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Teacher Leaders' Agency in Collaborative Professional Learning in Instructional Reform Contexts

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COLLEGE OF EDUCATION

TEACHER LEADERS' AGENCY IN COLLABORATIVE PROFESSIONAL LEARNING IN
INSTRUCTIONAL REFORM CONTEXTS

By

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ABSTRACT

This comparative case study explores the agency of two teacher leaders (TLs) as they facilitate their respective teacher-organized lesson study groups. Applying sociocultural theory, I describe TL agency as manifesting at two levels: (1) the meanings teachers make about student learning, teaching, and teacher learning and (2) their talk and actions as facilitators of teacher learning during lesson study. I find that differences in each TL's meanings of teaching and learning contribute to different approaches to facilitation and ultimately, different opportunities to learn for the teachers in each group, despite a very similar lesson study design and context. One TL's meanings of teaching and learning demonstrate a strong and cohesive vision of instructional improvement that reflects constructivist shifts in mathematics education and emphasizes deepening understanding of the connections between ideas and/or strategies. Her facilitation shapes opportunities to learn characterized by engaging in the resolving of dissonances between new and prior understandings. The other TL's meanings of teaching and learning reflect a fusion of traditional and constructivist approaches to teaching and learning, where exploration of multiple tools and strategies is valued, but primacy remains on the outcome of correct solutions. Her facilitation does not shape opportunities to learn characterized by deepened understandings or shifts in meanings of teaching and learning. Policy implications for supporting TLs' agency in collaborative learning will be discussed.

CHAPTER 1

INTRODUCTION

Teachers need opportunities for sustained professional learning to respond to rapidly changing classroom contexts and a policy environment characterized by instructional improvement reforms (Elmore, 2004; Webster-Wright, 2009). Recognizing this need, a significant amount of federal funding has been invested into teacher professional development (PD) to promote improvement of teaching and student learning (U.S. Department of Education, 2016). However, recent policy reports indicate that teachers are dissatisfied with PD offerings (Gates Foundation, 2014) and the investment has not resulted in instructional improvement (Garet et al., 2001; 2011; Garet & Warner, 2010; The Mirage Report, 2015).

In this context, increasing teacher agency in professional learning has been promoted as a way to overcome the breakdown between PD designed with characteristics identified by research as effective and teachers' actual experiences of research-aligned professional learning (Calvert, 2016). Drawing from a broad definition of agency as acting towards desired outcomes (Bandura, 2001), calls for teacher agency in professional learning are rooted in the belief that empowering teachers to shape their own learning will lead to more meaningful and effective engagement in instructional improvement processes (Calvert, 2016, Gates Foundation, 2014; Rentner, Kober, Frizzell, & Ferguson, 2016). Following a similar logic, teacher leadership has also been promoted as a promising pathway to instructional improvement (Borko, Koellner, & Jacobs, 2014; Elliott et al., 2009; Koellner, Jacobs, & Borko, 2011; Leithwood & Mascal, 2008; Lord & Miller, 2000).

These studies suggest that teacher leaders (TLs) may leverage their experiences, collegial connections, and knowledge of the school context to create unique and relevant learning

opportunities for fellow teachers. In other words, TLs may be seen as models of the highly agentic teacher, shaping her own professional learning and that of her peers. However, few studies have examined the relationship between TLs' agency and opportunities to learn in collaborative professional learning. This is reflective of a research trend focused on teachers' perceptions of agency. Only one empirical study have explored teachers' agency *in action* as they engage in professional learning (Bridwell-Mitchell, 2015). While one study has explored the agency of TLs (Szczesniul & Huizenga, 2015), it did not relate TLs' agency to learning opportunities.

This study aims to address this gap in research by focusing on the agency of two TLs leading two groups of teachers independently practicing a research-aligned form of collaborative professional learning known as lesson study. The comparative case study design facilitates in-depth exploration of the cases of Elena and Kate, two TLs who have actively sought to shape their own professional learning experience and that of their peers by initiating and sustaining lesson study groups at their respective schools. It aims to uncover the nature and enactment of teacher agency as manifested in the meanings they make about teaching and learning and their facilitation of group interactions around improvement of instruction and student learning. In prior research with these teams as part of a larger research project (Murata, Akiba, Howard, Kuleshova, & Fabrega, 2016), we have found that although each of the two groups has a very similar lesson study practice on the surface, notable differences exist in their approach to instructional improvement. This study seeks to further understand those differences through an analysis of teacher agency, designed to explore how TL' actions in group learning reflect meanings of teaching and learning that may relate to distinct approaches to instructional

improvement and, ultimately, different learning opportunities for teachers. Such a study focused on TLs' agency in professional learning addresses a central concern of education policy.

Teacher Agency and Policy

The tension between agency and structure is at the heart of policy research (Coburn, 2016). Policy's purpose is to influence human action, but implementation research has well documented how this rarely, if ever, is a unilateral process (Coburn, 2001; Honig, 2006; McLaughlin, 1998; Spillane, Reiser, & Reimer, 2002). Policy implementers influence outcomes by the actions they take in response to policy and the meanings they attribute to policy. In education, the implementing agents whose actions perhaps matter the most are teachers, since their work is most directly linked to student learning (Hanushek & Rivkin, 2006). While debates about the tension between structure and agency may be implied in all studies of education policy, recently, explicitly studying teacher agency in response to reforms has emerged as a topic of interest among researchers in education (Coburn, 2016). Focusing explicitly on teacher agency directs researchers' attention to the microprocesses—internal and external, individual and collective—that influence the outcomes of instructional improvement.

This type of research is particularly relevant given the nature of recent instructional reform movements, which usually seek to standardize the curriculum and are often packaged with accountability and evaluation policies that limit teachers' flexibility (Cochran-Smith & Lytle, 2006). These instructional reform movements are caught in a conundrum. As they seek greater control over the instructional core of schooling as a means to improve student learning, they may also decrease teachers' ability to apply professional discretion based on the localized needs of their classrooms (Hargreaves, 1998; Spillane et al., 2002). It is perhaps no surprise, then, that recently there has been an increased call for policies supporting teacher agency.

For example, in a series of 2016 reports, the Center for Education Policy (CEP) used survey results of a nationally representative sample of teachers (n=3,328) and focus groups to argue for increasing teachers' voice in policy decisions (Rentner et al., 2016). They found that teachers feel their voice is not being heard by school, district, state, and federal policymakers, which may have negative effects on teachers' understanding and implementation of instructional reform. In this case, teacher agency is associated with the ability to shape the policy decisions that affect teachers' work.

A report from the previous year by the Gates Foundation reached similar conclusions in relation to teachers' professional development (Gates Foundation, 2014). They found that teachers are largely dissatisfied with PD offerings, but teachers who have a choice in such offerings report higher levels of satisfaction. These findings were echoed in another 2016 report by Learning Forward, who partners with over 33 states on setting PD standards (Calvert, 2016). Their report highlights a need to increase teacher agency in professional learning and calls on policymakers to recognize "the intangible, but enormous value teachers place on being listened to and involved meaningfully as well as the benefits the school community enjoys when teachers are intrinsically motivated to pursue their continued development" (p. 3). Here, as in the CEP report, increasing teachers' ability to influence their learning environment is promoted as a way to be responsive to the needs and motivations of teachers as key policy implementers.

Indeed, the Every Student Succeeds Act (2016) provisions requiring stakeholder-input (including teachers) were celebrated as a response to the need to include teachers' voices in policy decisions (Hirsh, 2017), but those requirements were loosened by Secretary of Education Betsy DeVos a few weeks after taking office (Rose, 2017). Recent comments by Secretary DeVos, however, suggest that she too recognizes a need to increase teacher agency. Commenting

on a visit to a Washington, D.C. school, Devos said of the teachers she met: “I can tell the attitude is more of a ‘receive mode.’ They’re waiting to be told what they have to do, and that’s not going to bring success to an individual child” (Thomas, 2017). This now infamous comment also hints at a perceived relationship between teacher autonomy and student outcomes, where more choice and flexibility are associated with instructional improvement.

These calls for increases in teacher agency echo a similar demand for the development of TLs. In their literature review of teacher leadership, Muijs and Harris (2003) described teacher leadership as “centrally concerned with forms of empowerment and agency” (p. 439). Learning Forward (2017) includes leadership as one of its seven standards for teachers’ professional learning, noting that organizations that promote shared leadership benefit from collaborative capacity building and shared norms, goals, and values. In 2014, former Education Secretary Arne Duncan announced the Teach to Lead initiative—a partnership between the Department of Education, the National Board on Professional Teaching Standards, and ASCD that promotes teacher leadership by providing resources to teachers, organizing opportunities for collaboration, and facilitating stakeholder communication. He explained that teacher leadership means that teachers not only have a voice in guiding policies but in supporting the professional learning of fellow teachers (U.S. Department of Education, 2015).

According to the most recent MetLife Survey of the American Teacher (Markow, Macia, & Lee, 2013), such initiatives reflect teachers’ desire for leadership responsibilities. Approximately half (51%) of the 1,000 teachers from a nationally-representative sample responded that they were interested in a formal leadership role. Of the teachers who reported lower job satisfaction this number was even higher: 56% of those teachers reported an interest in a formal leadership role. Because teachers who reported lower job satisfaction were also more

likely to work in a low-achieving school, these findings led the researchers to conclude that teacher leadership may be a “potential resource for translating big challenges into opportunities” (p. 51). Their argument is consistent with other researchers (Berry, 2011; Cochran-Smith, 2004) who have suggested that teacher leadership pathways may be one way to decrease issues, such as burnout and high turnover, that are currently plaguing the teacher profession (Goldring, Taie, & Riddles, 2014; Ingersoll, 2001). Creating opportunities for teacher leadership is thought to confront these issues by: a) providing teachers with career pathways that keep them professionally engaged and acknowledge the value of their expertise and b) leveraging TLs’ experience to support novice teachers as they navigate the complex field of teaching.

In many ways, and as will be described below, these calls for increased teacher agency and leadership are supported in education research. However, the reports may paint an overly simplistic picture of what teacher agency looks like and what its results may be. The next section briefly outlines prior research on teacher agency to build the case for further research on the agency of TLs in collaborative learning contexts.

Prior Research on Teacher Agency

Agency is defined broadly as the capacity to act with intention towards valued outcomes within cultural, social, and institutional contexts (Bandura, 2001). Much of the research on teacher agency has specifically focused on teacher agency in large-scale instructional reform contexts and has broadly found that current instructional improvement reforms constrain teacher agency, although teachers’ professional identities—their values, goals, and beliefs related to teaching and learning—may mediate the effects of reform (Buchanan, 2015; Lasky, 2005; Pyhälto, Pietarinen, & Soini, 2012; 2014; 2015; Vähäsantanen, 2015; Vähäsantanen and Eteläpelto, 2009). Relatedly, teacher agency has also been implicated as a factor influencing the

implementation of instructional reform, since teachers use their agency to make sense of reform, although these studies may not always use the language of agency (Allen & Penuel, 2015; Bridwell-Mitchell, 2015; Coburn 2001; 2005; Pyhälto et al., 2014; Vähäsantanen 2015). These “sensemaking” processes usually occur in formal and informal interactions with fellow teachers and administrators.

In fact, all of the above research converges on the potential of collaborative professional learning as mechanisms to support teacher agency, learning, and instructional reform. As spaces in which teachers collaborate and reflect on practice, these communities are thought to lead to more meaningful learning around reform by increasing teachers’ agency, collective responsibility of the reform, and the shared meanings that teachers construct around instructional reform (McLaughlin & Talbert, 2001; Stoll et al., 2006). However, the nature and enactment of teacher agency in collaborative learning groups remains unknown, since few empirical studies have focused on teacher agency within collaborative professional learning contexts in the United States, where teacher agency is currently being promoted by influential education entities (Calvert, 2016).

