theorizing (Langley, 1999) and were also used as an analytic tool in our study of how teacher educators came to settle on an aim statement in this network (Sandoval & van Es, 2021). We also used a narrative in alignment with Ahn and colleagues' (2021) use of thick design narratives to provide rich descriptions of how the process unfolded. We reviewed this narrative, along with the codes we had generated, and found that activity systems and, as a result, teacher

educators' practices both changed dramatically as the design process shifted from reviewing drafts of surveys and survey items to collecting and reviewing data generated from survey administrations as a way to solicit feedback on the survey. This narrative also helped us generate a process map, a tool used in improvement science to visualize the whole of a process by identifying the specific steps that were taken to produce an outcome (Bryk et al., 2015). We then used this process map to generate a process model. This process model served to visualize the design process that emerged in the generation of a set of practical measures. The purpose of this process model was to help us see the characteristics, features, and patterns of unfolding work in the design process over time (e.g., Huber et al., 2014; Jay, 2013; Philbin, 2008). The process model, along with our analytic memos on the activity systems that were emerging, helped us see that two distinct phases of work, characterized by their activity systems, constituted the design process.

Following the generation and review of this narrative and upon seeing the changes in the activities in the design process using the process model, we circled back to our process codes to understand the practices that facilitators and teacher educators engaged in and how they changed as they moved from one kind of activity system to the next. To do this, we segmented codes into two phases characterized by their activity systems: the first phase focused on activity systems in which the primary object of design activities was to generate and revise survey drafts; while the second phase focused on activity systems in which the primary object was to test the survey by collecting and reviewing improvement data using the survey. This segmenting served as a form of temporal bracketing, a strategy used to make sense of process data in ways that afford a structuring of the unfolding nature of events (Langley, 1999). Bracketing the codes into these

two phases helped us understand the specific practices that facilitators and teacher educators engaged in as activity systems shifted from revising survey drafts to testing surveys.

After segmenting codes into these two phases, we then sought to categorize codes to check the patterns we saw in our memos. Using Saldaña's (2015) strategy of clumping codes into like categories, we categorized codes based on the similarity of the substance of the codes. We offer two unique codes that fell into the same category as an example:

1. Janet explaining how candidates could have done more to learn about students in their placement.
2. Jill expressing that it is "incredible" that 29 candidates did not seek to understand students' linguistic backgrounds and histories.

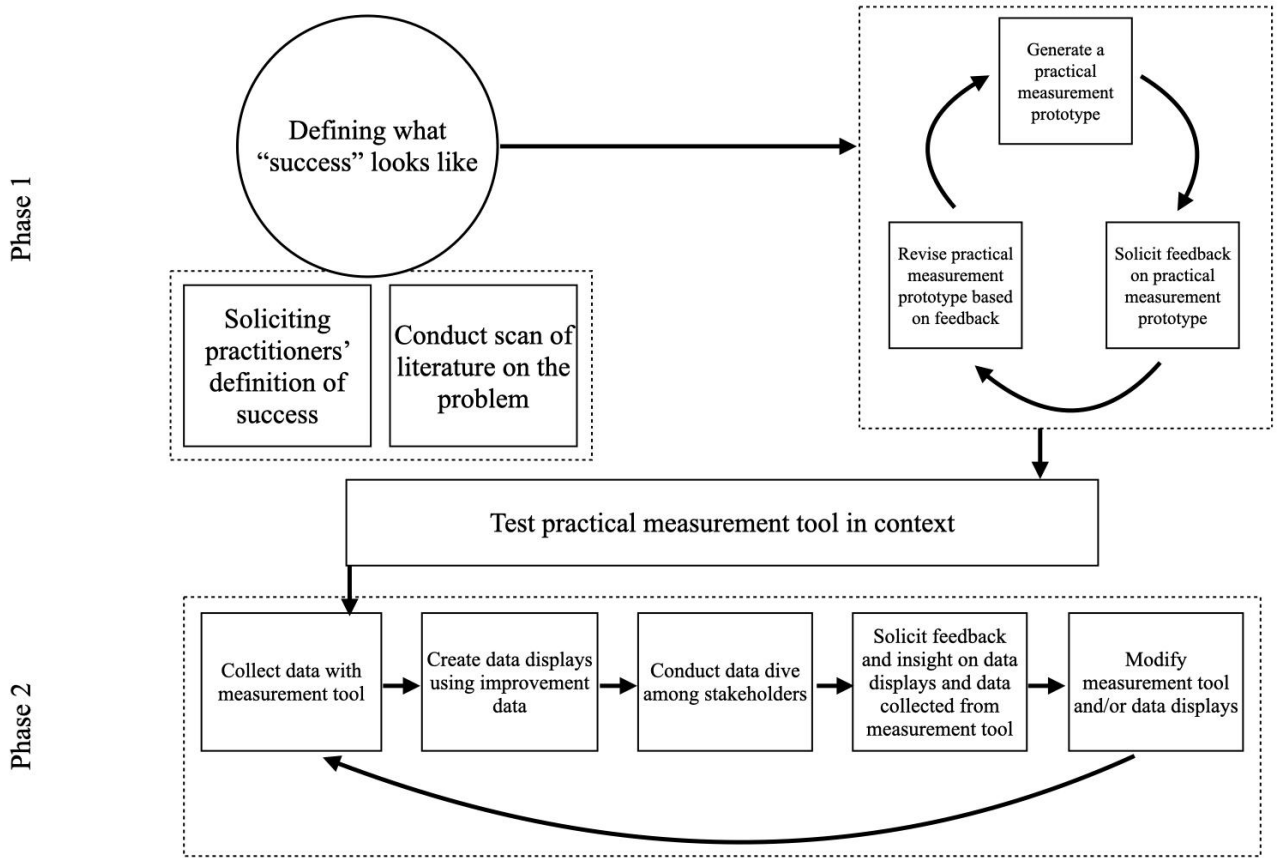
In both of these examples, TEs were making statements about how the data ought to look relative to how it currently looks. In both cases, Janet and Jill were articulating how the data revealed to them that candidates were responding in ways that they did not want them to respond. We categorized both codes as part of a larger category titled "Identifying what data should or should not look like."

From here, we reviewed each code and its context and recategorized them in order to ensure that codes within categories were consistent. In doing so, we found that some categories of codes were much more common than others, which we validated by counting the number of codes that we generated in each category. We reviewed these categories and their codes in context, in particular in relation to the process map we generated earlier in our analysis. We wrote memos to understand their relationship to the context within which these actions were taken and used these memos to generate prevailing practices that TEs engaged in as part of the design process.

Findings

Our analysis revealed that the work of designing process measures occurred through two different kinds of activity systems, distinguished by the central objects and tools that constitute them. We order these two types of activity systems temporally to show how the work of designing measures changed over time. The first type of activity system had as its central object the generation of a testable survey; its central tools were drafts of the survey to which facilitators and teacher educators (TEs) suggested and made revisions. In the second type of activity system, the central object was the resting of the survey and the primary tools were data collected from the survey and accompanying data displays. We found that the tools used to mediate interactions and the practices people engaged shifted as the process of designing measures moved from the first activity system to the second. Our process model (Figure 3.1) offers a summary of the practical measurement design process and what parts of the process took place in both activity systems. that illuminates how we generated a practical measurement tool in the form of a survey. We organize our findings around these two activity systems, highlighting the tools that were used by facilitators and teacher educators, as well as the practices facilitators and TEs engaged in within these activity systems.

Figure 3.1. Process Model of Practical Measurement Design



Activity System 1: Generating Survey Drafts

We characterize the first type of activity system that emerged in our analysis as being oriented towards generating and revising a survey. In our analysis, the primary tools that facilitators and TEs used and that mediated their conversations around were drafts of the survey, which were generated, shared, and interacted with in Google Docs. Conceptualizing drafts of the survey as tools enabled us to see how facilitators' and teacher educators' practices were enabled and shaped by survey drafts and the overarching object of generating and revising these survey drafts. Specifically, we found that facilitators engaged in the practice of *framing improvement data* to prime TEs for reviewing drafts of the survey; *soliciting feedback* from TEs around the survey drafts; and *inscribing* TEs' feedback into subsequent iterations of the survey. Teacher

educators, meanwhile, engaged in the practices of *augmenting* the survey drafts with additional items aimed at gaining more detailed insight into teacher candidates' experiences; and *editing* language in the survey drafts. While each of these practices shaped other practices, they were also shaped by the specific object of the activity system in which they emerged (generating and revising the survey) and the primary tool used (drafts of the survey). We note that the design process was characterized by facilitators being primarily responsible for collecting TEs' feedback and comments and codifying them in the survey. Facilitators chose to do this to both preserve TEs' time and because facilitators had access to feedback from meetings and could review and generate draft items that reflected TEs' comments.

First, facilitators engaged in the work of *framing improvement data* for teacher educators as a way to prime them for engaging with iterations of the survey and give them context for the purpose of the survey within the context of the improvement network. I highlight how the facilitator framed conversations around the drafts of the survey in a one-on-one feedback meeting with Sally. The facilitator commented:

> It's something that people in the program, you, instructors, and other people who are involved in the program can look at this on a regular basis, like, data that they can get back and make some decisions around that they sort of look at regularly. [...] And then also at the level of like, as a network, how are we doing across campuses. So I think primarily giving data back to instructors and you and [your colleagues] around this, that you can look at and frequently sort of see are [teacher candidates] where we want them to be.

In this comment, the facilitator is articulating to Sally the purpose of the survey as a tool for getting data to instructors on a regular basis so that they can "make some decisions," framing the

survey as a tool for getting feedback from teacher candidates to inform TEs on what candidates are doing and whether candidates are "where we want them to be." These comments were made at the beginning of meetings prior to TEs reviewing the survey so that TEs knew the purpose of the survey and could provide feedback based on what information TEs would find useful.

Facilitators also engaged in the practice of *soliciting feedback* from TEs, asking them for their critiques of survey drafts and engaging with that feedback by either brainstorming revisions in the moment or by validating their responses. One way in which facilitators solicited feedback was introducing the survey and asking TEs to silently review the survey for a set period of time and comment on it using Google Docs' commenting feature. The facilitators asked TEs to review the survey and comment for four minutes at the start of a network-wide meeting in December. After the four minutes had lapsed and the primary facilitator had summarized some comments he saw from TEs in the survey draft Google Doc, he commented, "I'm wondering as you were sort of going through people's comments and this survey in general, like, did y'all have any thoughts or reflections or insights or ideas?" The prompt was used to enable TEs' participation in designing the survey via soliciting their feedback during meetings. We note here that the use of prompts and time to review and comment in meetings was the primary mode through which facilitators engaged TEs in the process of co-designing measures. Rather than having TEs construct items themselves or make any other arrangement to engage TEs more or less centrally, facilitators chose to generate survey drafts themselves and bring them to TEs for feedback during meetings.

Central to this move by facilitators to generate survey drafts themselves was their engagement in the practice of *inscribing.* Once facilitators collected comments from TEs, they codified TEs' comments into new iterations of the survey. For example, in a feedback meeting,

Sally commented on items beginning with the phrase, "I was asked to," remarking that that this phrase made items "seem very assignment specific." She continued, "So if one of our instructors didn't ask them to do that this week, they would all say no." Immediately following this meeting, facilitators revised items to incorporate Sally's comment. For example, one item originally read:

> In the past week, I was asked to engage in an activity to better understand my English language learners' backgrounds

Following the feedback meeting with Sally, facilitators revised the item to remove the phrase, "I was asked to…" to read:

> In the past week, I engaged in an activity to better understand my English language learners' backgrounds

This revision of the survey based on Sally's feedback is an example of how facilitators engaged in the practice of *inscribing*, as they sought to incorporate TEs' feedback and insight into the survey. By taking out the item, facilitators had intended the survey to be more useful to TEs like Sally. We reiterate that it was the facilitators' decision to orient TEs to the work of generating survey drafts, solicit feedback on the drafts of the survey, and do the work of inscribing on their own without teacher educators.

Teacher educators also engaged in a range of practices in this kind of activity system that focused on generating a survey and used survey drafts as the primary mediating tools. One central practice that emerged was that of *augmenting*. By augmenting, we refer to moments where TEs sought to add to the survey as a way to generate more insightful feedback on what candidates were doing in their student-teaching placements. In particular, TEs augmented the survey by advocating for open-ended questions in response to seeing a survey draft that consisted

exclusively of multiple-choice questions. Upon reviewing the survey at the December network-wide meeting, one TE, Janet, remarked:

> I was wondering if there was any thought of, including an open-ended question at the end or something some of these are, you're looking for yes and no answers. And to me you're not really getting a sense of, of what the students are feeling or thinking. And I'm wondering if there was any thought of an open-ended question.

Janet suggested an open-ended question by making visible that the facilitators were "looking for yes and no answers" while missing the nuance of candidates' thoughts and feelings as it pertained to their own practices. We highlight here that this particular instance of augmenting was enabled by the facilitators' decision to generate a survey draft that included only multiple-choice items.

This practice of augmenting continued, particularly in response to the facilitator's pushback on the inclusion of open-ended items. In responding to Janet's suggestion, the primary facilitator commented:

> That is a really good point. And I think one of the tricky things is […] having [the survey] be something that doesn't take up— I can imagine some open-ended question might end up taking three to five minutes for candidates to answer in addition to any other question we might ask. So one is, like, time, and then the other is getting it back to you—getting those data back to you all in a timely manner, and in a way that you can sort of see across your candidates. It might be more difficult to do that with more open-ended responses.

Here, the facilitator calls the inclusion of open-ended questions "tricky," arguing that the survey would take much longer to complete, and that data would also take longer to send back to them.

In taking an improvement science lens to this work, the facilitator attempted to stay close to what practical measures ostensibly should be: easy to collect and sent back to practitioners in a timely manner. We highlight this as another instance of facilitators engaging in the practice of framing improvement data. However, this push back from facilitators enabled TEs to continue to engage in this practice of augmenting as part of their effort to include open-ended questions. Janet responded:

> But I mean, open ended in that: describe one experience you've had this week with multilingual students. So, capturing it, not necessarily just open ended, meaning reflect on what you're feeling, but tell us what's one experience you've had. You ask them all these yes or no questions, but you have no clue what that yes and no is signifying. [Adding an open-ended question about their experience] is going to give you more of a sense of what their yeses and noes mean, because you now have a specific action that they've done, which would be more data than a yes or no

Janet's comment highlighted how the "yeses and noes" offer little meaning to TEs and that understanding candidates' experiences qualitatively through open-ended questions would offer more insight into what candidates have done. Other TEs expressed agreement. One TE, Omri, remarked that, without details on the activities that candidates engage in, "it kind of just becomes a yes or no game." Later on, in a one-on-one meeting with the first author and primary facilitator, Omri suggested adding a conditional open-ended question for candidates who responded "yes, in my student-teaching placement" to particular items. Another TE, Valerie, also advocated for open-ended questions to be added to the survey by saying that, without detail on what candidates are doing, TEs "don't know what meaning they're making of the actual questions." TEs' engagement in the practice of augmenting was centrally concerned with attempting to generate

more insight into the details of what candidates did in their placements. Their engagement in augmenting also revealed what they viewed as the limitations and possibilities of the survey were; for Valerie, this draft of the survey would not give insight into how teacher candidates interpreted and understood questions. For her, more open-ended questions were required to understand candidates' understanding of particular items. TEs' engagement in augmenting was enabled by both the facilitators' decision to generate a survey draft consisting entirely of multiple-choice questions as well as their push back against making the survey longer in an attempt to ensure the survey would not be burdensome for practitioners to administer. Following these remarks, the facilitators added open-ended questions that asked candidates to "briefly describe, in one or two sentences" the specific activity candidates engaged in as they answered, another instance of facilitators' inscription practices. While this serves as another example of how facilitators used the survey as a tool for inscribing teacher educators' practices of augmenting, the survey also served as a tool that enabled TEs' augmentation via the initial exclusion of open-ended items, which TEs argued were more useful than multiple-choice items.

Teacher educators also engaged in the practice of *editing* in this first phase. Some TEs engaged in editing to challenge and modify existing language. For example, a statement at the top of the third draft of the survey read as follows:

> "Multilingual students" refers to students traditionally labelled "English language learners" and students with other language variations (e.g., students who speak in dialects other than White American English.)

The use of "White American English" was used in other items throughout the survey. During the December network-wide meeting, one TE noted that this language was "jarring" and wondered why the survey could not use the term "Standard American English." Other TEs agreed, with one

saying that including "White American English makes it seem like [Standard American English] is only for/from white speakers." Later on in the meeting, two TEs commented on the conflation of "academic English" and "White American English," remarking that they are "not synonymous." Facilitators removed this language and replaced "White American English" with "Standard American English" in the next iteration of the survey. By surfacing the word "White American English," the survey acted as a tool that enabled TEs to consider particular language to describe the dialect of English to which they were referring and wanted to make distinct in the survey.

Some editing practices focused on making changes to the survey that appeared more mundane. For example, the items in the third iteration of the survey asked candidates about their experiences at the home facilitators' campus rather than their placement more broadly to make the survey applicable to candidates at other campuses. One item in the third draft of the survey read:

> In the past week, I engaged in an activity to better understand my English language learners' backgrounds
>
> - ❑ Yes, in my UC Southern Campus coursework
> - ❑ Yes, in my student-teaching placement
> - ❑ Yes, in both my coursework and placement
> - ❑ No

TEs from other campuses noted that items were specific to the facilitator's campus ("UC Southern Campus") and pointed out that the item option should be changed so that the item could be used across campuses. In the fourth draft of the survey, the first option was changed to read "Yes, in my program coursework."

Other editing practices, however, were focused on identifying the scope of particular items and the survey more broadly. For example, at the same meeting in December, Omri commented via Google Docs on the following item:

> In the past week, I engaged in an activity to better understand my English language learners' backgrounds.

Omri commented that "backgrounds" was "too broad" and that either specific aspects of students' backgrounds "such as family, home lives, race/culture/ethnicity" ought to be named or the item should be removed altogether. Janet echoed Omar in the Google Docs comments, asking facilitators to "clarify what you mean by backgrounds." In these exchanges, the survey's inclusion of the phrase "English language learners' backgrounds" enabled teacher educators to edit the item to identify the scope of particular items. The object of the activity of offering suggestions and revisions also shaped how TEs engaged with the survey, affording them the opportunity to interrogate the scope and specificity of the items.

These practices that TEs engaged in were situated within activities where facilitators asked TEs to review the survey draft and offer comments, suggestions, revisions, and feedback. Some of these activities included facilitators asking TEs to comment specifically on the Google Docs document. Taken together, the draft of the survey and accompanying facilitation practices constrained and enabled how TEs engaged in the practices of augmenting and editing the survey, shaping what artifacts TEs were responding to and how they responded to these artifacts. However, TEs' comments and suggestions were taken up in ways that shaped the design process and, in turn, facilitators' practices. By making comments and suggestions the way they did, TEs shaped how facilitators came to include and exclude particular items and language in the survey.

We characterize the first activity system in this process as being centrally focused on iterating on the survey by focusing on drafts of the items and the specific language that they include. In this activity system, multiple versions of survey drafts served as a tool for enabling facilitators' and TEs' practices. We turn to examine the second activity of the design process.

Activity System 2: Testing the Survey

We characterize the second kind of activity system that emerged as being concerned with testing the practical measurement survey. The central tool that was used in this part of the design process were improvement data displays generated from data collected by teacher educators using the survey in their teacher preparation program courses. The majority of interactions in this activity system occurred through feedback meetings with TEs, or what the facilitator called "data dives," where TEs were asked to review and reflect on data. Our analysis revealed that the shift toward testing the survey and using data displays enabled shifts in facilitators' and teacher educators' practices. In this next phase of work, facilitators engaged in the practices of *clarifying* the survey and its results. In addition, facilitators continued to *inscribe* TEs' comments into iterations of the survey and *solicit feedback* from TEs but did so in ways that were unique to this particular activity system and shaped by the use of improvement data displays. TEs, on the other hand, engaged in the practices of *benchmarking* and *contextualizing.* Each of these practices emerged as the design activities shifted from developing survey drafts to using the survey in context as a way to test the survey.

First, facilitators engaged in the practice of *clarifying*, where they explained particular components or features of the data or data displays. This practice emerged as teacher educators asked questions about the data displays, expressed confusion about the displays, or had misinterpreted what the displays were meant to portray. In one instance during a data dive in

January 2019, three TEs expressed concern with how few teacher candidates had responded that they engaged in an activity to better understand their students' linguistic backgrounds. One TE, Janet, remarked:

> Candidates also had to do that [engage in an activity to better understand students' linguistic backgrounds] in terms of a language learner and how that language learner performs. And so nobody mentioned that but I know they did that in September, October (2018). So, was it so far away? They didn't know.

The primary facilitator noticed that Janet interpreted the data to mean that candidates had *never* engaged in an activity to better understand their students' linguistic backgrounds. The facilitator interrupted to clarify that the item asked candidates whether they had engaged in such an activity "in the past week." He remarked:

> Oh, yeah. Okay, so this is—I'm sorry. So, the one thing that I should put on here is, [the item] says in the past week, [TEs collectively: ohhh!]. So, then I need to make that clear. What that tells me is that I need to make that clear in the displays.