The results of studies on teacher agency and professional identity, teachers’ sensemaking, and teachers’ collaborative learning point to a complex relationship between teacher agency and collaborative learning in instructional reform contexts, where agency may take various shapes and may be used to resist or approve a reform, change or maintain practices, or, perhaps most commonly, negotiate a middle ground. However, these studies nonetheless tend to take an oversimplified and uncritical approach to the relationship between agency and collaborative learning, assuming that more teacher agency will result in more positive collaborative learning outcomes such as enhanced teacher capacity and improved instruction and student learning. For

example, Buchanan (2015), Vähäsantanen and Eteläpelto, (2011), and Pyhälto and colleagues (2015) all use their findings to call for *more* teacher agency in professional learning, despite each including empirical evidence that agency may be enacted in various ways. Studies on teacher agency also tend to focus on teachers' self-described *perceptions* of teacher agency (Buchanan, 2015; Lasky, 2005; Pyhälto et al., 2012; 2014; 2015; Vähäsantanen, 2015; Vähäsantanen and Eteläpelto, 2011), without exploring what agency looks like in practice as teachers negotiate their response to reform. While sensemaking studies *have* examined teachers' interactions, those observations have occurred while teachers are engaged in a researcher- or policy-designed activity to support implementation and have not explored the relationship between sensemaking and teacher agency in more autonomous learning environments (Allen & Penuel, 2015; Bridwell-Mitchell, 2015; Coburn, 2001; 2005).

While valuable findings about the relationship between teacher agency and collaborative professional learning have emerged from these studies, focusing explicitly on the agency of TLs involved in a more autonomous process of collaborative professional learning would add depth and nuance to our developing understanding of teacher agency in instructional improvement reform contexts, particularly since the autonomous nature of their practice is more aligned with the above-described policy calls for teacher agency. Furthermore, critically examining the assumption that teachers need more agency in professional learning may illuminate the more varied ways that agency may be exercised in a teacher-led and initiated collective learning environment. Moving beyond an analysis of teachers' *perceptions* of agency to include analysis of agency *in action* would also further our understanding of the relationship between TL agency and collaborative professional learning by shedding light on their actual negotiated responses to

reform. As the next section describes, this research would also inform our growing understanding of the role that TLs may play in supporting collaborative learning.

Teacher Leadership and Teacher Agency in Collaborative Learning

In research with considerable thematic overlap to that on teacher agency, research on professional learning communities (PLC) has identified collaborative learning groups as contexts for teachers to assume leadership responsibilities (Stoll et al., 2006), which has also been supported as a mechanism for facilitating instructional improvement (Borko et al., 2014; Elliott et al., 2009; Koellner et al., 2011; Leithwood & Mascal, 2008; Lord & Miller, 2000). Teacher leaders may leverage their accumulated experience, personal connections with colleagues, and knowledge of the local context to provide targeted support to their fellow teachers (Mangin & Stoelinga, 2008; Neumerski, 2013; York-Barr & Duke, 2004). However, research on teacher leadership within collaborative learning environments suggests that this relationship may also be complex (Harris et al., 2007; Louis, Dretzke, & Wahlstrom, 2010). For one, there is evidence that within a reform environment focused on accountability and evaluation, TLs might act merely as transmitters of “best” or administration-approved practices, which could work to stifle meaningful learning opportunities (Margolis & Doring, 2012; Timperly, 2005). Much of the literature on teacher leadership in professional learning has furthermore focused on how district- or school-designated TLs facilitate the learning of colleagues as they participate in formal or mandated professional development activities (Borko et al., 2014; Scribner et al., 2007). However, there has been little research focused on the actions of emergent, informal TLs participating in non-mandated collaborative professional learning. The one study (to my knowledge) that took such an approach found that informal TLs may influence teachers’ sense of efficacy and motivation to engage in collaborative learning, but they did not relate TLs’ agency to opportunities to learn (Szczesniul & Huizenga, 2015). Given that this level of agency and

leadership is one of the ultimate goals of research and policy calls for teacher agency, teacher leadership, and collaborative professional learning, there is a need to examine how these factors are enacted within contexts where informal leadership has emerged and been enacted via collaborative professional learning.

In sum, there is evidence that teachers and TLs exercise agency in diverse ways in collaborative professional learning environments, but this has not been the explicit focus of empirical studies. This indicates a need for more fine-grained, in-depth studies of what teacher agency looks like in collaborative professional learning environments and how TLs' agency shapes teachers' opportunities to learn. Developing a better understanding of how TLs exercise agency during professional learning may help illuminate ways to support productive professional learning in the contexts of instructional reforms.

Theoretical Framework

This study approaches the analysis of TLs' agency via a theoretical framework informed by sociocultural theory. Sociocultural theory emphasizes the way that social interactions and cultural tools shape learning and behavior. A sociocultural approach to agency directs attention to the ways teachers' agency may reflect the socially, culturally, and historically shaped meanings and tools teachers use to act. This makes it particularly relevant for a comparative study on TLs' agency in collaborative professional learning in a context of instructional improvement reform. Applying sociocultural theory, I approach the study of teacher agency using the following definition of TLs' agency in professional learning: *TL's capacity to act towards desired outcomes related to professional learning, where capacity and desired outcomes are shaped via the socio-culturally situated meanings TLs construct related to their lesson study practice.* Such a definition facilitates comparison of how approaches to instructional

improvement may shape and be shaped by TLs and their groups in collaborative professional learning.

Sociocultural theory suggests that understanding teachers' agency inherently requires an understanding of the cognitive and cultural tools teachers use to achieve agency, since tools and the actions they enable are mutually dependent (Wertsch, Tulviste, & Hagstrom, 1993). In this study, teachers' meanings related to lesson study are analyzed as a cognitive tool that mediates action and composes a crucial aspect of agency. TLs' facilitation of group discussions are also analyzed as a mediator and manifestation of teacher agency. Finally, I analyze the influence of TLs' agency on the sociocultural context of their lesson study groups by considering how TLs' agency shape teachers' opportunities to learn. Approaching the study of two TLs via this definition of agency extends attention beyond an examination of what teachers are doing or feel that they can do in response to reforms, to an analysis of how what they do and feel they can do is shaped via a dynamic and reciprocal process of meaning-making and action.

Description of Study

This study approaches the exploration of TLs' agency in collaborative professional learning in the context of two groups of teachers practicing a self-initiated, inquiry-based, collaborative professional development called lesson study. In lesson study, teachers work together to identify and research a topic, design a lesson to explore student understanding of the topic, teach the lesson, and discuss their observations of the lesson (Lewis & Hurd, 2011). This context has several features that make it particularly appropriate for studying teacher agency in professional learning. First, the collaborative, content-focused, inquiry-based, and teacher-driven nature of lesson study means it is precisely the kind of professional learning that research has suggested will empower teachers to improve instruction (Ball & Cohen, 1999; Loucks-Horsley,

Hewson, Love, & Stiles, 1998; Hawley & Valli, 1999; Hiebert, Gallimore, & Stigler, 2002; Lewis, Perry, & Murata, 2006; Perry & Lewis, 2009; Wilson & Berne, 1999). While lesson study cycles generally follow the same set of steps, within these steps, facilitators may have considerable flexibility in how they shape teachers' opportunities to learn. The conversations held in frequent meetings over the course of lesson study provide a data source that makes visible (or audible) both TLs' manifestations of agency via facilitation and teachers' opportunities to learn in relation to that facilitation.

Second, because the teachers in this study practice lesson study outside of any requirement to do so, they have demonstrated agency through their decision to participate in an independent PD practice. That agency was uniquely supported by the district and school context that honored the teacher-driven aspect of lesson study by not constraining the teachers' autonomous practice. One of the teacher leader-facilitators has sustained her lesson study practice for 14 years and the other for nine years, despite challenges in funding and constantly changing school and district leadership and priorities, suggesting a particularly strong agentic orientation. Because these TLs not only demonstrated agency to promote their own professional learning, but have actively sought to build the capacity of their peers through lesson study participation, they displayed and sustained a type of teacher leadership that research suggests may promote instructional improvement (Hargreaves & Fullan, 2012; Wenner & Campbell, 2017).

As stated above, few empirical studies have examined how TLs exercise agency to influence the learning opportunities of peers while engaged in collaborative professional learning. This context provides an excellent opportunity to understand how two TLs enact their agency in facilitating teacher learning, and how that shapes teachers' opportunities to learn.

Given this context, this study addresses the broader research question: How do TLs exercise agency as they facilitate lesson study? To answer this question, I was guided by two sub-questions:

1. What meanings do TLs construct regarding their lesson study practice?
2. How do those meanings shape teachers' opportunities to learn via lesson study?

To answer these questions, I drew upon over three years of data collected with each TLs' lesson study groups, including transcripts of more than 70 hours of lesson study planning meetings, interviews, surveys, and written reflections. In three phases of analysis, I first coded interview data for TLs' meanings, relying especially on an extensive semi-structured interview with each TL that I conducted with the purpose of better understanding their agency. I then combed planning meeting data to identify teachers' opportunities to learn. Informed by research on teacher learning in reform (Ball & Cohen, 1999; Opfer & Pedder, 2011; Thompson & Zeulli, 1999), I applied a definition of learning opportunities characterized by potential to engage in resolving cognitive conflicts. Within these opportunities, I analyzed facilitators' talk moves to understand their purpose, how that purpose reflected (or not) TLs' meanings of teaching and learning, and how facilitators' talk shaped teachers' opportunities to learn. Across-case analysis deepened my interpretation of individual cases and made it possible to consider generalizations about TLs' agency in collaborative learning that can be further investigated in future studies (Flyvbjerg, 2006).

Study Significance

This study leverages the unique context of an independent, long-term, teacher-led collaborative professional learning practice to explore TLs' agency in professional learning. The significant similarities in the practices and contexts of these groups allowed me to investigate

how teacher leadership and agency in professional learning may lead to different learning opportunities for the teachers in each group.

To develop a more critical and fine-grained understanding of TLs' agency and the differences that may emerge between teachers in similar environments, research on teacher agency must move beyond a sole focus on teachers' reported feelings of agency to an in-depth exploration of agency as meaning-making *and* action. This study zooms in on the interactions of two TLs and their groups to gain insights into teacher agency that may be obscured by studies with larger samples and those that rely solely on self-reported data. By applying a theoretical framework that draws from sociocultural theory, I explore agency at the level of meaning-making and at the level of actions/talk where those meanings are manifested and shaped. I relate TLs' agency to teachers' opportunities to learn via collaboration, a relationship not yet empirically investigated.

Instead of assuming these TLs are involved in highly agentic activity with positive outcomes, I cast a critical eye on each TL's agency as they facilitate lesson study. By questioning the assumption that more teacher agency in collaborative learning leads to positive outcomes, I develop a more nuanced understanding of the relationship between agency and teacher learning.

Given calls to support teacher agency and teacher leadership in professional learning, it is important that we further our understanding of the relationship between TLs' agency and instructional improvement. By critically examining the relationship between agency and professional learning, comparing two TLs leading independent lesson study groups, analyzing agency at the level of meaning making and talk/actions, and exploring the relationship between TL agency and teachers' opportunities to learn in lesson study, this study aims to contribute to our understanding of how teachers respond to and engage with instructional improvement, which

should, in turn, inform our efforts to support teachers and TLs as they make sense of a complex and changing profession.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews literature relevant to teacher leadership and teacher agency in professional learning contexts. It begins by situating this study of teacher agency within a theoretical framework informed by sociocultural theory. It then reviews literature on teacher agency in reform contexts and teacher agency in collaborative learning contexts to identify a knowledge gap. The chapter concludes with a discussion of how the current study contributes to filling the knowledge gap and increases our understanding of TLs' agency in collaborative learning contexts.

Theoretical Framework on Teacher Agency: Sociocultural Theory

The concept of agency has been studied by psychologists, sociologists, anthropologists, and economists, among others (Eteläpelto, Vähäsantanen, Hökkä, & Paloniemi, 2013). In education, research on teacher agency is often under-theorized, but the influence of sociocultural theory is frequently observed (e.g. Bridwell-Mitchell, 2015; Buchanan, 2015; Lasky, 2005; Pyhälto et al., 2012). For example, in her work on teacher agency and vulnerability, Lasky (2005) draws heavily on Wertsch (1993) and Vygotsky (1962) to define her approach to agency as “the ways people act to affect their immediate settings through using resources that are culturally, socially, and historically developed” (p. 900). Pyhälto and colleagues (2012) likewise describe agency as teachers' capacity to act with intention within the “historical, cultural, and social structures of the schools that are also reflected in the mediating tools, such as a policy and a curriculum” (p. 100). More succinctly, in a study on teacher agency and identity, Buchanan (2015) cites Ahearn's (2001) definition of agency as “socioculturally mediated capacity to act” (p. 109).

Approaching agency through a sociocultural lens draws analytical attention to the social nature of human activity (Wertsch, Tulviste, & Hagstrom, 1993). Sociocultural theory's most basic premise is that cognitive processes have social origins. Vygotsky (1981) proposed that mental functioning occurs primarily on the *intermental* level, or between people. *Intramental* functioning, or individual cognition, thus, derives from processes occurring at the intermental level. In other words, the way we think, or make meanings and develop responses to stimuli, is a result of our social relations.