In this comment, the facilitator clarified that the item was scoped temporally only in the past week rather than at any time during the program. This was one instance where the facilitator noticed that TEs were misinterpreting what the display was meant to portray and stepped in to enable them to review the data as it had been collected. This instance of clarifying occurred throughout these data dives with TEs, such as when TEs reviewed open-ended data and the facilitator clarified that candidates were only asked open-ended questions when certain responses from candidates triggered the survey to prompt them.

However, the facilitator frequently viewed these moments of clarification as a problem with the design of the display or the survey, thus enabling him to engage in the practice of *inscribing*.

Although facilitators inscribed TEs' comments and feedback into new iterations of the survey, they also inscribed into the survey, or the data displays how TEs used and/or interpreted data. In the example above, the facilitator located TEs' misinterpretation in the data displays, remarking that he needed to make it "clear in the displays" that the item asked about candidates' activities in the past week. The label for one bar in the display originally read:

> I engaged in an activity to better understand one or more of my students' linguistic backgrounds and/or histories.

After this meeting and TEs' interpretation that the data asked candidates about activities they engaged in throughout the entirety of their experience in the program, the facilitators changed the next iteration of the data displays. The label did not change; however, facilitators added a heading to the top of each display that read "In the past week…" in 36-point font. By doing this, the facilitator's inscribed into the data displays guides based on how TEs interacted with the displays. In subsequent data dives, TEs reviewed data in ways that were consistent with what was intended in the survey. The data displays in this case served as a tool for priming and focusing TEs' engaging with data; without the text "In the past week" at the top, TEs interpreted data differently than when the text "In the past week" was included with the data display.

Facilitators also engaged in the practice of inscribing as they had in the previous activity system, taking comments made by TEs about items or the data displays and making revisions to the survey or the displays based on TEs' feedback. In another data dive with three TEs, Janet critiqued a set of items that began with the phrase, "In the past week, I reflected on…" For example, one item read:

> In the past week, I reflected on my own privilege relative to the multilingual students in my classroom.

Janet remarked that these questions referencing reflection were "very broad." Janet had said that these items were "more a general reflection… I don't think the [teacher candidates] would read that question and say, When you picked up a novel or a book that you were going to read to students, what did you think about what it showed you about privilege? … I want them to do that." Later on, Janet suggested the word "noticing" as a way to attach candidates' awareness to particular events that happened in their placement. She remarked, "Do we mean, I noticed it, or there was an incident, an event that made me reflect on it?" After teacher educators discussed the issue and scope of reflection, the primary facilitator sought to clarify and offered a suggestion:

> I see what you're saying. I'm wondering—it sounds like to make these more useful, these ones on "reflected on my own privilege" and "reflecting on how schools enforce Standard English" … It sounds like maybe a modification that we can make to these to make them more usable on an ongoing basis is something around, 'I noticed something about, you know, my own privilege.'

Janet responded by saying that she "liked the difference in the word notice, versus reflected … If I noticed it, then I am going to reflect on it. But if I don't notice it, I can't reflect on it. Thank you, that's probably where I was coming from." Valerie agreed with Janet that noticing was preferred to reflection. After these data conversations, the facilitator changed the items from "reflecting" to center noticing. Facilitators changed the example item from above to the following (emphasis added to reflect the revision):

> In the past week, I ***noticed*** something in my placement that made me think about my privilege relative to my multilingual students.

The revised item was meant to reflect the comments Janet made, and that her other colleagues agreed with, by replacing "reflected on" with "noticed." Much like the first type of activity

system in the practical measure design process, facilitators tasked themselves with incorporating TEs' comments into the survey. Unlike the first activity system, however, this revision emerged from reviewing data collected from teacher candidates in the form of data displays. We note here that the original items which included the words "reflected on" were present in earlier drafts of the survey that Janet and other TEs reviewed before testing. The language of "reflected on" was not a subject of conversation nor was it surfaced by Janet or other TEs. This concern with "reflected on" being "too broad" only emerged when TEs reviewed data and were tasked with interpreting it.

These interpretations of data emerged in part through facilitators' engagement in the practice of *soliciting feedback.* This practice emerged in ways that were similar to how it emerged in the first activity system: facilitators asked TEs to review an artifact, in this case the data displays, and offer critiques or suggestions for revision. However, the practice of soliciting feedback also emerged through facilitators' solicitation of insights on data from TEs. For facilitators, soliciting TEs' insight on data enabled them to identify what about the displays could be improved or how data could be more useful. Facilitators frequently did so by borrowing prompts from data dive protocols frequently used in improvement science-driven efforts (National School Reform Faculty, 2015; School Reform Initiative, 2002). In a data dive with one TE, Jill, the facilitator sought to solicit her insights by asking her to review the data "without analyzing":

> So, I'm going to show you the rest of the data. I put them in data displays. What I thought you could do is to take a minute and note anything that first without analyzing just yet, but just sort of like what do you notice what sticks out to you as surprising, or what's unsurprising and sort of do that for, I don't know, however long it will take you to go

through so you can just go through each slide. And feel free to think out loud. Think out loud what you're thinking and feeling.

In this early prompt as the facilitator is about to show Jill the data displays, he asks her to review data "without analyzing" and to note "what sticks out to you as surprising or what's unsurprising." The facilitator, drawing on prompts from data dive protocols that ask participants to review data without judgment and to identify surprises, sought to solicit data insights from Jill. The facilitator's particular form of soliciting feedback, in this case, came through the kinds of insights that Jill generated via the data dive protocol that would be used to guide conversations around improvement data. While the facilitator did ask TEs for direct feedback and critiques of artifacts—data displays, open-ended responses, and the survey—he also solicited feedback via data dive prompts.

The second type of activity system that emerged was characterized by the facilitation practices of *clarifying, inscribing,* and *soliciting feedback,* mediated through the use of data displays and within the context of testing improvement measures. How facilitators engaged in these practices were shaped by the object and particular tools that were centered in these activity systems. Notably, facilitators continued to engage in the practices of inscribing and soliciting feedback as they did in the first set of activity systems. However, these practices emerged in different ways, as TEs' feedback and comments emerged not just from direct prompts asking for critiques, but from the use of and generation of insights from data and data displays.

Recognizing the entanglement between facilitators and TEs' practices, we now turn to describe how TEs' practices in the second set of activity systems shifted. Two practices from TEs emerged as central as the practical measurement design process shifted to testing the survey: *benchmarking* and *contextualizing.* We start by describing the practice of benchmarking. By

benchmarking, we refer to moments when teacher educators reviewed data and made claims about what data should and should not look like or what they want or do not want data to look like. After one teacher educator, Jill, administered the survey to her elementary candidates at the beginning of the winter quarter and at the start of a new student-teaching placement, the primary facilitator generated data displays that he then presented to her at a data conversation. The facilitator then asked Jill to share what she noticed and what surprised her. Jill engaged in the practice of benchmarking in a number of ways, including naming her expectations for how data *should not* look. For example, Jill noticed that 30 out of the 53 candidates who responded to the survey responded "No" to the item "In the past week, I engaged in an activity to better understand my multilingual students' home lives." She remarked:

> I'm engaged in an activity to better understand. So, this to me is like frightening as well. So, the majority of them said no, they didn't do any kind of activity to better understand their student's [home lives]. So, I don't really like that data. Like, I don't want it to look like that.

By expressing that she was "frightened" by the data, Jill made visible that she did not expect the data to show the majority of candidates not engaging in activities to better understand their multilingual students' home lives. Jill makes normative that candidates should be engaging in these activities at any moment in the program, such that it would be captured and reflected in the data. Colleagues at her campus expressed similar sentiments at a later meeting. Janet, for example, commented:

> Because it's about their home lives, I would expect hopefully to see more. But the [next] two [items] are both activities that could be done at any time right before, but it still is a

> little bit worrisome to me that we had so many students say they didn't do anything that first week in their placement to get to know their students in general.

Much like Jill expressed fear of candidates not engaging in an activity to better understand students' home lives, Janet expressed disapproval and worry at the same results. Both of these expressions of worry and fear serve as evidence that TEs viewed data in light of what they think the data should *not* look like.

TEs also engaged in the practice of benchmarking by making normative what data *should* look like by identifying activities that candidates ought to be engaging in regularly. For example, Jill pointed to data from the item "In the past week, I incorporated some aspect of my multilingual students' languages, communities, or families into an activity or lesson" and responded with the following:

> Well, in their normal, whatever, sometime during the quarter, but then also when they're doing their full-time student teaching—so if I'm like teaching all the time, we should see, like we would hope to see 100 percent [candidates responding "yes, in my fieldwork"] on this.

Jill argued in her comment that, when candidates are taking on full teaching responsibilities in their placement, they *should* always incorporate some aspect of their multilingual students' languages, communities, or families into an activity or lesson. Janet also engaged in benchmarking by pointing out certain items as ones describing activities candidates should always be doing throughout their time in the program. She remarked that for the item on incorporating multilingual students' backgrounds into activities or lessons, she "would expect to see that ongoing" and also remarked of the item on language demands that she "would expect that to happen all the time." Naming these expectations for what candidates should be doing, and

benchmarking data relative to those expectations, was a core practice TEs engaged in that emerged from reviewing improvement data displays. These data displays enabled the practice of benchmarking by activating for TEs what their expectations of candidates were.

TEs also engaged in the practice of *contextualizing* during these activity systems oriented towards testing the practical measurement survey. By contextualizing, we refer to how TEs reviewed improvement data as part of the design process and situated the data within the program, candidates' trajectory within the program, and candidates' experiences in their student-teaching placements. In some instances, TEs engaged in contextualizing by situating their affective reactions within what they knew about candidates' experiences in the program. For example, after Jill remarked that she was "frightened" by how few candidates engaged in an activity to better understand their students' home lives, she remarked:

> But then I'm also wondering like, okay, I taught a class last week, and I didn't do any of this, either. Or even talk about it. […] I don't know, like I look at that and it frightens me, but then I think—it's just the first week. And I'm one person. And if I take myself as that coursework because I was one, I was one of the whatever classes they took, but we didn't talk about that.

In this comment, Jill expressed that while the data frightened her, she recognized that candidates were in the first week of a new placement and in taking new coursework. Jill situated the data within what coursework candidates were taking and where they were in their student-teaching placements as a way to make sense of data and generate insight into why the data looked the way that they do. Charlotte, a colleague at a different campus in the network, also engaged in contextualizing around data from Jill's candidates. Charlotte had similar insight into how Jill's program was organized and situated data displays within that context:

> So, I thought for my most recent conversation with Virginia, that this group just started a new placement in winter. (Facilitator: That's correct) So they're just kind of getting to know the teacher and the students […] most of my attention was on the noes, but, you know, it did just seem as a trend that they were reflecting more than they were engaging, which isn't, which might be partly because it's a new placement, right? […] But it doesn't seem like at this point in time, they're engaging in as many actions and so I guess I would wonder if there was some way that we could provide more structured opportunities you know, for the students to try things out, or is that mainly a function of the newness of the placement?

Charlotte offered similar remarks to Jill in that she contextualized Jill's data within what candidates were experiencing at the time they took the survey. This practice of contextualization afforded TEs a way to make sense of data in ways that connected particular program activities to what candidates reported having done in the survey. By calling attention to particular program features, TEs are making conjectures about what data can be expected to look like depending on the activities and coursework in which teacher candidates are engaged.

TEs also engaged in contextualizing data within candidates' placements by arguing that candidates' responses were shaped by the number of students classified as "English language learners" were present in candidates' classrooms. For example, Valerie reviewed the data and revisited the item that asked candidates how many of the students in their placements were English language learners. She remarked:

> But we have a large group, 31 percent, who say, oh, yeah, between zero and 25 percent (of students are English language learners). And if a lot of those candidates actually think zero, then none of these—this is all irrelevant, or they all say no, right. Every single

> question. So, I don't know how you fix that in the survey. But that's a problem. Like this one, you would need to have multilingual students to actually reflect on whether your mentor teacher's classroom was a welcoming environment on page four for multilingual students, you wouldn't actually need to have multilingual students in your class to reflect on that.

Valerie argued that a large number of candidates likely responded and would respond "no" to every single question if they had no English language learners in their placement. Without those students in the placement, they would not be able to reflect on aspects of their multilingual students' experiences. By naming the variation in the number of English language learners in student-teaching placements, Valerie is engaging in the practice of contextualizing data. For Valerie, the data are "irrelevant" if student-teaching placements have no English language learners, expecting that candidates would respond negatively to the survey. These insights emerged from Valerie's work to contextualize data, and these insights were enabled by data—in this case, candidates' reporting of the number of English language learners in their placements—that primed Valerie to attend to the kinds of students that teacher candidates were assigned to teach and how that affected the results of the survey.

We note that the practices of contextualizing spanned a wide range of items and also included a wide range of contextual factors that TEs felt shaped how the data looked. Some TEs highlighted how responses were shaped by what courses candidates had just taken and what courses they would take. Jill, for example, commented that her course on inquiry would not cover topics pertaining to multilingual students or English language learners extensively and thus, she would not expect candidates to respond affirmatively to items as a result of her class specifically. Janet, on the other hand, expressed surprise that many candidates did not respond

affirmatively to some items given that they had just discussed English language development standards in a course during the previous term. In other instances, TEs situated data within particular program features, such as the extent to which bilingualism was interwoven throughout the program and conjectured about whether and how those features influenced how candidates responded.

These contextualizing practices make visible how TEs participated in the design process in this second activity system focused on testing the practical measurement survey that was generated from the first phase. These contextualizing practices emerged specifically from the use of data displays and the testing of practical measure surveys; the use of data displays enabled TEs to consider the context of their programs and programmatic activities while also enabling them to discuss what their expectations were for candidates' engagement in particular activities. Both the practices of benchmarking and contextualizing were central to the way TEs participated in the design process and were enabled by the particular activity systems in the design process that centered the use of improvement data. We turn to situate these findings within existing literature and articulate our contribution to existing improvement-focused research literature.

Discussion

This study seeks to build on existing work we engaged in on examining enactment of continuous and networked improvement efforts (Sandoval & van Es, 2020; 2021) by unveiling and examining the process of designing a practical measurement tool in a NIC. Prior research on practical measurement has offered insight into the design of data visualizations that support instructional improvement (Ahn et al., 2019) and how practical measures ought to be evaluated given their focus on utility and use by practitioners (Ing et al., 2020). Prior research on practical measurement has also revealed how practices and processes of practical measurement can be

established and integrated into existing systems in order to build the capacity of schools and education organizations to use improvement data (Takahashi et al., 2019; Sherer et al., 2020). We contribute to this growing body of work on practical measurement by centering how practical measures can be *designed* when few or no shared measures exist across sites or teams.

Our study focused on unveiling and examining the enactment of the design process of a short survey in a teacher preparation networked improvement community. In doing so, we generated a process model to illuminate how the design process unfolded and evolved over time and found that the design process evolved from focusing on reviewing drafts of surveys in the first phase of the process to reviewing data generated by those surveys in the second phase. We found that as the process and its activity systems changed, so did the central tools and objects of the design process as well as facilitators' and teacher educators' practices. The work of designing practical measures began with a focus on generating and revising drafts of surveys, where facilitators engaged in the practices of framing improvement data, soliciting feedback, and inscribing, while TEs engaged in the practices of augmenting and editing. After the survey draft underwent five cycles of revision, the work of designing the practical measurement tool shifted to testing the survey in teacher educators' classrooms. As part of this work, facilitators engaged in the practice of clarifying, while continuing to engage in inscribing and soliciting feedback, though these practices were engaged differently as a function of the activity system in which they emerged. Teacher educators, on the other hand, engaged in the practices of contextualizing and benchmarking improvement data that they collected as part of the testing. Each of these practices were shaped by and shaped the activity systems within which they emerged and were central to the production of a shared practical measurement tool.

We identify four broad implications of this study. First, the process model we generated for designing a practical measurement tool, and the practices that facilitators and TEs engaged in, illuminate one way to design measurement tools situated within continuous improvement efforts. In existing research, improvement facilitators and improvement-focused researchers concern themselves with finding data or measurement systems that already exist—typically for accountability or monitoring or as part of engagement in learning activities—and repurposing and reframing them for improvement efforts (e.g., Takahashi et al., 2019; Krumm et al., 2015). This is done primarily to foreground efficiency and leverage existing systems to more seamlessly integrate measurement for improvement in schools and universities. However, existing data may not be readily accessible or relevant for particular improvement efforts. This was the case for Nieman and colleagues (2020) who designed a set of measures aimed at understanding students' experiences in whole-group classroom discussions rather than using existing data on mathematical proficiency, for example, to advance their improvement work. In the case of our teacher preparation improvement network, campuses collected little shared data across sites and the data that were collected were not seen as particularly valuable to teacher educators, leading to the network designing a set of measures. Our study adds to Neiman and colleagues by offering another process for designing practical measures. However, our study also reveals the particular ways that stakeholders—in this case, facilitators and teacher educators—engaged in the work of designing these measures and how this work looked different depending on where they were in the process and, importantly, what activities and tools were employed at any given time. Our study revealed that facilitators were primarily responsible for generating tools, using them to solicit TEs' feedback, and codifying TEs' feedback while TEs were responsible for providing insight on and suggestions for revising these tools. We build on Neiman and colleagues' (2020)

work by generating insight about how people participate in the work of designing measures as well as insight into the constellation of tools, objects, and people that comprise the process of designing measures. Understanding how people design practical measures and the tools employed to do so can help others engaged in the work of designing measures consider the kinds of practices and artifacts that are central to the design process.

Second, by unveiling how teacher educators participated and shaped the design process, we argue that improvement facilitators ought to be aware of and sensitive to the practitioners' participation practices when they engage practitioners in co-designing practical measurement tools. Although a plethora of research exists on data use in education (Coburn & Turner, 2011; Schildkamp & Datnow, 2020), attending to how practitioners use data as a way to inform measurement design is a critical area of research that requires further investigation. Our study highlights how practitioners used and engaged with data that were generated from tests of a survey and how their practices of data use then informed the design of the survey. For example, TEs engaged in the practice of benchmarking to make normative what data should look like given their knowledge of the program and candidates, and those practices then shaped what was and was not included in future survey iterations. We argue that testing surveys by collecting data and attending to how practitioners engage with those data can reveal important insights into the design of practical measures. We also argue that understanding the range of ways that practitioners engage in the design process can help other facilitators of practical measurement design efforts anticipate how practitioners engage with measurement tools and how particular forms of engagement can be solicited through particular design activities.

Third, we unveiled the facilitation practices that emerged as part of the work of designing practical measurement tools. Research on facilitation practices in continuous improvement is

sorely needed, particularly given the position of the facilitators in the work of doing improvement (Bryk et al., 2015; Perry, 1995). Our work seeks to help build our understanding of the work of improvement facilitation by attending to what specifically facilitators do. We also contribute to a conversation started by Coburn and Penuel (2016), which concerned the need to understand the strategies and techniques employed in collaborative partnership work in education. Specifically, our study adds to our understanding of partnership strategies and techniques employed in the form of facilitation practices. Our study reveals how facilitators framed improvement data for practitioners, solicited feedback from them, and inscribed their comments into improvement tools. We see our study as beginning to build a repository of common practices that improvement and RPP facilitators engage in as part of the work of doing joint work with practitioners. As continuous improvement as an approach to educational improvement spreads, the need for quality facilitation to bring together stakeholders from disparate organizations will grow. Understanding how facilitation work unfolds affords a conversation about what practices are most advantageous for engaging in particular improvement or partnership activities.

Lastly, we think this study has implications for teacher preparation given the context of this study and the improvement network. Although data use in education broadly has been well-researched, there is a need to understand issues of data use in the field of teacher preparation. Much of the research on data use in teacher preparation concerns the use of data to establish more robust accountability systems or engage in broad reform of teacher preparation (e.g., Bastian et al., 2018; Noell & Burns, 2006; Wineburg, 2006) or the preparation of new teachers to use data (e.g., Mandinach & Gummer, 2016). Our study is instead situated within a broader effort in the field of teacher preparation to bring data use to bear on program improvement (e.g.,

Peck & McDonald, 2013; Takahashi et al., 2019). Although our study focuses on the design process of a practical measurement tool for teacher educators, our attention to teacher educators' practices in engaging with data offer some insight into how teacher educators may use and respond to improvement data.

Conclusion and Directions for Future Research

As continuous improvement approaches continue to spread throughout the field of education and teacher preparation more specifically, we argue that improvement-focused researchers must carefully attend to the enactment of improvement efforts. Our study highlights the enactment of one piece of an improvement effort, situated within the initiation phase of a networked improvement community: the design of a system of practical measurement. We believe this study can spark a number of directions for future research.

One such direction concerns the agency that data and data visualizations have in shaping and guiding how people engage in data use and improvement efforts more broadly. Ahn and colleagues' (2019) study on designing dashboards offers insight into how teachers use data on students' experiences in whole-class discussions, highlighting a particular design decision generated from teachers' conversations to not signal the "right answer." Future research on the design and use of practical measures could consider how data displays and data presentations shape how those engaged in improvement efforts then participate in data conversations and in subsequent improvement activities.