Another major interrelated component of sociocultural theory is the "cultural" aspect. Vygotsky (1981) described culture as "the product of social life and human social activity" (p. 164) and described human action as mediated by cultural tools. Cultural tools do not merely facilitate action and/or mental processes, they determine the nature of thought and action, making them irrevocably linked to agency (Wertsch & Tulviste, 1992). In Vygotsky's description, cultural tools are semiotic, signs we use to convey and construct meaning. Language is therefore the most obvious example of a cultural tool. The role of cultural tools in explaining mental functioning will vary based on the activity in which someone is engaged and the socioculturally situated setting in which the activity occurs (Gallimore, Goldenberg, & Weisner, 1993; Scribner & Cole, 1981). Building on these ideas, Scribner (1985) proposed that to understand the relationship between knowledge and action, "the starting point and primary unit of analysis should be culturally organized human activities" (p. 199), or "goal-directed actions" that represent a synthesis of mental processes, behavior, and the tools, capabilities and sign systems employed to execute such activities.

In their description of socioculturally-mediated agency, Wertsch and Rupert (1993) add further nuances to how a sociocultural approach to agency can inform our understanding of

human action in learning environments. They suggest that “by incorporating dimensions of value and authority as well as dimensions of cognitive efficacy into our analyses,” we can gain a better understanding of why certain types of thinking, knowing, and speaking are privileged over others. Their argument gets to the heart of why focusing on agency is important: because the instrumentality of cognitive processes is not so neatly defined by what is most efficient, but is also linked to issues of authority—involving perceptions and negotiations of power—reflective of what is valued within groups, where what is valued might have as much to do with the negotiation of power relations (or the negotiation of the power to decide what can and should be valued/accomplished) as it does the accomplishing of a particular task.

In teacher learning groups in which teachers make sense of new approaches to instructional improvement, group interactions should not only signal valued ways of learning and knowing but the negotiation (or perpetuation) of those values. This power dimension is implicit in the term “agency” and definitions that describe agency as “*capacity to act.*” Sociocultural theory defines this capacity as highly dependent upon the social, cultural, and historical context and the human and material resources it affords, but it also suggests that through our social interactions, we help to shape this context.

Combining the two central tenets of sociocultural theory—that cognitive processes are social in nature and mediated by cultural tools—I approach the study of teacher agency by separating agency into two levels for the purpose of analysis. One manifestation of TLs’ agency occurs at the level of meaning-making, as TLs respond to external cues about teaching and learning by constructing meanings about these processes. This aspect of agency is a more cognitive process, occurring via what Vygotsky termed intramental functioning, although it is a product of intermental, or social, processes. Building on Vygotsky’s ideas and incorporating

Bakhtin's ideas about meaning in speech, Wertsch (1993) described cognitive activity at this level as employing and mediated by semiotic processes and cultural tools, where response to stimuli is negotiated via an ever-present and dynamic tension between accepting the authoritative or transmitted meaning of a "text" or creating a new meaning in dialog with ourselves, others, or other aspects of our context.

As mentioned above, Wertsch (1993) describes agency as inseparable from the mediational tools used to make action possible. In agreement with this idea, I conceptualize meaning-making as both a manifestation of agency and a cognitive tool that shapes the nature of agency. In my analysis, I explore the meanings TLs make related to their lesson study practice as a key part of understanding what I call the nature of teacher agency, or what teacher agency is like in relation to the meanings that undergird teachers' actions. This focus is especially important because recent calls for teacher agency have tended to discuss teacher agency without an explicit description of what that agency is like or to what ends it may be used.

Because I cannot actually observe intramental processes, I rely on teachers' talk during interviews and reflections to identify key meanings related to lesson study practice. I focus on "meanings" instead of constructs like definitions, goals, beliefs, or values to highlight the dynamic aspect of the nature of teacher agency. Meanings are constructed and reconstructed in interaction with our socioculturally situated context, and this process is key to understanding both learning and responses to policy.

However important, meaning-making is only one aspect of agency. Another manifestation of agency occurs at the level of action and talk. At this level, TLs' meanings about teaching and teacher learning manifest as they enact lesson study processes, including the facilitation of group discussions and the setup of lesson study tasks. I refer to this as the

enactment of agency to draw attention to its visible and audible manifestation via actions and talk and to distinguish it from studies that rely on teachers self-reported perceptions of agency as the unit of analysis. Here, I want to be clear that what I call the enacted aspect of agency is both reciprocal and integral to the meaning-making aspect, since meaning-making is influenced by talk and interactions and vice versa.

Finally, tying the tenets of sociocultural theory to the goal of professional learning, I explore how one aspect of the sociocultural context of a lesson study group—TL’s facilitation—shapes teachers’ opportunities to learn. I suggest that, via their role as facilitators, TLs are in a position of more authority to shape the nature of teacher learning in lesson study. As they guide conversations about student learning and teaching, they have potential to signal valued ways of learning and knowing and present opportunities for the teachers in their group to consider, accept, reject—or negotiate a response—to those ideas. In other words, the way TLs guide conversations via their facilitation influences the type of learning possibilities made possible via lesson study. In sum, sociocultural theory allows me to a) conceptualize TLs’ agency as socio-culturally shaped and occurring at the levels of meanings and talk/action via facilitation and b) analyze how TLs’ agency influences teachers’ opportunities to learn in lesson study.

Because this study seeks to capture and analyze an in-depth portrait of TLs’ agency in professional learning, a framework informed by sociocultural theory helpfully orients my analysis to the dynamic and complex nature of teacher agency. In the following literature review, I will explain that this approach was particularly warranted because prior research has not fully explored the varied nature and enactment of teachers’ agency in professional learning or the relationship between teacher agency, teacher leadership, and professional learning in instructional improvement contexts.

Reform Context

Many recent reforms, particularly in mathematics and English language arts, have asked teachers to significantly alter the way they approach instruction (Ball & Cohen, 1999). Such reforms and attempts to prepare teachers for them via professional learning often reflect shifts from traditional to more constructivist approaches to teaching (National Research Council, 2000). Traditional approaches to teaching view knowledge as transmitted from someone who has knowledge about a particular topic to someone who does not. It is associated with lecture and rote memorization and explains why the traditional image of a classroom includes desks lined up in rows facing a teacher ready to pass on knowledge (Tyack & Cuban, 1995). Constructivist approaches to teaching and learning are backed by a slew of big-name educationists (e.g. Dewey, Piaget, and Vygotsky) who might disagree on the particulars but share the belief that knowledge, or understanding, is constructed as individuals interact with new ideas and make meaning of those ideas in relation to what they already know and believe (Brown, Collins, & Duguid, 1989; Resnick, 1987; Richardson, 1997). This approach emphasizes the role of conversations and active problem-solving as ways for new knowledge to become integrated.

A more constructivist vision of education is reflected in many of the reforms that began in the United States in the latter half of the twentieth century, particularly in science and mathematics, where students are no longer asked to memorize facts and procedures but “think like mathematicians and scientists.” The most infamous and recent evidence of a constructivist shift to education in the U.S. can be seen in the Common Core State Standards, which have been adopted to some degree by over 80% of states to help develop the “critical-thinking, problem-solving, and analytical skills students will need to be successful” (Core Standards Website, 2018). In mathematics, this means the standards stress conceptual understanding and its

application to solving real-world problems. As suggested by the phrase, “thinking like a mathematician,” the shift towards a more constructivist approach to teaching not only requires changes in *what* students learn, but *how* students learn and think.

Reasonably, the same may be said of the teachers charged with shifting their instruction to a more constructivist approach. While constructivist ideas have gained traction in recent reforms, most teachers in the U.S. were taught using more traditional methods, and much of teacher professional learning continues to employ traditional methods, such as set-and-get workshops (Darling-Hammond, 2005; The Gates Foundation, 2014). Much research has cast doubt on the potential of such professional developments to adequately prepare teachers for new approaches to teaching (Ball & Cohen, 1999; Darling-Hammond, 2005; Desimone et al., 2002; Garet et al., 2001; Hawley & Valli, 1999; Kennedy, 2016; Lampert, 1990; Lampert & Ball, 1999; Putnam & Borko, 2000; Stein, Silver, & Smith, 1999; Wilson & Berne, 1999). This research suggests that teacher learning experiences where knowledge is passed from an expert to a non-expert, or where teachers are merely updated on a new policy or practice are not considered up to the task of supporting teachers in what may be seen as a complete shift in their approach to teaching. Instead, teachers need opportunities to learn that support shifts in teachers’ meanings of teaching and learning and deepen their understanding of the relationship between subject matter, student thinking, and pedagogy.

(Re)Defining Teachers’ Opportunities to Learn

A major challenge that literature has identified for supporting teachers as they learn about constructivist approaches to learning and teaching is that, because most teachers were likely not taught using the methods they are being asked to employ, teachers will need opportunities to craft new meanings related to teaching, knowing, and learning (Lampert, 1990; Putnam &

Borko, 2000). To do so, research has suggested that teachers need opportunities to learn characterized by specific types of content and pedagogy.

A fundamental premise of the content of teacher professional learning aimed at supporting shifts to constructivist instruction is that teachers need opportunities to learn about how students think and how to support student thinking in a way that builds on and advances students' understanding (Thompson & Zeuli, 1999). In order to effectively leverage students' understanding, teachers must have an understanding of subject matter that includes meanings and connections between ideas and information, not just memorization and procedures (Ball & Cohen, 1999; National Academies of Science, Engineering, and Mathematics, 2018). Teachers also need opportunities to develop knowledge of the relationship between student thinking and subject matter and teaching and subject matter, so that they can effectively guide students as they make sense of new ideas (Ball, Thames, & Phelps, 2008). This may require teachers to also learn a new way to define concepts such as teaching, learning, knowing, and thinking, and, of course, to learn new approaches to pedagogy that reflect these new definitions. Each of these aspects of the *content* of teachers' opportunities to learn are challenging in their own right, and to coordinate their learning entails a particular approach to the *pedagogy* of teacher learning that is grounded in the constructivist ideas it seeks to enable.

If the fundamental goal of the content of teachers' professional learning opportunities is aimed at increasing teachers' knowledge of how to support and leverage students' thinking, then a fundamental aspect of the pedagogy of teachers' professional learning is that it must include opportunities to investigate student thinking. Thus, one of the defining features of the pedagogy of teacher learning to support constructivist shifts is that it is situated within the contexts of teachers' practice (Ball & Cohen, 1999; Putnam & Borko, 2000). Research has suggested that

this means teachers need opportunities to learn from both their own practice and others'. Because teachers may not have been exposed to the instructional approach they are asked to employ, they will need learning opportunities where they can observe teaching and learning that reflects such an approach (Putnam & Borko, 2000). Furthermore, because teaching using more constructivist-oriented methods entails uncertainty and improvisation, teachers must "become serious learners in and around their practice" so that they can use classroom experiences "to correct, refine, and improve instruction" (p. 4).

While opportunities to learn may emerge from teachers' observation of and reflection on practice, these opportunities may also be characterized by the accumulation of strategies or best practices, instead of shifts in teachers' meanings of teaching and learning. In order to shift teachers' meanings, teachers will also need opportunities to surface their previous understandings, make sense of those in light of new evidence, and perhaps forge new meanings of teaching, learning, and knowing (National Academies of Science, Engineering, and Mathematics, 2018; Thompson & Zeulli, 1999; Wilson, & Berne, 1999). These "dissonance-inducing phenomena" are opportunities for teachers to make tacit knowledge explicit (Thompson & Zeulli, 1999). This is important because while prior knowledge may facilitate new learning, it may also constrain learning, since teachers depend on existing schema to make sense of new information (National Academies of Science, Engineering, and Mathematics, 2018; Spillane et al., 2002). While overcoming the bias of prior knowledge may happen organically, it is much more likely to require intention and guidance.

In, perhaps a slight exaggeration, Thompson and Zeulli (1999) lamented that changing such habits is "more like unlearning the patellar reflex than like changing one's normal route to

work” (p. 349). They suggest that the pedagogy of teacher learning must include explicit attempts to:

create a sufficiently high level of cognitive dissonance to disturb in some fundamental way the equilibrium between teachers’ existing beliefs and practices on the one hand and their experience with subject matter, students’ learning, and teaching on the other (p. 355).