Relatedly, another direction concerns episodes in our data where teacher educators expressed having affective reactions to our data displays (e.g., when TEs found data "frightening" or "worrisome"). We contend that future research can generate insight into the various affective reactions that practitioners express in response to data and how that then shapes improvement

efforts. We surface this to bring to light a tension we found in the literature. On one hand, research on the use of data visualizations, for example, highlights how data displays are more productive when they are not causing practitioners to feel as if they were told by an external entity they were wrong (Ahn et al., 2019). On the other hand, some improvement-focused scholars argue that improvement is most productive and likely when there exists "dissatisfaction with the status quo" (Dolle et al., 2018, p. 3). We highlight this tension to reiterate the importance of attending how affective reactions to and engagement with data use influences engagement with subsequent improvement activities.

We end by arguing that while continuous improvement approaches, and practical measurement in particular, have emerged as promising for improving schools and school systems, understanding intimately how these processes unfold is an important line of work for interrogating and improving the practice of improvement. By centering enactment in the context of practical measurement use, we seek to spark a conversation around the various ways that these improvement tools can be implemented and utilized.

References

Adams, R. S., Turns, J., & Atman, C. J. (2003). Educating effective engineering designers: The role of the reflective practice. *Design Studies, 24*(3), 275–294.

Ahn, J., Campos, F., Nguyen, H., Hays, M., & Morrison, J. (2021a). Co-designing for privacy, transparency, and trust in K-12 learning analytics. In *LAK21: 11th International Learning Analytics and Knowledge Conference* (pp. 55-65).

Ahn, J., Nguyen, H., Campos, F., & Young, W. (2021b). Transforming everyday information into practical analytics with crowdsourced assessment tasks. In *LAK21: 11th International Learning Analytics and Knowledge Conference* (pp. 66-76).

Ahn, J., Nguyen, H., & Campos, F. (2021c). From visible to understandable: Designing for teacher agency in education data visualizations. Contemporary Issues in Technology and Teacher Education, 21(1), 155-186.

Bastian, K. C., Lys, D., & Pan, Y. (2018). A framework for improvement: Analyzing performance-assessment scores for evidence-based teacher preparation program reforms. *Journal of Teacher Education, 69(*5), 448-462.

Boyd, D., Grossman, P. L., Hammerness, K., Lankford, R. H., Loeb, S., McDonald, M., ... & Wyckoff, J. (2008). Surveying the landscape of teacher education in New York City: Constrained variation and the challenge of innovation. *Educational Evaluation and Policy Analysis, 30*(4), 319-343.

Bryk, A. S., Yeager, D. S., Hausman, H., Muhich, J., Dolle, J. R., Grunow, A., & Gomez, L. (2013, June). Improvement research carried out through networked communities: Accelerating learning about practices that support more productive student mindsets. In A White Paper prepared for the White House meeting on “Excellence in Education: The

Importance of Academic Mindsets.

Cobb, P., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiments in educational research. *Educational Researcher, 32*(1), 9-13.

Cobb, P., Jackson, K., Henrick, E., & Smith, T. M. (2020). *Systems for instructional improvement: Creating coherence from the classroom to the district office.* Harvard Education Press.

Coburn, C. E., & Turner, E. O. (2011). Research on data use: A framework and analysis. *Measurement: Interdisciplinary Research & Perspective, 9*(4), 173-206.

Coburn, C. E., & Penuel, W. R. (2016). Research–practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher, 45*(1), 48-54.

Coburn, C. E., Penuel, W. R., & Geil, K. E. (2013). Practice partnerships: A strategy for leveraging research for educational improvement in school districts. William T. Grant Foundation.

Cochran-Smith, M., & Villegas, A. M. (2015a). Framing teacher preparation research: An overview of the field, part 1. *Journal of Teacher Education*, *66*(1), 7-20.

Cochran-Smith, M., Villegas, A. M., Abrams, L., Chavez-Moreno, L., Mills, T., & Stern, R. (2015b). Critiquing teacher preparation research: An overview of the field, part II. *Journal of Teacher Education*, *66*(2), 109-121.

Copur-Gencturk, Y., & Thacker, I., (2020). A comparison of perceived and observed learning from professional development: Relationships among self-reports, direct assessments, and teacher characteristics. *Journal of Teacher Education, 72*(2), 138-151.

Design-Based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher, 32*(1), 5-8.

Dolle, J., White, M. E., Evans-Santiago, B., Flushman, T., Guise, M., Hegg, S., Myhre, O., Ramirez, E., & Won, N. (2018). *Improvement science in teacher preparation at California State University: How teacher preparation partnerships are building capacity to learn to improve.* San Francisco, CA: SRI International and WestEd.

Edelson, D.C. (2002). Design research: What we learn when we engage in design. *The Journal of the Learning Sciences, 11*(1), 105-121.

Engeström, Y., Miettinen, R., & Punamäki, R. (Eds.) (1999). *Perspectives on activity theory*. Cambridge University Press.

Feldman, M. S., & Orlikowski, W. J. (2011). Theorizing practice and practicing theory. *Organization Science, 22*(5), 1240-1253.

Feldman, M. S., & Pentland, B. T. (2003). Reconceptualizing organizational routines as a source of flexibility and change. *Administrative Science Quarterly, 48*(1), 94-118.

Feiman-Nemser, S. (1990). Conceptual orientations in teacher education. Issue Paper 90-2.

Huber, T.L., Fischer, T.A., Dibbern, J., & Hirschheim, R. (2014). A process model of complementarity and substitution of contractual and relational governance in IS outsourcing. *Journal of Management Information Systems, 30*(3), 81-114.

Ing, M., Chinen, S., Jackson, K., & Smith, T. M. (2020). When should I use a measure to support instructional improvement at scale? The importance of considering both intended and actual use in validity arguments. *Educational Measurement: Issues and Practice, 40*(1), 92-100.

Jackson, K., Henrick, E., Cobb, P., Kochmanski, N., & Nieman, H. (2016). Practical measures to improve the quality of small-group and whole-class discussion [White Paper]. Retrieved from University of Washington:

http://www.education.uw.edu/pmr/files/2016/09/White-Paper.pdf

Jay, J. (2013). Navigating paradox as a mechanism of change and innovation in hybrid organizations. *Academy of Management Journal, 56*(1), 137-160.

Krumm, A. E., D'Angelo, C., Podkul, T. E., Feng, M., Yamada, H., Beattie, R., ... & Thorn, C. (2015, March). Practical measures of learning behaviors. In Proceedings of the Second (2015) ACM Conference on Learning @ Scale, 327-330.

Krumm, A. E., Beattie, R., Takahashi, S., D'Angelo, C., Feng, M., & Cheng, B. (2016). Practical measurement and productive persistence: Strategies for using digital learning system data to drive improvement. *Journal of Learning Analytics*, *3*(2), 116-138.

Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management \ Review, 24*(4), 691-710.

Mandinach, E. B., & Gummer, E. S. (2016). *Data literacy for educators: Making it count in teacher preparation and practice.* Teachers College Press.

Mandinach, E. B., & Schildkamp, K. (2021). Misconceptions about data-based decision making in education: An exploration of the literature. *Studies in Educational Evaluation, 69*, 100842.

Martin, W.G. & Gobstein, H. (2015). Generating a networked improvement community to improve secondary mathematics teacher preparation: Network leadership, organization, and operation. *Journal of Teacher Education, 66*(5), 482-493.

Martin, W.G. & Strutchens, M.E. (2018). Improving secondary mathematics teacher preparation via a networked improvement community: Focus on clinical experiences. In M.E. Strutchens et al. (Eds.), *Educating Prospective Secondary Mathematics Teachers,* ICME-13 Monographs.

National School Reform Faculty (2015). Data dialogue protocol.

https://www.nsrfharmony.org/wp-content/uploads/2017/10/DataDialogue.pdf

Nieman, H.J., Kochmanski, N.M., Jackson, K.J., Cobb, P.A., & Henrick, E.C. (2020). Student surveys to inform and improve classroom discussion. *Mathematics Teacher: Learning and Teaching PK-12, 113*(12), e91-e99.

Noell, G. H., & Burns, J. L. (2006). Value-added assessment of teacher preparation: An illustration of emerging technology. *Journal of Teacher Education, 57*(1), 37-50.

Peck, C. A., & McDonald, M. (2013). Creating "cultures of evidence" in teacher education: Context, policy, and practice in three high-data-use programs. *The New Educator, 9*(1), 12-28.

Penuel, W. R., Van Horne, K., Jacobs, J. J., & Turner, M. (2018). Developing a validity argument for practical measures of student experience in project-based science classrooms. In Annual Meeting of the American Educational Research Association, New York, NY.

Perry, L. (1995). Effective facilitators–a key element in successful continuous improvement processes. *Training for Quality.*

Philbin, S. (2008). Process model for university-industry research collaboration. *European Journal of Innovation Management, 11*(4), 488-521.

Proger, A. R., Bhatt, M. P., Cirks, V., & Gurke, D. (2017). Establishing and sustaining networked improvement communities: Lessons from Michigan and Minnesota. REL 2017-264. Regional Educational Laboratory Midwest.

Richmond, G., Bartell, T., Carter Andrews, D. J., & Neville, M. L. (2019). Reexamining coherence in teacher education. *Journal of Teacher Education, 70*(3), 188-191.

Rudd, J., Stern, K., & Isensee, S. (1996). Low vs. High-fidelity prototyping debate. *Interactions,*

3(1), 76-85.

Russell, J. L., Bryk, A. S., Dolle, J., Gomez, L. M., LeMahieu, P., & Grunow, A. (2017). A framework for the initiation of networked improvement communities. *Teachers College Record*, *119*(7), 1-36.

Saldaña, J. (2015). *The coding manual for qualitative researchers* (3rd ed.). Sage Publications.

Sandoval, C. & van Es, E. (2020). Complexifying the process of generating an aim in a teacher preparation networked improvement community. In Gresalfi, M. and Horn, I. S. (Eds.), The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 5 (pp. 2523-2529). Nashville, Tennessee: International Society of the Learning Sciences.

Sandoval, C., & van Es, E.A. (2021). Examining the practices of generating an aim statement in a teacher preparation networked improvement community. *Teachers College Record, 123*(6).

School Reform Initiative (2002). Data driven dialogue. https://www.nsrfharmony.org/wp-content/uploads/2017/10/DataDialogue.pdf

Schildkamp, K., & Datnow, A. (2020). When data teams struggle: Learning from less successful data use efforts. *Leadership and Policy in Schools*, 1-20.

Silva, E., & White, T. (2013). *Pathways to improvement: Using psychological strategies to help college students master developmental math*. Carnegie Foundation for the Advancement of Teaching.

Siwatu, K.O. (2007). Preservice teachers' culturally responsive teaching self-efficacy and outcome expectancy beliefs. *Teaching and Teacher Education, 23*(7), p. 1086-1101.

Takahashi, S., White, M., & Donahue, C. (2019). *A system of measures to support improvement*

in teacher preparation. San Francisco, CA: WestEd.