Thompson and Zeulli describe the inducing and resolving of dissonance as key to the kind of teaching and learning envisioned in reforms, and they argue that in order for teachers to learn how to support students’ thinking, it is essential that teachers must also have opportunities to engage in the kind of thinking they are expected to support. In fact, by their constructivist-informed definition of learning, content and pedagogy can only create successful opportunities to learn when they result in the surfacing and resolving of cognitive dissonance.

The need for opportunities to learn characterized by this type of content and pedagogy has influenced calls for collaborative professional learning opportunities such as lesson study, which affords opportunities for dissonance as teachers observe, research, and reflect on student thinking and classroom practices. However, as such approaches have gained ubiquity, evidence has amassed that even within professional learning formats reflective of the content and pedagogy described above, teachers may experience differential opportunities to learn (Bausmith & Barry, 2011; Curry, 2008; Grossman et al., 2001; Hargreaves, 1991; Horn & Little, 2010; Horn & Kane, 2015; McLaughlin & Talbert, 2001).

Within this context, research and policy reports have started to look at the role of teacher agency in professional learning. Much of this focus seems to stem from two premises. First, because reforms promoting a constructivist approach to teaching and learning have developed

alongside standardization and accountability policies, teachers may feel less agency to respond flexibly and creatively to their classroom environments (Hargreaves, 1998; Lasky, 2005). Second, collaborative professional learning may be a way for teachers to both exercise and develop agency as they make sense of policies and shifts in instructional improvement (Buchanan, 2015; Calvert, 2016; Pyhälto et al., 2014; Vähäsantanen, 2015). Similarly, teacher leadership has been promoted as a way for teachers to leverage their knowledge of the school context and experiences to support fellow teachers as they navigate shifts in instruction (Borko, et al, 2014; Elliott et al., 2009; Koellner et al., 2011; Leithwood & Mascal, 2008; Lord & Miller, 2000). Below I synthesize the valuable insights gleaned from research on teacher agency in reform contexts and teacher leadership to describe what a comparative study exploring the nature and enactment TLs agency can contribute to our understanding of how to support teachers' opportunities to learn.

Teacher Agency in Reform Contexts

Literature on teacher agency in reform contexts has applied the language of agency to understand teachers' sensemaking and implementation of reform. Some of this research has focused on ways that teachers' agency is constrained by instructional improvement reform contexts that increase surveillance and limit teacher flexibility (Buchanan, 2015; Lasky, 2005). Other research has focused on teachers' agentic actions in the implementation of reforms, although this literature may not always use the language of agency (e.g. Allen & Penuel, 2015; Biesta et. Al, 2015; Bridwell-Mitchell, 2015; Coburn 2001; 2005; Pyhälto et al., 2014; Vähäsantanen 2015). From both strands, studies report that teacher agency in reform contexts is mediated by formal structures (such as policies and institutional arrangements), teacher-level factors such as goals and beliefs, as well as by teachers' informal interactions with other teachers

and administrators. In particular, this body of literature has shown how teachers use agency to learn about or “make sense” of reforms in interaction with others and within situated contexts (Spillane et al., 2002). The result may be agency via resistance to, or token implementation of, the reform, or agency as a vehicle for teachers to take ownership and collective responsibility of the reform.

From these studies, two salient points emerge. One, although aspects of instructional reform may in some ways constrain teacher agency, the effect of reforms are mediated via teachers’ values, goals, and beliefs—often described collectively as “professional identity.” Two, social interactions are key opportunities for teachers to exercise agency as they make sense of reforms. Thus, the interplay of teachers’ values, goals, and beliefs and collaborative sensemaking about instructional improvement within sociocultural contexts are key components shaping teachers’ agency in response to reforms and influences whether their agency is directed at resisting, embracing, or forging new meanings around a reform effort. However, missing from the literature are studies that capture the complex nature, enactment, and influence of teacher agency *in practice* as teachers collaborate to make sense of instructional improvement. Also absent in the literature is an examination of the agency of TLs leading collaborative professional learning. This gap is notable given evidence from the above studies that teachers’ interactions with other teachers, particularly in collaborative professional learning, may play an important role in influencing teachers’ response to instructional improvement.

Professional Identity and Teacher Agency

Most studies that have described teacher agency in reform contexts focus on teachers’ *perceptions* to examine whether teachers perceive a fit between their own goals and values and that of the reform (Buchanan, 2015; Lasky, 2005; Pyhälto et al., 2012; 2014; 2015; Vähäsantanen, 2015; Vähäsantanen & Eteläpelto, 2011). Most of these studies use the language

of professional identity as an umbrella term that includes teachers' values, goals, and beliefs related to learning and instruction (Buchanan, 2015; Lasky, 2005; Vähäsantanen, 2015; Vähäsantanen & Eteläpelto, 2011). Although these studies all hint at the complex nature of agency, they tend to a simplistic and uncritical approach to agency, where more teacher agency in reform contexts is assumed to be positive. They nonetheless point to the importance of studying agency by suggesting that teacher agency shapes the instructional improvement process through teachers' values, goals, and beliefs about teaching and learning.

Studies on the relationship between teachers' professional identity and agency in reform contexts position identity (or, in the case of the Pyhälto and colleagues' studies, teachers' self-perceptions) as an interpretive framework through which teachers determine how a reform idea "fits" with their goals, beliefs about learning, and professional values. In general, these studies assume that the more teachers perceive a fit between their professional identity and a reform, the more agency they experience (Buchanan, 2015; Vähäsantanen, 2015; Vähäsantanen & Eteläpelto, 2011). Intuitively, this makes sense. If a teacher shares the goal of a reform and a belief in the reform mechanism employed to bring about that goal, then that teacher should feel more capacity to act towards the goal when a reform is implemented. On a psychological level, the reform reaffirms the approving teachers' professional goals and values as the right ones (Vähäsantanen, 2015), and on a material level, a reform aligned with a teachers' goals should (hypothetically) provide resources to act towards valued outcomes (Vähäsantanen & Eteläpelto, 2011). Empirical examples of this type of strong fit have been noted, albeit sparsely, in prior studies—e.g. a California school teacher with a strong belief in standardized assessment as a means to hold all students to high expectations (Buchanan, 2015) and a Finnish vocational teacher who agreed with her country's move to provide more real-world work experiences for

students (Vähäsantanen & Eteläpelto, 2011). In both cases, teachers felt empowered by reforms that matched their goals and values related to teaching.

More common, however, are instances in which the relationship between teacher agency in reform and professional identity are more complex. For example, based on survey (n=59) and interview data (n=4) with teachers undergoing a large-scale fiscal, curricular, and accountability reform in Canada, Lasky (2005) found that even if teachers agree with the goals of a reform, they may feel deprofessionalized by public discourses surrounding the reform and constrained by a lack of material resources to implement reform. Conversely, based on semi-structured interviews with nine California school teachers, Buchanan (2015) found that it is more important for teachers to perceive a fit between their professional identity and the *school* culture (as opposed to the national reform environment), since the school culture mediated the effects of national-level reform. Buchanan describes teachers who feel constrained by national reforms, but nonetheless experience agency within their school setting, when that setting conforms to their meanings related to teaching and learning.

In fact, although the primary finding of all studies reviewed is that recent reform contexts tend to constrain teacher agency (Buchanan, 2015; Lasky, 2005; Pyhälto et al., 2012; 2014; 2015; Vähäsantanen, 2015; Vähäsantanen & Eteläpelto, 2011), all of these studies also mention ways that teachers nonetheless exercise some agency despite a lack of fit between their identity and the reform. This may be through negotiating a new professional identity in response to the reform (often through social relationships) (Pyhälto et al., 2014; Vähäsantanen, 2015), maintaining an existing professional identity but complying with the reform (Buchanan, 2015; Vähäsantanen, 2015), “stepping up” to go beyond the expectations of the reform (Buchanan, 2015), resisting the reform outright (Buchanan, 2015; Vähäsantanen, 2015), or implementing

some aspects of the reform that are non-negotiable while choosing to resist or ignore other aspects (Lasky, 2005).

In other words, there are significant variations in how teachers exercise agency in response to reform. While professional identity—teachers’ values, goals, and beliefs—may offer a clue to explaining these variations, its role seems to be less of a predictor of teachers’ response to reform and more of a reference point for teachers as they negotiate their response to reform. For example, in their studies, Buchanan (2015), Lasky (2005), and Vähäsantanen (2015) describe professional identity as a resource that teachers leverage in response to reform, so even if teachers do not perceive a fit between their professional identity and a reform, they call upon their professional identity to find ways to take action towards the valued outcomes they *do* have control over. Because professional identity is not a static trait, teachers can also change their professional identity in response to reform. An example of this is outlined in Vähäsantanen and Eteläpelto’s (2011) study of 14 Finnish vocational teachers, in which they describe the case of a teacher who initially opposed a nationwide curricular reform, but after implementation, changed her view of teaching and learning based on the success she experienced as part of the reform.

However, Buchanan and Lasky also note that the teachers in their study developed their professional identities based on early career experiences. Although they both acknowledge that these identities are dynamic, these studies suggest that teachers’ professional identities may be difficult to change, since they are formed early on. Pyhälto, Pietarinin, and Soini (2015) reach a similar conclusion in their analysis of quantitatively coded teacher essays (n=187) before and after a designed collaborative professional learning intervention in Finland. They find that it may be easier to change teachers’ perceptions of reform than it is to change their self-perceptions or identity. Indeed, one could argue that that is what happened to the vocational teacher in

Vähäsantanen and Eteläpelto's study whose professional identity changed *after* she saw the effectiveness of the reform. Thus, although the perceived fit between a teacher's professional identity and a reform may influence a teacher's agency, that relationship is complex and, to a certain extent, dynamic, where negotiation is not only possible, but an inherent part of the process of articulating an agentic response to reform.

Across all studies, a key site identified for the negotiation of agency and professional identity in reform contexts is collaboration with other teachers. Reflecting the influence of sociocultural theory, Pyhälto and colleagues (2015) describe collaborative learning communities as spaces for teachers to negotiate changes at the interpersonal level (in interactions with other teachers) before negotiating those changes at the intrapersonal level, the level of meaning-making. In fact, they call upon researchers and policymakers to “focus on monitoring and developing the dynamic fit between these levels by, for example, negotiating the interrelation between personal and collective learning goals” (p. 320). This seems to be a fruitful area for future research and a logical next step for research on teachers' agency in reform contexts.

The literature on teacher agency and professional identity has given us valuable insights into how teachers' values, goals, and beliefs mediate their feelings of agency in response to reforms. However, as I will continue to argue below, to advance our understanding of teacher agency in reform contexts, we need more research that evaluates how the values, goals, and beliefs that make up a teachers' professional identity influence action as teachers negotiate their response to reforms in sociocultural contexts. I suggest that one way to build on these studies is to shift analysis from a focus on teachers' identities, goals, and values to analysis of the meanings teachers make about teaching and learning. A shift of this type would further direct attention to the dynamic nature of the ideals that undergird teacher agency and complement

studies on teachers' collaborative sensemaking by emphasizing the relationship between agency and the meanings teachers actively construct as they teach and learn to teach. A comparative case study of two teacher-leaders facilitating lesson study groups is well positioned to further illuminate ways that teachers' values, goals, and beliefs—or the meanings they make about teaching and learning—relate to variations in the nature and enactment of teacher agency.

Teachers' Collaborative Sensemaking about Reforms.

The above findings from research on teacher agency and reform are similar to the policy implementation research that studies teachers' sensemaking (Allen & Penuel, 2015; Bridwell-Mitchell, 2015; Coburn, 2001; 2005; Spillane et al., 2002). Sensemaking theory draws on insights from social and cognitive psychology and institutional theory to articulate an integrative, cognitive framework of implementation in which individual and situated cognitions interact with policy representations as implementers make sense of policy signals to determine if and how to implement policy (Spillane et al., 2002). Within this framework, sensemaking is defined as an “active attempt to bring one's past organization of knowledge and beliefs to bear in the construction of meaning from present stimuli” (p. 294). Said differently, implementing agents use their agency—informed by the past and situated in a present context—to make meaning of policy directives. Like the above findings focused more explicitly on teacher agency, empirical research on teachers' sensemaking has identified collaborative processes as key factors shaping teachers' agency in responses to policy. However, unlike the literature on professional identity and agency, sensemaking literature has focused on analysis of teachers' interactions and conversations with other teachers as they negotiate responses to reforms. This analysis suggests that the *nature and content* of collaboration around reform ideas mediate teachers' response to reform. It also adds to the evidence above (Buchanan, 2015) on the role that school-level culture

and administration may play in sending messages about reform and creating spaces for collaboration.