Willis, G. B. (2015). *Analysis of the cognitive interview in questionnaire design.* Oxford University Press. Chicago

Wineburg, M. S. (2006). Evidence in teacher preparation: Establishing a framework for accountability. *Journal of Teacher Education, 57*(1), 51-64.

Yurkofsky, M.M., Peterson, A.J., Mehta, J.D., Horwitz-Willis, R., & Frumin, K.M. (2020). Research on continuous improvement: Exploring the complexities of managing educational change." *Review of Research in Education 44*(1) (2020): 403-433.

CHAPTER 5

Conclusion

Networked improvement communities have emerged as promising approaches to address complex problems of practice. Countering traditional approaches to research that prioritize top-down mandates and implementing interventions with fidelity, networked improvement communities engage practitioners and researchers in collective efforts grounded in the tools and methodologies of improvement science (Bryk et al., 2015). The potential of these efforts has been recognized by funders, who have invested substantial resources into the initiation and sustenance of NICs (Barletta et al., 2018; Feygin et al., 2020; LeMahieu et al., 2017). Because of their promise for addressing problems of practice in education and the resources that these efforts have been given, I argue that it is critical to examine how these networks are enacted to learn about how they do and do not work, document the specific practices that can constitute them, and identify how their enactment can be improved.

The three studies that constitute this dissertation take central this charge to understand the enactment of networked improvement efforts, examining a teacher preparation networked improvement community consisting of eight University of California teacher preparation programs. To do this, I centered the three studies on the initiation of the improvement network, seeking to understand how network initiation unfolded. To gain insight into the enactment of the initiation of this network, I focused broadly on understanding the practices and the processes that constitute network initiation, centering actions and talk. This focus on what network members were *doing* as part of network launching afforded opportunities to make the process visible to other improvement practitioners and stakeholders. To gain insight into practice and process, all three studies drew on practice and process theory (Feldman & Orlikowski, 2011; Langley et al.,

2013) to understand the dynamics that constituted these efforts. Additionally, all three studies used qualitative data consisting of recordings of meetings, memos, and improvement artifacts and analyzed these data interpretively with an attention toward unveiling practices over time. Each of the three studies, however, focused on a specific process within the overall effort to launch a NIC. The first study focused on how teacher educators and facilitators generated a shared aim statement; the second study focused on how facilitators led the generation of a shared theory of improvement using a driver diagram; and the third study examined how facilitators and teacher educators engaged in the process of designing an improvement measure.

In the first study, I revealed how tensions emerged in the process of reaching convergence on an aim and the practices TEs engaged in to grapple with these tensions in ways that foregrounded multilingualism and peripheralized language acquisition. I examined how teacher educators engaged with a central tension that emerged as they, with facilitators, sought to identify the network's direction and focus. During improvement activities focused on identifying a shared network aim, a central tension emerged that required TEs to grapple with and resolve the tension in order to reach convergence. This tension emerged between a) language acquisition stances that foregrounded working within existing systems to improve English language proficiency; and b) multilingual stances that foregrounded what schools should aspire to do, preferring to focus on transforming schooling to honor the range of ways of speaking students bring to classrooms (Lucas & Villegas, 2013). I found that TEs engaged in three sets of practices around this tension en route to the generation of a shared aim: *aspirationalizing* and *dualizing* to construct a tension between language acquisition and multilingualism; *recentering* and *rerouting* to ensure multilingualism would be taken up as the network's organizing frame; and *tuning, clarifying,* and *converting* to make modifications to a driver diagram that centered

multilingualism. These practices offered specific, empirical evidence for Mehta's (2015) claim that all education reform efforts necessarily foreground some perspectives over others, while also providing a concrete example of the shifting focus of improvement work as its focus becomes refined (Bryk et al., 2015). This study also complicates these two claims, highlighting how focusing an effort is fraught with tensions and contradictions and resulting in unequal relations between those who foreground multilingualism and those who center language acquisition.

The second study takes the lessons around unequal relations generated from the first study and expands on it, examining the process of generating a shared theory of improving to understand power dynamics that emerge in launching networks. To do that, I focused this study on the facilitation practices and how facilitators themselves were positioned in the network to engage in practices that shaped TEs' practices. A focus on practices was consistent with how I conceptualized power, drawing on Watson (2017) and Hardy and Thomas (2016) who conceptualized power as being produced through practice and, specifically, through practices that shape others' practices at some other time and place. I found that facilitators were systematically and advantageously positioned to engage in practices in and between *backstages* and *frontstages*, moving in and between them to generate driver diagram drafts, check those drafts with TEs, and present them to TEs and solicit their feedback on the drafts. Additionally, I found that facilitation practices shaped when and how TEs participated in the process of generating an aim, from whose perspectives were drawn on to check drafts of the driver diagram and what questions were asked to solicit feedback. This study revealed that doing improvement work is laden with power dynamics, highlighting how improvement facilitators in particular are positioned in ways to shape how the improvement work unfolds and who is more or less central in the unfolding of improvement work. Existing RPP research talks about power as a currency,

attending to power "imbalances" (Henrick et al., p. 5) and defining partnership as leading to the shifting of power from researchers to practitioners via engaging in mutualism and amplifying "voices" of practitioners and community members (e.g., Coburn et al., 2021, p. 17). Our study reveals, however, that instead of power moving from one group to the next, power is produced in a range of ways, affording all stakeholders opportunities to produce power, but systematically and advantageously positioning some stakeholders to produce more power than others. In our study, facilitators were systematically and advantageously positioned to produce power, a position that was entrusted to them to practitioners through their participation. This positioning afforded facilitators the ability to produce power in ways that allowed them to make some perspectives durable while making others ephemeral.

The third study focuses on a process that came to the fore of network initiation following the construction of a shared theory of improvement: the development of practical measures. I focused this study specifically on how facilitators and teacher educators engaged in the process of designing a practical measurement survey. I complemented a practice and process theoretical lens with a design-based research lens to conceptualize the process of generating measures as a design process, motivating an examination into the design process as contributing to research on design methodologies (Edelson, 2002). I drew on process theory and cultural-historical activity theory to understand how this process evolved, including how the objects and tools that are part of the process changed and, in turn, changed how facilitators and teacher educators participated in the process. I found that the design process consisted of activity systems that, over time, changed as the process shifted from focusing on drafts of a survey to using improvement data generated by administering the survey to preservice teachers.

Alongside this shift in objects and tools in the design process was a shift in how facilitators and teacher educators engaged in the design process. In the initial phase of the design process, the work of generating measures was characterized by activity systems that were focused on generating a survey and used as its central tools multiple drafts of the practical measurement survey. During these activities, facilitators engaged in *framing improvement data* to prime TEs for reviewing drafts of the survey; *soliciting feedback* from TEs around the survey drafts; and *inscribing* TEs' feedback into subsequent iterations of the survey. For facilitators, the survey was used as a tool for enabling TEs' understanding of data for improvement and for codifying what they would find useful for their own improvement work. Meanwhile, TEs engaged in the practices of *augmenting* the survey with open-ended items to improve its utility; and *editing* the survey to clarify language and revise the scope of the questions asked. The survey for TEs was a tool that they analyzed for whether it would solicit useful insight for them and revised to improve its relevance to their work. The second phase was characterized by shifts in activity systems from reviewing surveys to testing surveys. The central tools in these activity systems shifted, from drafts of the practical measurement survey to improvement data and data displays which were used in data and feedback conversations. During these activities, facilitators continued to solicit feedback and inscribe TEs' comments, albeit in different ways than in the first phase, and also engaged in *clarifying* data displays by explaining the displays and the data that were collected to teacher educators. For facilitators, data displays served as tools for enabling TEs' understanding of data and their critiques of the survey as a tool for getting back useful data. Meanwhile, TEs engaged in *benchmarking* by articulating what data should look like relative to how the data actually looked like. TEs also engaged in *contextualizing* to situate improvement data within their program structures and timeline, typically to explain why data

looked the way they do. This study made visible a process for designing a set of practical measures and also highlighted how practitioners participated in that process. In both practices, the data served as a tool that enabled them to discuss their expectations and the settings that constrained and enabled teacher candidates' practices in their placements. By revealing the process and practitioners' participation in the process, I offer both an approach to designing practical measures with practitioners that can be modified or interrogated, as well as a set of dominant practices that facilitators can design for or try to elicit. I emphasize that unveiling facilitation practices in particular helps to start a conversation about what practices are useful for what contexts. While the facilitation practices described in this third study enabled the production of shared measures in this context, other practices may have made this process more equitable, more efficient, or produced better measures. These practices also may be less useful or common in other efforts aimed at designing practical measures in partnership and improvement work. Thus, these practices are subject to modification and interrogation in future studies.

Together, these three studies reveal how practitioners and facilitators engage in the work of launching an improvement network. A central theme across the three studies concerns the work of inscribing and codifying relations and commitments. In study 1, the work of inscribing helped to codify settlements around a central tension that helped to focus the network's direction; in study 2, inscribing was used to make central and durable some teacher educators' perspectives while peripheralizing and ephemeralizing others; and in study 3, inscribing was used to codify what TEs found useful into an improvement data collection tool. This work of inscribing emerged as a central practice in the work of doing improvement and, in this study, a practice in which facilitators primarily engaged. Another theme that emerged across the three studies concerned the prevalence of the practice of soliciting feedback. In study 1, the solicitation of

feedback enabled certain tensions to be constructed by teacher educators during activities focused on identifying the network's central problem and outcome; in study 2, the solicitation of feedback was a practice facilitators engaged in to construct a theory of improvement and, importantly, enabled facilitators to codify some TEs' commitments over others; and in study 3, facilitators solicited feedback to design a practical measurement tool that TEs would find useful and also find usable. The prevalence of these practices across three different phases of work in launching an improvement effort suggest that these practices may be core improvement practices that require further investigation. Having summarized and looked across all three studies, I turn to situate these findings within existing literature to make visible their implications.

Implications

The three studies that comprise this dissertation raise three implications. First, these studies afford insight into the specific dynamics that constitute collaborative, cross-site improvement efforts. Unveiling the work of stakeholders in improvement efforts highlights the challenges that emerge in bringing disparate institutions and stakeholders together to improve. Second, understanding improvement network enactment reveals how these NICs operate as a way to aid those responsible for leading improvement, documenting the specific approaches that constitute improvement work and allowing improvement practitioners and improvement-focused scholars to adopt, adapt, or abandon particular improvement techniques and strategies. Finally, these studies reveal how continuous improvement efforts can work in the context of teacher preparation, highlighting the challenges and opportunities that exist for bringing improvement science to improving the work of preparing new teachers. I describe each of these implications in detail.