For example, Coburn (2001) interviewed and observed 18 teachers in an urban California elementary school to examine how those teachers constructed and reconstructed multiple messages about reading instruction. She found that teachers relied on both informal and formal networks (with fellow teachers and school administrators) to make sense of reading reform. The meanings teacher made through such interactions were influenced by their worldviews, preexisting practices, access to knowledge resources, and shared understandings. As a result, they privileged some reform messages more than others and this mediated the way teachers implemented the reform. However, Coburn (2005) cautions that professional collaboration alone does not explain teachers' engagement with reform:

It is not these practices in and of themselves that facilitate substantive implementation. Rather, it is the nature, quality, and content of the interaction in the course of these activities that shapes the degree to which teachers engage with policy in ways that transforms their practice or that reinforces preexisting approaches (p. 501).

In other words, the *nature* of that collaboration (along with cognitive processes influenced by teachers' worldviews) instead of collaborative practice itself shapes the *nature* of teachers' agency.

Similarly, Allen and Penuel (2015) examined the sensemaking of three teachers (at two different schools) around the coherence of science professional development with larger systems of curriculum, assessment, and standards. They found that teachers' perceptions of coherence are influenced by interactions occurring within PD, associated curriculum materials, and interactions with colleagues and school leaders. In particular, the presence of conflicting goals (between the

researchers' designed PD and school and district initiatives) served to either spur sensemaking conversations around these conflicts or disrupt teachers' attempts to apply the PD and implement new standards.

This finding is reminiscent of the above studies (Buchanan, 2015; Lasky, 2005) on teachers' perception of "fit" and professional identity and perhaps further elucidates ways that teachers negotiate agency in response to reforms. The incongruence, in Allen and Penuel's study, served as an impetus for collective sensemaking, where differences in the nature and content of sensemaking explained differential responses to the same PD between schools. Although the teachers in their studies all shared a value aligned with the PD, Allen and Penuel suggest that school-specific management strategies influenced different approaches to sensemaking, where the two teachers in a school that afforded more teacher autonomy and opportunity to collaborate displayed greater ability to reconcile issues such as conflicting goals and ultimately create new instructional materials to support implementation of the PD.

Although Coburn's study examined sensemaking in a single school, she had a similar finding related to autonomy. Coburn (2001) noted that teachers in her study were less likely to engage deeply with reform messages in highly-structured formal school activities that made it difficult for teachers to see the link between the assigned activities and their classrooms. This was in stark contrast to informal conversations, which were almost always linked to classroom practice and more likely to bring about incremental changes in teachers' perception of the reform. However, the self-selected nature of these informal interactions also often led to conversations that reinforced preexisting worldviews and practices. While Coburn (2001) and Allen and Penuel's (2015) work suggests a relationship between teachers' autonomy and the

quality and nature of collaborative sensemaking, this study also demonstrates how, given more autonomy, teachers may use their agency to maintain or transform practices.

A more recent study that characterizes teachers' sensemaking as institutional agency (Bridwell-Mitchell, 2015) offers further detail on how the context and nature of collaborative sensemaking influences whether collaboration serves to foster change or maintain the status quo. Analyzing a school undergoing comprehensive school reform in the U.S., Bridwell-Mitchell identifies three mechanisms that drive teacher agency in school-based reform contexts: (1) peer learning, (2) patterned social interactions, and (3) shared instructional understandings, aims, or practices. These mechanisms are mediated by the balance between cohesion vs diversity, cognitive and normative divergence vs convergence, and innovation vs socialization, where for example, too much cohesion in collaboration can result in teacher agency that maintains institutional practices instead of changing them in reform contexts. This study stands out as the lone example of an analysis that explicitly addresses teacher agency *in practice* as teachers collaboratively make sense of a reform and offers a promising way to apply its findings about collective sensemaking at the school level to a similar study of group-level interactions.

These studies reinforce the finding that teacher collaboration is a key site for the shaping of agency in response to reforms but suggest a need to more closely examine the nature of collaboration within particular contexts to understand how agency may be used to reinforce or transform practices. The sensemaking studies also highlight the role of the sociocultural context—including both schools and the micro-communities within them—in shaping the nature of collaboration as well as access to knowledge resources that influence teachers' agency via sensemaking processes.

Teacher Agency in Collaborative Professional Learning

Given the research highlighting the important role that collaboration may play in teachers' response to policy and given another strand of research that identifies collaboration as a key component to effective professional development (Garet et al., 2001; McLaughlin & Talbert, 2001), much recent research and policy attention has focused on collaborative professional development as a vehicle for supporting teachers during implementation of instructional reform. However, only a few studies have explored teacher agency in collaborative professional learning, and none have studied agency in the context of a teacher-led, autonomous, collaborative professional learning community.

Teacher collaborative learning emerged as a popular professional development paradigm after teacher isolation was implicated as a culprit for low student achievement and teacher burnout (Little, 1990; Lortie, 1975). When teachers are allowed time and space to collaborate, the logic goes, they can potentially learn from one another's commonly-held problems and benefit from shared professional expertise (Bryk et al., 1999; McLaughlin & Talbert, 2001). As mentioned above, the rise in research and reforms promoting constructivist approaches to teaching and learning also contributed to calls for collaborative learning as contexts where teachers could engage in the kind of learning that more closely mirrored the kind of teaching required by reforms (Ball & Cohen, 1999). However, that teachers' collaboration may be a mechanism for both change and resistance to change is also a frequent observation (e.g. Buchanan, 2015; Bridwell-Mitchell, 2015; Coburn, 2001; Datnow, 2012; Hargreaves, 1994; Horn & Little, 2009; Servage, 2009; Pyhälto et al., 2014; Vähäsantanen, 2015). Thus, again, it seems that collaborative spaces are key sites for teachers to negotiate the tension between agency and structure as they make sense of reforms. Yet, despite the importance of teacher collaboration

as a key site to understand teacher agency, no studies have specifically looked at how teachers exercise agency *during* teacher-led collaborative professional learning.

In fact, the only studies that focused explicitly on teacher agency in collaborative learning are those associated with the “Learning and Development in the Comprehensive School” (2004–2009) project in Finland (Pyhälto et al., 2012; 2014; 2015) (referenced above in relation to their findings on teachers’ perceptions because of their focus on the influences of a designed PLC on teachers’ self-perception and perception of a reform). Applying a design research approach, researchers conducted site visits and interventions with nine case schools over a two-year period, collecting data related to teachers’ views of the reform and perception of agency. The intervention consisted of building collaborative learning communities designed to promote teacher empowerment and ownership of the reform, create spaces for collaborative learning, and foster shared meaning making around the reform.

In their analysis of pre- and post-intervention teacher essays, Pyhälto, Pietarinin, and Soini (2014) found that collaboration in communities with other teachers (the intervention) increases the likelihood that teachers will view themselves as having more professional agency and increases the likelihood that teachers will adopt a more holistic view of the reform, meaning that teachers recognize the multilevel coherence of the reform as it relates to their classroom practice, professional learning, and national goals for education. However, echoing the above findings from sensemaking, the authors caution that professional learning in collaborative communities does not lead to professional agency or a holistic view of the reform for *all* teachers.

Supported by findings from the larger study, Pyhälto and colleagues call attention to the complexity of teacher learning and professional agency in reform, pointing out that teachers’

motivations and beliefs interact with organizational supports that foster occupational well-being and attend to collaborative and individual teacher capacity-building. Thus, where the professional identity and agency literature points to ways that teachers' values, goals, and beliefs mediate reform messages, and sensemaking literature shows how teachers interact with others to construct meaning in response to reform, Pyhälto and colleagues' study, along with the broader literature on professional learning communities suggests that PLCs are not only sites to make sense of a reform but also to potentially *build capacity* to respond to reform.

Unfortunately, although Pyhälto and colleagues (2014) stress the importance of conducting research that captures the complexity of teacher professional agency and professional learning, they did not examine what professional agency and learning look like *during* teachers' participation in learning communities. To truly understand the complexity of the relationship between teacher learning and professional agency, qualitative research that captures an in-depth, fine-grained portrait of teacher agency in professional learning is needed. Furthermore, like much of the literature on professional learning, teacher agency, and even teachers' sensemaking, the "Learning and Development in the Comprehensive School" project studied teachers as they applied an intervention designed by researchers aimed to help implement a top-down reform. While this focus is certainly warranted given the ubiquity of such interventions, the design of those very interventions would almost certainly benefit from an understanding of teacher agency in an emergent and autonomous collaborative professional learning practice, where teachers' meanings about teaching and learning may be more manifest as they direct their own sensemaking process. Such a study would also hopefully contribute to our growing understanding of the role of TLs in supporting the learning of their peers.

Teacher Leadership and Teacher Agency in Collaborative Professional Learning

The relationship between agency and teacher leadership is frequently implied in studies on teacher leadership that identify the important role of TLs in supporting other teachers' professional learning (Borko et al., 2014; Gigante & Firestone, 2008; Harris et al., 2007; Margolis & Huggins, 2012; Stein & Nelson, 2003; Taylor et al., 2011; Vernon-Dotson, 2008). As highly committed and respected professionals, TLs are uniquely positioned to leverage their experience to support the learning of their peers as they make sense of reform-based practices (Borko et al., 2014; Elliott et al., 2009; Koellner et al., 2011; Lord & Miller, 2000). Their localized knowledge of teachers, students, and the school context is a resource they can use to provide targeted supports to fellow teachers (Mangin & Stoelinga, 2008; Neumerski, 2013; York-Barr & Duke, 2004). As leaders of collaborative professional groups, TLs' agency should play a critical role in influencing other teachers' learning opportunities. However, the links between agency, teacher leadership, and collaborative learning have rarely been empirically explored.

The sole study (Szczesniul & Huizenga, 2015) that I found with this focus succinctly describes the theoretical premise for linking teacher leadership and agency in learning:

Teacher leadership—as a process of individual and collective influence—is therefore theorized by many scholars to be the critical bridge between organizational structure and teacher agency that makes building collective capacity for instructional improvement possible (p. 369).

To explore this theoretical relationship empirically, Szczesniul and Huizenga (2015) analyzed how informal TLs (from two teacher teams at a high-performing middle school) leverage psychological factors (such as efficacy and motivation) and structural factors (such as common

planning) to guide conversation routines (as defined in Little & Horn, 2010) that promote collective learning during common planning time. Through analysis of interviews, surveys, and observations, they found that the informal TLs who emerged during common planning created and maintained positive social processes that increased relational trust and nurtured a serious professional stance towards collaboration. They also found that the TLs fostered motivation and collective efficacy (Bandura, 2001) by highlighting teams' professional strengths without negating areas where improvement was needed.

Although Szczesiul and Huizenga's (2015) findings are valuable for what they reveal about how informal teachers influence learning in collaboration, they focus primarily on the nature of leadership instead of the nature of agency. In doing so, they conceptualize teacher leadership but fail to explore the nature of teacher agency. Like other studies, their implicit definition takes for granted that more agency is a good thing. It seems that by agency, they mean teachers' sense of efficacy and motivation in relation to professional learning, since these are the outcomes they describe as resulting from teacher leadership in collaborative learning. However, as mentioned above, Bandura (2006) himself (whom the authors frequently cite to support their focus on efficacy and motivation) warned that agency was value neutral. A similar study with a focus on a more critical conceptualization of agency might afford a more nuanced analysis on the under-studied relationship between teacher leadership, agency, and collaborative professional learning.

Contributions and Limitations of Teacher Agency Research

Collectively, studies on teacher agency and professional identity, teachers' sensemaking, professional learning communities, and teacher leadership suggest that there are variations between teachers in exactly how reforms interact with agency, since teachers may use their

agency to maintain or transform existing practices. These studies highlight teachers' professional identities, their interactions with coworkers, and the organizational context as factors that mediate the reciprocal relationship between reform and agency. These observations are important because they suggest two insights into teacher agency and reform that may inform future studies: 1) Professional collaboration is a venue in which teachers' agency may be exercised and shaped in response to reforms, but the nature of collaboration matters, and 2) individual cognitive factors also mediate teachers' agentic response to reforms, but these individual factors may also be negotiated in social interactions. While these insights can be deduced from the reviewed studies, they did not form the focus of the studies, pointing to a need for research that explicitly studies teacher agency in collaborative professional learning from a perspective that captures differences in the ways that cognitive and social processes influence teachers' agency and opportunities to learn in response to reforms.