To date, scholarship on collaborative educational improvement efforts have focused on understanding research-practice partnerships, a broad term that encompasses a wide range of arrangements of researchers and practitioners engaged in joint work (Penuel et al., 2015). Studies of their enactment typically focus on the roles of researchers and practitioners in these partnerships, including boundary crossing and spanning (Hopkins et al., 2019; Wegemer & Renick, 2021), mutual learning on the part of both researchers and practitioners (Farrell et al., 2020), and role identity and negotiation (Farrell et al., 2019). However, there is a dearth of research that examines the enactment of efforts grounded in and driven by the principles of networked improvement science. I conjecture that the principles of networked improvement science and the specific ways in which improvement facilitators are developed and trained shape what practices improvement facilitators engage in and how those efforts come to be carried out in ways that are distinct from other approaches to educational improvement, such as research-practice partnerships. I note that were a different approach organized this network and was employed by someone well-versed in that approach, different practices would have emerged than the improvement practices that I articulate here.

In focusing on the enactment of this improvement network, I reveal the techniques and strategies deployed in starting this network and reaching convergence around an aim statement, a theory of action, and a practical measurement tool. My examination of the enactment and dynamics that constitute improvement work are inspired by a call from those engaged in healthcare to examine the micropolitics of improvement in the healthcare settings (Langley & Denis, 2011). Given that much of the current move to use continuous improvement methodologies in education have been motivated by efforts to bring improvement to healthcare (Bryk et al., 2015), calls to examine dynamics in improvement efforts in healthcare are pertinent

to educational improvement efforts. The three studies in this dissertation reveal the range of practices that are central to the work of initiating improvement efforts and the interactions and micropolitics that constitute initiation. The findings reveal how practitioners' perspectives are solicited, how facilitators use (or do not use) practitioners' perspectives, whose perspectives are made central and whose are peripheral, and how they come to materially shape the work of improvement via tools, artifacts, and representations.

Examining the enactment of improvement efforts also affords opportunities to share learning and document core processes of improvement work, while making visible the relational and power-laden dynamics that emerge while engaging in improvement. Although research on continuous improvement efforts and networked improvement communities is emerging, there exists little documentation of how these efforts unfold in ways that offer insight to those who lead improvement. Additionally, there exists a dearth of research unveiling the relational dynamics that constitute improvement efforts, possibly due to the lack of attention to relational and political dimensions of education in continuous improvement approaches generally (Yurkofsky et al., 2020). Yurkofsky and colleagues argue that an attention to the relational dynamics of improvement would afford more attention to issues of power as well as issues of race, gender, and class, all of which shape schools and how improvement work is performed. The first study of this dissertation unveiled how practitioners engage with tensions in ways that settle them to center some perspectives while peripheralizing others. The second study of this dissertation attended to the relations within an improvement network to unveil how the facilitator was systematically and advantageously positioned to shape the network's direction in ways that enabled some perspectives to endure and become codified in organizing network documents and made other perspectives ephemeral. Although the third dissertation study did not explicitly

attend to issues of power or positioning, examining how practical measurement tools are designed through a power and positioning lens can afford insight into whose perspectives get to be taken up, measured, and discussed as normatively continuously throughout improvement efforts. In addition, Yurkofsky and colleagues also argue for the importance of unveiling protocols and routines that constitute improvement efforts to generate insight into what actions can be taken given the specific context, problem, or location within an improvement effort. The three dissertation studies here center on the specific strategies employed to hold them up and interrogate them and make them visible to other improvement practitioners. Across these three studies, I surface how the practices of inscribing and soliciting feedback are central to the work of improvement. By making these visible and connecting them to how the work of improvement unfolds, future research can begin to examine how these practices come to be lived and employed in other contexts for other purposes.

Finally, the three dissertation studies have implications for doing continuous improvement in the context of teacher preparation. Teacher preparation improvement efforts have emerged in the past few years to closely examine and make changes to teacher preparation programs. For example, Dolle and colleagues (2018) and Takahashi et al. (2019) used improvement science to organize teacher preparation program improvement efforts across the California State University (CSU) system. In these efforts, the authors document how they developed teacher educators at these programs to use the tools and methods of improvement science to address problems of practice locally at their sites. The problems of practice that programs chose to work on varied, including improving the recruitment of master teachers, improving the quality of student teaching placements via rubrics, and improving the reliability and quality of feedback to preservice teachers. Improvement science was also used to organize a

networked improvement community of teacher preparation programs aimed at increasing the number of mathematics teachers entering the workforce, taking a high-level approach to improving the quality of teacher preparation programs by leaning on "research action clusters" to generate improvement knowledge across sites (Martin & Gobstein, 2015). Although continuous improvement approaches are starting to emerge in teacher preparation, there exists a need to understand how the structures of teacher preparation constrain and enable taking an improvement approach to problems of practice. The three studies in this dissertation make visible particular challenges in teacher preparation that shape how improvement work is done. For example, in the first and second studies, the tension between centering language acquisition and multilingualism shaped both how the network's aim and its theory of improvement were generated. The tension between attending to existing systems for practicality and imagining new ways of doing school are central tensions in the work of preparing new teachers (Jurow et al., 2019; Philip et al., 2019), and thus shapes the particular outcomes to which improvement work is oriented. Additionally, improvement efforts typically focus on improving existing outcomes in K-12 and community colleges, such as improving developmental mathematics success rates (Dolle et al., 2013) and improving grade-level literacy rates (Russell et al., 2017). However, these outcomes are not particularly clear in teacher preparation; although scholars have generated a wide range of outcomes to which programs should aspire (e.g., Darling-Hammond & Bransford, 2005; Kennedy, 2016), the extent to which programs agree on reaching these outcomes is unclear. Applying an improvement science approach to a setting in which the dominant outcomes are ambiguous and varied offers a unique challenge to teacher preparation, a challenge that emerged in the first and second studies of this dissertation.

Overall, the three studies in this dissertation are concerned with understanding the enactment of a networked improvement community to generate scholarly insight about how partnership work and improvement networks are performed, practical insight about the range of techniques and strategies deployed in an improvement network in particular processes, and insight into the utility of improvement science in teacher preparation. I turn to describe the limitations of these studies and offer possible pathways for research that builds on the insight generated from this dissertation.

Limitations & Directions for Future Research

Although the studies that comprise this dissertation have generated useful insight into how NICs are enacted, they all use data from one improvement network conducted by one team of facilitators across one period of time (network initiation). Thus, a limitation of these studies is that they do not reveal the possible variation that exists in improvement network initiation or improvement facilitation practices. I highlight practices that emerged in this particular setting, a teacher preparation improvement network focused on building multilingual students' strengths; however, given that the specific structures of teacher preparation constrain and enable how improvement work unfolds, the practices unveiled here may be unique to teacher preparation improvement efforts. Thus, one possible direction for future research concerns examining the variation of improvement facilitation and participation practices. I argue that building a repository of improvement practices generates practical insight for the kinds of practices that may be productive for advancing improvement efforts. Additionally, unveiling variation in improvement participation practices can help facilitators anticipate how practitioners engage in improvement efforts or aid them in soliciting particular forms of engagement that are productive for advancing improvement.

A second limitation of this study is that it does not examine how particular improvement practices, namely facilitation practices, are shaped by the principles of improvement science. Although this study highlights how facilitation practices like inscribing and soliciting feedback are central to this improvement effort, it is unclear the extent to which these practices are specific to improvement science principles or standard practice. Additionally, because the primary facilitator received improvement science training and brought that to the network, what improvement science *ought to be* simultaneously shaped, guided, constrained, and enabled these improvement practices to emerge. Bringing a lens of organizational routines (Feldman & Pentland, 2003) around ostensive features of particular systems (in this case, improvement science as an approach) and performative features of those systems (the specific improvement practices that emerge) offers one way for understanding the relation of enacting improvement efforts and how enactment is shaped by improvement science principles and commitments. A direction for future research concerns how improvement science practices vary and how they differ from other approaches to collaborative educational improvement, such as design-based research or design-based implementation research. Understanding the difference in practices and how those practices are shaped by the specific approach in which they emerge can afford greater understanding into the nature of these approaches and for which settings or problems they are most appropriate.

Another limitation of this study is its focus on initiation. Although network initiation is a central process that shapes, constrains, and enables participation in subsequent improvement activities, it is one aspect of doing improvement work. Examining the micropolitics of improvement (Langley & Denis, 2013) beyond network initiation can reveal insight into the practices that constitute improvement activities such as testing changes, collaboratively

analyzing improvement data, updating improvement artifacts such as aim statements and driver diagrams, and spreading and scaling promising changes. Future research into these improvement activities can also unveil how power dynamics shift over time. Bryk and colleagues (2015) note how those who participate in network initiation are typically not the same people who participate in later improvement activities such as testing change ideas. Thus, given that the improvement activities and the stakeholders change, it is likely that power relations and practices also shift.

Finally, these dissertation studies did not examine the range of contexts within which individual teacher educators were situated as they participated in this network. While the studies attended to teacher educators' actions situated within particular improvement activities, they did not attend to how teacher educators were also situated within their institutions, each of which ostensibly hold varied commitments and principles. The studies also did not attend to the situated nature of teacher educators' actions relative to their roles within teacher preparation programs (e.g., supervisors, instructors, and coordinators). Although conjectures can be reasonably made about how they may participate given existing research on the roles that teacher preparation program staff and stakeholders play in educating new teachers (e.g., Borko & Mayfield, 1995), empirical research on how they participate in improvement efforts can generate insight into how teacher preparation improvement efforts can be organized to be productive and reach aims that these efforts establish for themselves. Insight into the multiple situating contexts within which improvement stakeholders reside more broadly can generate similar insight into how to bring in and arrange diverse expertise for educational improvement.

The three dissertation studies are broadly focused on beginning a conversation in improvement-focused research on closely examining participation and enactment within partnership and improvement efforts. Given that much of the emphasis from these efforts centers

on helping practitioners to improve, I contend that improvement facilitators are also engaging in practices to lead these efforts and therefore practitioners whose practices ought to be subject to improvement. Making these practices visible is the first step into improving how the field improves.

References

Barletta, B., Comes, D., Perkal, J., Shumaker, R., Wallenstein, J., & Yang, B. (2018). Networks for school improvement: A review of the literature. Columbia University Center for Public Research and Leadership.

Borko, H., & Mayfield, V. (1995). The roles of the cooperating teacher and university supervisor in learning to teach. *Teaching and Teacher Education, 11*(5), 501-518.

Bryk, A. S., & Gomez, L. M. (2008). Ruminations on reinventing an R&D capacity for educational improvement. *The future of educational entrepreneurship: Possibilities of school reform*, 181-206.

Coburn, C. E., & Penuel, W. R. (2016). Research–practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher, 45*(1), 48-54.

Coburn, C. E., Penuel, W. R., & Farrell, C. C. (2021). Fostering educational improvement with research-practice partnerships. *Phi Delta Kappan, 102*(7), 14-19.

Darling-Hammond, L., & Bransford, J. (Eds.). (2007). *Preparing teachers for a changing world: What teachers should learn and be able to do.* John Wiley & Sons.

Dolle, J. R., Gomez, L. M., Russell, J. L., & Bryk, A. S. (2013). More than a network: Building professional communities for educational improvement. *National Society for the Study of Education Yearbook, 112*(2), 443-463.

Dolle, J., White, M. E., Evans-Santiago, B., Flushman, T., Guise, M., Hegg, S., Myhre, O., Ramirez, E., & Won, N. (2018). Improvement science in teacher preparation at California State University: How teacher preparation partnerships are building capacity to learn to improve. San Francisco, CA: SRI International and WestEd.

Edelson, D. C. (2002). Design research: What we learn when we engage in design.

Journal of the Learning Sciences, 11(1), 105-121.

Farrell, C., Penuel, W. R., Allen, A. R., Anderson, E., Bohannon, A., Coburn, C., & Brown, S. (2020). Mutual learning at the boundaries of research and practice: A framework for understanding research-practice partnerships. In Gresalfi, M. and Horn, I. S. (Eds.), The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 5 (pp. 2515-2522). Nashville, Tennessee: International Society of the Learning Sciences.

Farrell, C. C., Harrison, C., & Coburn, C. E. (2019). "What the hell is this, and who the hell are you?" Role and identity negotiation in research-practice partnerships. *AERA Open, 5*(2), 2332858419849595.

Feldman, M. S., & Orlikowski, W. J. (2011). Theorizing practice and practicing theory. *Organization Science, 22*(5), 1240-1253.

Feldman, M. S., & Pentland, B. T. (2003). Reconceptualizing organizational routines as a source of flexibility and change. *Administrative Science Quarterly*, *48*(1), 94-118.

Feygin, A., Nolan, L., Hickling, A., & Friedman, L. (2020). Evidence for networked improvement communities: A systematic review of the literature. American Institutes for Research.

Hardy, C., & Thomas, R. (2016). Power and process: The production of "knowing" subjects and "known" objects. *The SAGE Handbook of Process Organization Studies*, 466-479.

Hopkins, M., Weddle, H., Gluckman, M., & Gautsch, L. (2019). Boundary crossing in a professional association: The dynamics of research use among state leaders and researchers in a research-practice partnership. *AERA Open, 5*(4), 2332858419891964.

Jurow, S., Horn, I. S., & Philip, T. M. (2019). Re-mediating knowledge infrastructures: a site for innovation in teacher education. *Journal of Education for Teaching, 45*(1), 82-96.

Kennedy, M. (2016). Parsing the practice of teaching. *Journal of Teacher Education, 67*(1), 6–17. https://doi.org/10.1177/0022487115614617

Langley, A., & Denis, J. L. (2011). Beyond evidence: the micropolitics of improvement. *BMJ Quality & Safety*, 20(Suppl 1), i43-i46.

Langley, A., Smallman, C., Tsoukas, H., & Van de Ven, A. H. (2013). Process studies of change in organization and management: Unveiling temporality, activity, and flow. *Academy of Management Journal*, *56*(1), 1–13.

LeMahieu, P. G., Grunow, A., Baker, L., Nordstrum, L. E., & Gomez, L. M. (2017). Networked improvement communities. *Quality Assurance in Education, 25*(1), 5-25.

Lucas, T., & Villegas, A. M. (2013). Preparing linguistically responsive teachers: Laying the foundation in preservice teacher education. *Theory Into Practice, 52*(2), 98–109.

Martin, W. G., & Gobstein, H. (2015). Generating a networked improvement community to improve secondary mathematics teacher preparation: Network leadership, organization, and operation. *Journal of Teacher Education, 66*(5), 482-493.

Mehta, J. (2015). *The allure of order.* Oxford University Press.

Philip, T. M., Souto-Manning, M., Anderson, L., Horn, I., J. Carter Andrews, D., Stillman, J., & Varghese, M. (2019). Making justice peripheral by constructing practice as "core": How the increasing prominence of core practices challenges teacher education. *Journal of Teacher Education, 70*(3), 251-264.

Russell, J., Bryk, A., Dolle, J., Gomez, L. M., Lemahieu, P., & Grunow, A. (2017). A framework for the initiation of networked improvement communities. *Teachers College Record,*

119(5), 1-36.

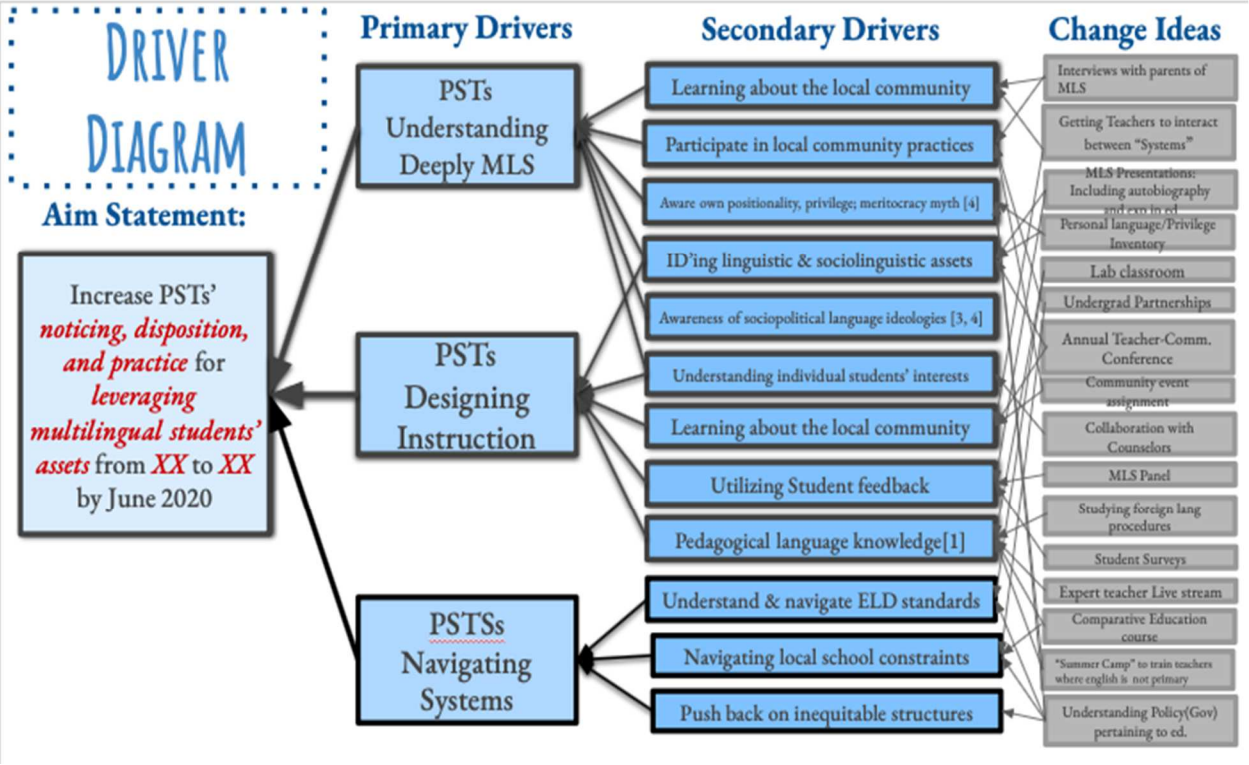
Takahashi, S., White, M., & Donahue, C. (2019). A system of measures to support improvement in teacher preparation. San Francisco, CA: WestEd.

Watson, M. (2017). Placing power in practice theory. *The Nexus of Practices: Connections, Constellations, Practitioners*, 169-182.

Wegemer, C. M., & Renick, J. R. (2021). Boundary spanning roles and power in educational Partnerships. *AERA Open, 7*, 23328584211016868.

Yurkofsky, M. M., Peterson, A. J., Mehta, J. D., Horwitz-Willis, R., & Frumin, K. M. (2020). Research on continuous improvement: Exploring the complexities of managing educational change. *Review of Research in Education, 44*(1), 403-433.

Appendix A. Driver diagram



Appendix B. First draft of practical measurement survey.

Please answer the following questions about your teacher preparation coursework and university-based activities.

DRIVER: EMPATHIZING WITH MULTILINGUAL STUDENTS

1. In the past week, I was asked to engage in an activity to better understand my multilingual students' home community or communities

    - Yes
    - No
    - I don't know

1. In the past week, I was asked to engage in an activity to better understand my English language learners' background

    - Yes
    - No
    - I don't know

1. In the past week, I was asked to engage in an activity to better understand the backgrounds of my students who use non-academic English dialects

    - Yes
    - No
    - I don't know

1. In the past week, I was asked to obtain information about my multilingual students' home lives.

    - Yes
    - No
    - I don't know

2. In the past week, I was asked to engage in an activity to better understand my multilingual students' families

    - Yes
    - No
    - I don't know

3. In the past week, I was asked to engage in an activity to better understand my multilingual students' racial, cultural, or ethnic backgrounds

   - Yes
   - No
   - I don't know

4. In the past week, I was asked to reflect on my own privilege relative to the multilingual students in my classroom.

   - Yes
   - No
   - I don't know

5. In the past week, I was asked to reflect on how schools enforce the use of academic English (i.e., White American English).

   - Yes
   - No
   - I don't know

6. In the past week, I was asked to identify ways that the school culture (e.g., values, norms, and practices) is different from my multilingual students' home culture.

7. In the past week, I was asked to reflect on whether my mentor teacher's classroom was a welcoming environment for multilingual students.

   - Yes
   - No
   - I don't know

DRIVER: DESIGNING INSTRUCTION FOR MULTILINGUAL STUDENTS

8. In the past week, I was asked to incorporate some aspect of my multilingual students' languages, communities, or families into an activity or lesson.

   - Yes
   - No
   - I don't know

9. In the past week, I was asked to analyze an activity or lesson for its language requirements of students.

- Yes
- No
- I don't know

10. In the past week, I learned about strategies to incorporate into my teaching some aspect of my multilingual students' languages, communities, or families.

    - Yes
    - No
    - I don't know

11. In the past week, I was asked to reflect on my knowledge of my students' languages or language development.

    - Yes
    - No
    - I don't know

DRIVER: NAVIGATING SYSTEMS OF SCHOOLING

12. In the past week, I was asked to reflect on my school placements' policies for teaching English language learners.

    - Yes
    - No
    - I don't know

13. In the past week, I was asked to reflect on current English Language Development (ELD) standards.

    - Yes
    - No
    - I don't know

PRACTICE

14. In the past week, approximately how many times did you hear students speak a language other than English?

    - Yes
    - No

- I don’t know

15. In the past week, approximately how many times did you hear students speak a language other than English while staying on task?

    - Yes
    - No
    - I don’t know