Most of the above studies relied on self-reported data from teachers, primarily interviews, and none examined teacher agency as teachers actively responded to reform in interaction with other teachers. The reliance on teachers' self-reported perceptions of agency makes it difficult to capture the dynamic nature of agency and teachers' response to reforms as something that is under constant negotiation (Pyhälto et al., 2014). Although all of the studies reviewed point to the role of collaboration in shaping teachers' actions as they respond to reforms, only one prior study (Bridwell-Mitchell, 2015) has explicitly approached the study of teacher agency by examining agency *in action* as teachers collaborate around reform ideas.

Another gap related to these studies concerns the generally uncritical assumption that more teacher agency will have positive results for teachers and students. For example, despite the finding that agency can be enacted for multiple purposes in reform contexts, each of the studies

on teacher agency and professional identity nonetheless call for policy environments that are less constraining to teacher agency. This paints an overly simplistic portrayal of agency, despite findings from the same studies that signal a more complex reality, and limits our understanding of how to best support teacher agency in ways that lead to instructional improvement. The reviewed sensemaking articles also promote more teacher “autonomy” in collaboration, which is also an underlying theme in much of the PLC literature and teacher leadership literature.

The problem with assuming that teachers need more agency is that it takes for granted that teachers’ intentions and mediational means will align in “positive” ways, which is not necessarily so. Indeed, this is the very conundrum that increasing teacher agency has been supposed to solve: that instructional improvement policies and/or research-based innovations fail when they fail to mobilize the support of teachers, the agents most responsible for their implementation (McLaughlin & Mitra, 2001). Thus, assuming teachers need more agency leads to two problems. One, a teachers’ agency may not be used to serve the interests of her students, fellow teachers, administrators, or policymakers, and, relatedly, starting from the assumption that teachers need more agency focuses analysis on the amount of agency, instead of the nature of that agency. Without developing a more nuanced understanding of the varied enactments of teacher agency in collaborative learning environments and their influence on teachers’ opportunities to learn, figuring out how to design the kind of environments that support that kind of teacher agency will be difficult.

This study aims to contribute to that understanding by exploring variations in the nature and enactment of two TLs’ agency as they facilitate lesson study and how those variations influence teachers’ opportunities to learn. The unique cases of two emergent and informal TLs who have led and sustained their own lesson study groups present an ideal opportunity to further

investigate how and why teachers' agency may vary. By removing the assumption that more teacher agency is a good thing, we can move beyond considerations of how agency is afforded or constrained in certain contexts to consider the complex and myriad ways that teachers may act, pushing the conversation beyond *capacity to act* to consider *capacity to act towards what end*. This is particularly relevant in the unique context of a study of teachers independently leading the learning activities of other teachers, since their agency may or may not be driven by intentions aligned with institutional goals, and since their capacity to act towards those intentions may influence the learning opportunities of teachers within their lesson study groups. By exploring agency as both the meanings teachers make about teaching and learning and how those meanings are enacted via facilitation, this study contributes to our understanding of how to support TLs and teachers as they engage in collaborative instructional improvement.

Teacher Agency in Lesson Study

As a teacher-led, research-aligned, collaborative professional learning practice in which teachers collectively research student learning and plan and teach a research lesson to better understand how students respond to specific instructional approaches (Lewis & Hurd, 2011; Perry & Lewis, 2009), lesson study offers a fruitful context for studying TLs' agency in a collaborative group setting. Lesson study embodies the kind of content-focused, coherent, continuous, and collaborative teacher learning (Perry & Lewis, 2009) that has been empirically demonstrated to be associated with improved instruction and student learning in the United States (Hawley & Valli, 1999; Loucks-Horsley, Hewson, Love, & Stiles, 1998; Wilson & Berne, 1999). Lesson study has also been identified as a powerful model for enacting teaching aligned with the Common Core State Standards because it has been found to facilitate teacher enactment of effective instruction (Hiebert et al., 2002; Lewis et al., 2006). Yet, research from a project on

lesson study implementation in Florida suggests that there may be wide variations in the way that lesson study is practiced or the collaborative focus of groups (Akiba & Wilkinson, 2016). Lesson study therefore provides a fruitful context to better understand variations in teacher agency, since its architecture provides a promising frame for instructional improvement, but also leaves flexibility for teachers—and especially TLs—to shape the learning process.

Lesson study teams are led by a facilitator who ensures meetings run smoothly and guides conversations towards learning goals. In the case of the two teams in this study, each is led by a teacher-facilitator who is also largely responsible for initiating and coordinating each group's lesson study. The teacher-facilitator potentially wields considerable power over the structure of the lesson study cycle and, especially, the content of conversations, which ultimately means the teacher-facilitator may be a major factor in shaping groups' opportunities to learn. However, as mentioned above, the relationship between teacher leadership, agency, and professional learning has rarely been explored empirically.

Lesson study is usually practiced in cycles of four steps (Fernandez & Yoshida, 2004; Hart, Alston, & Murata, 2011; Lewis & Hurd, 2011), each of which offer distinct opportunities for TLs to exercise and demonstrate agency via their facilitation. In the first step, a team of teachers meets to study curriculum, identify long-term student learning goals, and select a topic or problem to study (Lewis & Hurd, 2011). Because the selected topic will significantly shape the type of learning that occurs throughout the remainder of the cycle, TLs' facilitation in this first step may be critical to the shaping of teacher learning opportunities.

In the second step, teachers plan a research lesson together that will be taught by one of the participating teachers. In this process, a multitude of opportunities exist for TLs to enact their meanings about teaching and student learning via conversations about which instructional

practices to include in the lesson. In this step, many ideas are proposed, debated, and sometimes tested, but only a few can make it into the lesson. Thus, this step offers the opportunity to observe how TLs respond as they confront values or practices that may be different from their own.

In the third step of lesson study, one teacher teaches the research lesson while the others observe. The research lesson is part of what makes lesson study unique, because it offers teachers the opportunity to not only learn from each other, but to learn from students. Thus, the research lesson presents a key learning opportunity for teachers. However, the facilitator's framing of the research lesson's role and importance and the way conversation are guided over the course of the lesson design can significantly influence teachers' opportunities to learn from the research lesson. For example, one group might approach the research lesson as an opportunity to investigate student thinking while another considers it a demonstration of an ideal lesson, with meanings about teaching and learning undergirding each approach.

Finally, in the fourth step, teachers debrief and reflect about the research lesson, usually immediately after it has been taught. In this step, teachers use data gathered during the research lesson to identify areas of improvement that may be addressed in future lesson study cycles. As TL facilitators share their own observations and interpretations, they also invite others to do so and guide the conversation according to what they think should be noticed. They may also guide conversations towards particular interpretations of the data observed during the lesson.

Due to its teacher-driven nature, throughout all steps of lesson study, teachers have opportunities to use collegial conversations to describe and address problems of practice. This requires facilitators to respond flexibly to topics of concern as they arise. These conversations are particularly important contexts to observe TLs' agency, since their unpredictable nature

prompts TLs to improvise in ways that may reveal their meanings of teaching and learning. Such conversations may also represent key opportunities for teachers to learn as they use the process of lesson study to investigate their concerns. In more autonomous and voluntary lesson study groups, such moments may be even more common, since teachers have more flexibility regarding the topic and focus of lesson study and have elected to participate based on self-identified learning needs.

In sum, lesson study is an ideal context for a comparative case study of TLs' agency because a) it embodies precisely the kind of collaborative learning that has been identified as a key venue for teachers to build and exercise agency in instructional improvement and b) its steps create opportunities to observe and compare TLs' enactment of their meanings related to teaching and learning. It also enables observation of the relationship between TLs' agency and opportunities to learn by providing a context in which TLs may respond to teachers' emergent problems of practice.

By problematizing the assumption that more teacher agency results in instructional improvement in a context, such as lesson study, in which teachers are presumably demonstrating the type of agency we assume to be positive, we can learn more about the conditions under which this relationship holds or not (Alvesson & Sandberg, 2011). Given calls for teacher agency in collaborative learning, the context of two TLs facilitating their own independent lesson study teams affords the opportunity to better understand what agency in teacher learning looks like and how TLs' agency may shape teachers' opportunities to learn as they engage in the various processes of a teacher-driven professional learning activity.

Conclusion

In sum, prior research on teacher agency in collaborative professional learning contexts has not adequately problematized the idea that teachers need more agency in learning or sufficiently examined both the nature and enactment of teacher agency in collaborative learning contexts. Furthermore, little is known about how TLs exercise agency in collaborative professional learning or how their agency influences teachers' opportunities to learn in lesson study.

Given calls for increasing teacher agency in teacher learning (The Mirage Report, 2016), the ubiquity of collaborative PD (Markow et al., 2013; Stoll et al, 2006), and a research and policy focus on fostering teacher leadership (Leithwood & Mascall, 2008), there is a need to examine the complex nature and enactment of teacher agency through a detailed analysis of TLs' meanings about teaching and learning and the enactment of those meanings via facilitation. Such a study would assume a critical view of teacher agency, collaborative learning, and teacher leadership to refine our understanding of how these elements contribute (or not) to teacher learning aimed at instructional improvement.

The need for such research is supported by calls for professional learning policies that support teacher agency (Calvert, 2016, The Gates Foundation, 2014; The Mirage Report, 2016) and further fomented by research that explores teacher agency and instructional improvement reforms more broadly. Given agreement (Garet et al., 2008; 2010; The Gates Foundation, 2014; The Mirage Report, 2016) that spending on teacher professional development in the United States has not produced the desired results, such a study could inform our efforts to understand how to better support the professional learning of all teachers as they engage with instructional improvement reforms.

A conceptual framework that applies sociocultural theory orients analysis to how TLs' cognitive processes (via meaning-making) interact with social processes (via talk and action) as TLs' enact meanings about teaching and learning as they facilitate lesson study, ultimately shaping the learning opportunities of teachers in their group.

Building on the findings from the research reviewed in this chapter, the next chapter describes how the application of such a framework was applied to data collection and analysis.

CHAPTER 3

METHODS

This study is a comparative case study that relies primarily on semi-structured teacher interviews and analysis of data collected throughout all steps of two lesson study cycles with two teams over a three-year period. My analysis draws partially from data collected as part of a larger research project on lesson study in Florida. I have been a member of this research team for four years and have been active in the data collection and analysis. A teacher survey was conducted to gather background information from each participant. To understand the nature of TLs' agency, I focused analysis on multiple semi-structured interviews (five total with each lasting from 30 min to 115 min) conducted with TLs during and after lesson study cycles, including an extended interview in the spring of 2018 designed specifically to address the research questions of this study. To understand the enactment of TLs' agency and how that influences teachers' opportunities to learn in lesson study, I analyzed over 70 hours of transcripts of lesson study meetings, teachers' written reflections after lesson study meetings, interviews with teachers, lesson plans, and other documents related to each group's lesson study practice.

A comparative case study approach was selected to develop an in-depth understanding of the unique cases of two TLs who self-initiated and sustained lesson study groups at their respective schools in Coast County, Florida (Creswell, 2005). This approach also facilitated analysis of variations in the nature and enactment of teacher agency and how variations in facilitation may create different opportunities to learn between groups. Treating each TLs' facilitation as a separate case helped me to understand the "context-dependent knowledge and experience" that is at "the very heart of expert activity" (Flyvbjerg, 2006, p. 222). Each case is bounded by each TL's activities related to lesson study facilitation between 2014-2016,

particularly their facilitation of lesson study cycles in the 2014-15 and 2015-16 school years¹. In keeping with the goals of case study research, I employed multiple data collection methods to develop an in-depth understanding of the nature and enactment of TLs' agency as it relates to their facilitation of lesson study and how TLs' agency shapes teachers' opportunities to learn in lesson study (Yin, 1994). This chapter details and justifies the sample, describes the research context and its relevance to the research questions, identifies the data sources, and details my data analysis.

Research Context

This study focuses on the cases of two TLs, Kate and Elena, who each organize and lead their own lesson study groups at two school sites in Coast County School District—a mid-size school district (61,000 students) with average poverty and diversity levels (39% of student receiving free or reduced-price lunch and 39% ethnic minority) in the state of Florida. Florida began promoting lesson study as a statewide professional development model in 2010 using federal Race to the Top Funding (Akiba & Wilkinson, 2015). However, one of the teachers (Elena) started practicing lesson study in 2003 and the other (Kate) in 2008, before the state promoted lesson study and outside of a school or district mandate to do so. Kate and Elena hold no official leadership title. Instead, inspired by their own professional learning experiences, they emerged as informal TLs who promote and lead lesson study groups. Thus, the context offers a unique opportunity to explore the agency of two TLs who, on the surface, conform to research and policy-supported ideals of a teacher leader engaged in continuous and sustained professional learning.

¹ Because the research lesson was taught in the spring of each year, for simplicity's sake I refer to the 2014-15 team as "2015" and 2015-16 as "2016"

These teachers were also uniquely supported by a school and district who honored their autonomy in lesson study practice. Although Elena and Kate describe variations in level and type of administrator support over the years, each credits supportive principals with providing them with time and space to practice lesson study and helping them to locate funding to pay for resources such as materials and substitutes to cover the teachers as they observe and collect data during the research lesson. Although in the past, the district has had very little influence on the teams' practice, they recently partnered with our research team to explore how to grow lesson study practice in the county. In recent years, the district has collaborated with these two teams to promote lesson study, but has honored the teacher-led aspect by making participation voluntary.

Participants

The participants of this study belonged to two lesson study groups led by two TLs, Elena and Kate, who—to my knowledge—are the only two TLs in Florida to initiate and sustain a lesson study practice outside of any school, district, or state mandate to do so. In prior analysis as part of the larger research project, we found that despite similarities in their contexts—both as independent practitioners in similar schools in the same district—conversations within each group were notably different, where, generally, in Elena's group, conversations focused on teaching approaches and content, while conversations in Kate's group focused on the procedural aspects of designing of the lesson. The uniqueness of their long-term, teacher-led lesson study practice and observed differences between their approaches warranted further investigation of the relationship between professional learning, agency, and teacher leadership.

In addition to Elena² and Kate, the study participants also include 20 teachers who participated in lesson study in 2015 and 2016, nine from Kate's school and 11 from Elena's.

² All names used are pseudonyms.

Table 1 lists the teachers along with their participation in the 2015 and 2016 cycles of lesson study and their background—the number of years they have taught and the number of lesson study cycles they participated in previously—gathered from a teacher background survey conducted as part of the larger research project. Common to all of these teachers is that they decided to participate in lesson study even though they were not required to do so. The uniqueness of their independent practice and observed differences in the nature of each group’s conversations present an apt context to comparatively explore TLs’ agency and the learning opportunities shaped via lesson study.

Table 1. Study participants

School/Team		Lesson Study Participation		Years Taught	Lesson Study Cycles
		2015	2016		
Riverside	Elena (Facilitator)	X	X	24	13
	Stacey*	X		19	15
	Elena*	X		26	10
	Vicky*	X		22	6
	Emily	X		14	8
	Maggie	X		11	0
	Christine	X		17	0
	Allie	X	X	14	1
	Melissa		X	20	0
	Carmenza		X	2	0
	Manuela		X	11	0
Warrior	Kate (Facilitator)	X	X	29	7
	Beth	X		23	6
	Nikki	X		12	4
	Anna	X		11	6
	Laura	X		27	5
	Vanessa	X	X	30	3
	Eva	X	X	12	2
	Carol		X	1	2
	Brittany		X	1	0

Notes: * Elena invited these teachers from Trailways to participate in lesson study because they worked with Elena closely on lesson study before she transferred to Riverside. Stacey and Elena are teachers at Trailways and Vicky is a retired teacher who used to work at Trailways.

Elena

Elena is the facilitator of lesson study at Riverside Elementary School, where she has been teaching since 2014. Before transferring to Riverside, Elena taught at Trailways Elementary School, located less than two miles from Riverside and the school where Elena taught when she formed the first lesson study team. As suggested by their geographical proximity, Riverside and Trailways have similar student demographics. At Riverside, 43% of students receive free and reduced lunch, and 23% are ethnic minorities, while 46% of students at Trailways receive free and reduced lunch, and 19% are ethnic minorities. Elena has 26 years of teaching experience in grades 3-5 and currently teaches gifted and non-gifted mathematics to third, fourth, and fifth graders. She holds a master's degree in Elementary Education, is certified in elementary education with a gifted endorsement, and holds a National Board Certification in Mathematics.

Elena is a veteran teacher who has organized and facilitated lesson study groups in Coast County for 15 years. She has worked to educate school and district leaders about the potential benefits of lesson study, but has maintained her practice with and without official school or district support depending on administrative changes and priorities. The core group of teachers with whom she has practiced over the years speak of her approach to teaching mathematics and leading lesson study as a source of inspiration. For example, one teacher describes her as having “a world of expertise”, while others credit her for being “very knowledgeable about math,” “so good at what she does,” and “the best leader.” As such, Elena has many of the qualities of the kind of agentic teacher leader that has been suggested as a key to instructional improvement, warranting further analysis of the nature of that agency, and how her agency shapes her group's opportunities to learn in lesson study.

In fact, lesson study was brought to Coast County by Elena, who was introduced to lesson study in 2003 when she attended a conference in Washington, D.C., and overheard teachers discussing a form of professional development that “empowers teachers through collaboration” (personal communication, June 8, 2015). She approached one of the teachers to learn more and was told about lesson study. From 2003 to 2017, Elena has facilitated nine cycles of lesson study. Although the composition of her teams has varied from cycle to cycle, she slowly formed a core group of four teachers who have continued practicing with her, even as two of them (including Elena) transferred to another school and one retired.

In 2014, our team approached Elena to participate in our project after learning about her practice from another lesson study researcher who had previously collaborated with Elena’s team. Since Elena was new at Riverside, she invited three teachers from Trailways to participate in the 2015 cycle of lesson study alongside four teachers from the school.

Kate

Kate is also a veteran teacher, currently teaching 5th grade, who has sustained a lesson study practice at her school for ten years, without any mandate or requirement to do so. Like Elena, Kate embodies the sort of highly agentic teacher leader that research and policy has suggested may be a key to instructional improvement. Kate is the facilitator at Warrior Elementary, where she currently teaches fourth grade. Warrior is in the same town as Riverside and Trailways, but is located in a more metropolitan part of the city about five miles away from Riverside and Trailways. At Warrior, 49% of students receive free and reduced lunch, and 31% are considered ethnic minorities. Kate has taught at Warrior Elementary for all 28 years of her teaching experience. She currently teaches 4th grade, but has previously taught grades K-5 and

spent many years as a physical education teacher. In fact, Kate has a Ph.D. in Exercise Science, but is certified in elementary education and physical education, with an ESOL endorsement.

Kate was introduced to lesson study via her friendship with Elena. After attending a 2008 conference in Coast County that highlighted the success of Elena's team, Kate and three of her colleagues immediately began practicing lesson study in her school. Since 2009, Kate's team has completed eight cycles of lesson study. Her first team was composed of seven members, five of whom have continued with Kate throughout all six cycles. Kate has actively sought to spread lesson study in the school and district by teaching a school-wide lesson study, presenting lesson study summaries at staff meetings, leading a grade-level lesson study, participating in a summer facilitator's workshop to spread lesson study in the district, and actively recruiting members to her group.

Our team also collaborated with Kate after Elena introduced her to us beginning in 2014. For our collaboration, Kate organized a team that included the five members who have regularly practiced lesson study with Kate since 2008. She also coordinated with our research team in her initiative to promote lesson study via a schoolwide lesson study cycle meant to introduce teachers at her school to the benefits of lesson study practice.

Like Elena, Kate's team speaks glowingly of her leadership, often focusing on her ability to organize and take charge. Says one teacher,

She's just a leader on everything, and she's one of those people who can take charge, and tell you what to do, but you never take it the wrong way, whereas some people might come across as bossy, and you don't want to listen. She just has that natural leadership quality (Anna, Interview, 2015).

Another long-term member of her team, Eva, describes her as organized, explaining, “she takes charge; that’s what she does. She’s good at it” (Interview, 2016). A newer member from her 2016 describes her as a “professional lesson study guru,” elaborating, “she definitely knows her stuff about lesson study. She’s definitely an expert in that area. And if she got a question, she’ll know who to go to if she didn’t know the answer, and she was just really helpful” (Brittany, Interview, 2016).

In sum, there are many overlaps in Elena and Kate’s lesson study practice. They both practice outside of any school or district requirement to do so and have taken the initiative to organize and facilitate multiple lesson study cycles and grow lesson study in their district. Both teachers are seasoned veteran teachers who value collaboration and who are respected and trusted by their peer teachers. These similarities create a backdrop against which I can observe differences in TLs’ agency and how those differences may shape different learning opportunities for teachers in each group.

The Teams

Table 2 presents the group composition of the Riverside and Warrior teams with the number of group members, teaching experience and lesson study experience. In 2015, the Riverside team was composed of eight members, two of whom were new to lesson study, one of whom had only practiced one cycle of lesson study at another school, and six of whom had multiple years of lesson study practice alongside Elena (Table 1). All 2015 members had been teaching for at least ten years. For this team, Elena strategically invited four teachers with whom she had practiced lesson study in the past, two of whom traveled from a nearby school to participate and one of whom was already retired. In contrast, in 2016, three of the five members on Elena’s team had no lesson study experience. In fact, besides Elena, the only other member

with lesson study experience had completed her first cycle the year before. The 2016 Riverside team also included a teacher with only two years of teaching experience, and another teacher with 20 years of teaching experience but no prior lesson study experience.

Table 2. Group composition

Group		Members	Average Teaching Experience (ALL)	Average Teaching Experience (Excluding Facilitator)	Average LS Experience: Num of Cycles (ALL)	Average LS Experience (Excluding Facilitator)
Riverside	2015	8	18	18	7	6
	2016	5	14	12	3	0
Warrior	2015	7	21	19	5	4
	2016	5	15	11	3	2

Similarly, in 2015, the Warrior team had seven members with an average of 21 years of teaching experience, all of whom had some lesson study experience. However, in 2016, this Warrior team split into two groups, and Kate facilitated a group of five (including herself), two of whom were brand new teachers. In fact, this group was quite different from any group Kate had previously facilitated, since all of her prior lesson study cycles (including 2015) had included the core group of teachers who also attended the regional lesson study conference in 2008 and often shared facilitation duties with Kate.

In both cases, Elena and Kate facilitated very different groups in 2015 and 2016, with notable differences in teaching experience and lesson study experience. Each of the 2015 teams are composed of several experienced teachers who have practiced lesson study with one another for years, while in 2016, Elena and Kate facilitated teams with more teachers who are new to the profession and/or new to lesson study, with fewer veteran lesson study practitioners on their team. Differences between each facilitator’s teams made it possible to examine each TL’s agency

and facilitation across group contexts and identify the aspects of their facilitation that remained the same despite the changes in their group compositions.

Lesson Study Process

As described above, lesson study is practiced in multi-step cycles in which teams collectively research a topic related to student learning and teaching and design a research lesson to investigate student thinking around the selected topic. Within this basic premise, there is a wide range of variation in how the process may be organized and practiced. However, Elena and Kate’s teams follow a very similar lesson study process, with meetings of varying lengths held over a period several weeks, culminating in the research lesson and debrief. Tables 3 and 4 describe the length and topic of each meeting by team for 2015 and 2016. Shorter meetings were held after school and longer meetings were held on scheduled professional development days that lasted all-day or half-day.

Table 3. Lesson study process by team 2015

		<u>Riverside Team</u>		<u>Warrior Team</u>
	Length (min)	Topic	Length (min)	Topic
Intro	75	Discuss lesson study process; identify goals; choose topic	n/a*	n/a
Planning 1	80	Explore standard	40	Choose topic; review data; explore standard
Planning 2	320	Discuss research, developmental story	280	Discuss research, developmental story
Planning 3	80	Debate lesson situation	60	Debate lesson situation; choose task
Planning 4	160	Choose lesson task, discuss flow of lesson	65	Review lesson
Planning 5	80	Anticipate student responses	330	Anticipate student responses
Planning 6	60	Review and practice	55	Practice lesson

Table 3 – continued

	<u>Riverside Team</u>		<u>Warrior Team</u>	
	Length (min)	Topic	Length (min)	Topic
Research lesson	#	Research lesson and data collection	#	Research lesson and data collection
Debrief	65	Discuss research lesson	100	Discuss Research lesson
Total	15 h		15.5 h	

*Did not convene for introductory meeting.

Table 4: Lesson study process by team 2016

	<u>Riverside Team</u>		<u>Warrior Team</u>	
	Length (min)	Topic	Length (min)	Topic
Intro	120	Discuss lesson study process	n/a	n/a
Planning 1	320	Discuss research; identify goals; choose topic	320	Discuss research; choose topic; developmental story
Planning 2	120	Developmental story; choose lesson task	180	Review data; choose lesson task; discuss flow of lesson
Planning 3	120	Debate lesson situation, flow of lesson	180	Review lesson; anticipate student responses
Planning 4	120	Anticipate student responses	n/a	n/a
Planning 5	120	Review and practice lesson	n/a	n/a
Research lesson	#	Research lesson and data collection	#	Research lesson and data collection
Debrief 1		Discuss research lesson	110	Discuss research lesson; prepare reteach
Debrief 2	n/a	n/a	45	Discuss research lesson
Total	15 h		14 h	

One notable difference is that the Riverside team includes an introductory meeting each year in which Kate discusses the purpose and process of lesson study and assigns reading materials before the actual planning meetings begin. In 2016, the district encouraged lesson

study teams to follow a three-day model of lesson study. This was a model promoted in several districts across the state (Akiba & Wilkinson, 2016) in which teachers meet intensively for three days and then teach two research lessons in one day, the second of which is designed based on feedback from the first research lesson. While Kate's team followed this approach in 2016, Elena opted to not follow this model.

Otherwise, the overall process of lesson study for all four groups follows a very similar trajectory. In early planning meetings, the focus is on selecting and understanding a topic related to student learning. For example, in 2015, Elena's team focused on multiplication of a fraction by a fraction, while Kate's team focused on representing mixed fractions. Based on the selected topic, both teams read research related to the topic and engage in discussion of what each refers to as the "developmental story." In this task, teams draw on curriculum maps to understand the mathematical ideas that students will need to understand in order to engage in the selected topic. They also discuss how the selected topic will inform future understanding of mathematical ideas. The lesson is designed over multiple meetings, in which teachers debate potential lesson situations. Both teams use a lesson planning template that includes columns that prompt teachers to consider students' anticipated responses and how teachers will address those responses. Both teams also spend some time in each cycle actually practicing the tasks that students will be asked to complete during the lesson.

In addition to meeting lengths and focus, lesson study processes may also vary by the selection of the who teaches the research lesson and the class in which it will be taught. Some teams in Florida, for example, choose the teacher by drawing a name from a hat shortly before the research lesson. Both Kate and Elena approach this decision through discussion with their team, using criteria such as scheduling, the teachers' comfort level, and the selected topic, to

decide who should teach the research lesson. In each group, the conversation of who will teach emerged organically as the teams planned the lesson.

Overall, the lesson study process for Kate and Elena's groups share far more similarities than differences, and yet, our research team observed a notable divergence in the nature of conversations between groups. This oriented my analysis away from how the lesson study process shapes teachers' opportunities to learn to how conversations that occur across these processes shape opportunities to learn. Because the primary role of the lesson study facilitator is to guide these conversations, I drew upon multiple sources of data to better understand Elena and Kate's facilitation as the enactment of their agency.

Sources of Data

To answer my research question about how TLs exercise agency in lesson study, I relied on data collected over a four-year period as part of a larger project on lesson study in Florida. Sources of data include videos and transcriptions of planning meetings and debriefings, transcriptions of interviews, a teacher survey, written reflections, video and transcripts of research lessons, and documents, such as lesson plans and research articles, related to lesson study practice (see Table 5). Each facilitator also participated in a summer facilitator institute sponsored by the district in partnership with our research team. Video and transcripts from the institute were also analyzed, particularly instances in which Elena and Kate shared their facilitation experiences with other potential facilitators in the district. In an effort to promote lesson study at her school, Kate also organized an open house lesson study at her school in the spring of 2016, in which her team taught a public research lesson for all of the teachers in her school. Video and documents from the open house also informed my analysis. Although Kate facilitated this "cycle," I did not use this data to analyze her approach to facilitation, given the

uniqueness of the context of a public research lesson. Rather, this data was included in my analysis of Kate’s meanings related to lesson study. For each lesson study cycle and during the facilitator training institute, teachers completed a background survey where they reported their prior teaching experience, professional preparation, past experiences with leadership and professional development, and their prior lesson study experience. Also in each cycle, the team conducted teacher interviews, and, in 2015, a focus group interview at the end of each cycle. These were not analyzed explicitly (save for the TL interviews) for this project, but teachers’ commentary on Elena and Kate’s facilitation did inform my understanding of Kate and Elena as emergent and informal leaders.

Table 5. Data sources

	2014-15	2015-16	2017-18	Summer 2015
	Meeting 1	Meeting 1	TL Interview	(Both TLs)
	Meeting 2	Meeting 2		
	Meeting 3	Meeting 3		Facilitator
	Meeting 4	Research Lesson 1		Training
	Meeting 5	Debrief 1		Institute:
	Meeting 6	Research Lesson 2		
	Research Lesson	Debrief 2		Survey
	Debrief	Lesson Plan		Day 1
	Lesson Plan	TL Interview 1		Day 2
	TL Interview 1	TL Interview 2		Day 3
Warrior	TL Interview 2	Teacher		Research lesson
	Teacher Interviews	Interviews		Debrief
	Focus Group	Teacher survey		Feedback form
	Teacher survey	Documents		
	Reflections			
	Documents	Schoolwide LS:		
		Intro Meeting		
		Research lesson		
		Lesson Plan		
		Debrief		

Table 5 - continued

	2014-15	2015-16	2017-18	Summer 2015
Riverside	Intro Meeting	Meeting 1	TL Interview	
	Meeting 1	Meeting 2		
	Meeting 2	Meeting 3		
	Meeting 3	Meeting 4		
	Meeting 4	Meeting 5		
	Meeting 5	Debrief		
	Meeting 6	TL Interview 1		
	Debrief	TL Interview 2		
	Lesson Plan	Lesson Plan		
	TL Interview 1	Teacher		
	TL Interview 2	Interviews		
	Teacher Interviews	Teacher survey		
	Focus Group	Documents		
	Teacher survey			
	Reflections			
	Documents			

For each lesson study cycle, the research team conducted a mid- and post-cycle interview with each teacher leader to gather their impressions of the lesson study cycle and learn more about their lesson study experience and facilitation process. In previous analysis of these interviews, I sought to understand the motivations and values behind each TL’s lesson study practice. Based on my findings from these earlier rounds of analysis, I created an extensive, semi-structured interview protocol tailored to each teacher leader in which I sought to further probe their understanding of teaching, learning, and facilitating. In total, I analyzed 42 pages of interview transcripts for Kate and 47 pages of interview transcripts for Elena (single-spaced, 12-point Times New Roman font).

To understand how TLs’ agency shapes teachers’ opportunities to learn in lesson study, I analyzed planning meeting data, lesson plans, research lesson recordings, debriefing meetings, and all other data collected during two cycles of lesson study (per team) in the 2014-15 and 2015-16 school years. All meetings for these cycles were videotaped and transcribed as part of a

larger project on lesson study in Florida. Elena's team met for an average of 25 hours each cycle, and Kate's team met for an average of 19 hours each cycle.

The purpose of utilizing meeting and research lesson data was to move the analysis beyond teachers' perceptions of agency or the factors influencing teacher agency to the underexplored topic of what teacher agency looks like in practice in collaborative learning environments. Interview data was used primarily to inform my understanding of each TLs' meanings related to lesson study. As will be described below, analysis applied a sociocultural lens to explore TLs' agency at the level of meanings and teacher talk/action. I also analyzed meeting data to explore how the agency enacted by TLs shaped teachers' opportunities to learn in lesson study.

Data Analysis

In alignment with my research questions, my data analysis had three purposes: 1) to understand the nature of TLs' agency by analyzing the meanings they make related to their lesson study practice, 2) to understand the enactment of TLs' agency via their talk and actions as they facilitate lesson study, and 3) to identify the learning opportunities afforded by each TLs' facilitation. Each of these purposes required their own phase of data analysis, which will be described below.

To analyze data, I used the Nvivo12 Pro qualitative coding software. While analyzing key segments of planning meeting data, I also found it useful to export transcript excerpts to Microsoft Excel to create a simple, chart-style representation of talk turns with multiple codes and my notes. Throughout all phases of analysis, I relied heavily on memo writing to organize and elaborate on findings as they developed. To write memos, I would organize notes from a session of data analysis into a narrative loosely structured around the affordances and constraints

of that session's analysis. This served as a helpful way to reorient myself after breaks in analysis. More importantly, memos helped me to capture the "conceptual details" that integrated findings and described the nuances between cases (Corbin & Strauss, 1990, p. 10).

Phase 1: Meanings

I analyzed teachers' meanings related to lesson study as a way to understand the nature of their agency at a cognitive level. This focus reflects a view of agency that considers the meanings teachers make about action as key to understanding agency. To begin this analysis, I used Nvivo12 Pro software to perform open coding of TLs' interview, surveys, and written reflections to answer the question: What kinds of meanings do TLs make about their lesson study practice? This broad round of coding was primarily aimed at first identifying what concepts TLs discuss in relation to lesson study, or, said differently, the things that TLs make meanings about in relation to their lesson study practice. This coding process resulted in 35 codes.

In a second round of coding, I sought to refine these codes according to my definition of "meanings" as both the way TLs define key aspects related to their lesson study practice and the significance teachers attach to their lesson study practice. Therefore, in this round of coding I returned to my existing codes guided by the questions:

- What do TLs mean by this concept?
- Why is that concept significant for them?

For example, if a TL discussed the importance of teacher collaboration, I reviewed all that teachers' codes for collaboration to understand how she defined collaboration and/or why collaboration is significant or important to her. This round of coding helped me to develop a more cohesive definition of meanings of learning and teaching for each teacher.

Based on emerging themes, I reorganized and condensed those codes into two broader domains that I identified as most salient: meanings about student learning/teaching and meanings about teacher learning/facilitating. This resulted in 12 primary codes across both domains, representing 12 primary meanings of teaching and learning. In each category, meanings were further aggregated by whether they suggest a more traditional or constructivist view of teaching and learning. I aggregated codes according to these constructs based on the research reviewed in Chapter 2 about shifts in mathematics instruction and the type of teacher learning experiences needed to support these shifts. This was particularly relevant given the role that lesson study is assumed to play in supporting such shifts (Hiebert et al., 2002; Lewis et al., 2006) and justifies analysis of how the meanings TLs make about their lesson study participation and facilitation reflect (or not) constructivist shifts.

The final codes used for the domain of Meanings about Teaching and Student Learning are presented below in Table 6. The parent³ code representing a more traditional view of teaching and learning was labeled “Knowledge-giver/Teacher-centered” to describe an approach to teaching and learning in which knowledge is seen as being transmitted from someone with more knowledgeable about a given topic to someone with less knowledge. Freire (2007) used the metaphor of banking to describe (and criticize) how learning according to this meaning is conceptualized as “an act of depositing, in which the students are the depositories and the teacher is the depositor” (p. 27). Within this “parent” code, three “child” codes captured talk in which a specific type of meaning reflected a more traditional view of student learning and/or teaching. These were: meanings about tools and strategies, meanings about student struggle, and meanings about the purpose of classroom discourse.

³ The terms “parent” and “child” code reflect the terms for coding hierarchies used in the Nvivo12 software.

Table 6. Coding for meanings about teaching and student learning

Traditional: Knowledge-giver/ Teacher-centered		Constructivist: Mediator/Student-centered	
Tools & Strategies	Captures instances in which student learning is associated with building a repertoire of tools, skills and strategies to solve problems	Reasoning & Ideas	Captures instances in which student learning means applying prior knowledge to reason through ideas and/or make connections between concepts and strategies
Struggle	Captures instances in which student struggle means students have not yet figured out the correct or best strategy to get to the correct answer. (May be fixed by someone else telling you the correct answer or strategy.)	Struggle	Captures instances in which the role of struggle in student learning is described as an opportunity to deepen understanding between the connection of ideas and/or evaluate your own thinking about mathematical ideas
Exploration	Captures instance in which student exploration is described as opportunities for students to try different tools and strategies in order to select the best one.	Exploration	Captures instances in which student exploration is described as opportunities for students to make connections between ideas and problems and/or strategies.

Talk coded as “tools and strategies” within this domain captured instances in which a TLs’ talk suggested that student learning consists primarily of accumulating a repertoire of tools, skills, and strategies. Talk captured under this category may also explicitly or implicitly describe teaching as the “giving” of tools or strategies, where the focus is on transmission of knowledge, with little to no emphasis on how students construct knowledge using current understandings.

Talk coded as “student struggle” captured instances in which a TL described a view of student struggle in which a student does not yet know the correct answer or best strategy to get the correct answer. To describe differences in views of student struggle (between traditional and constructivist approaches), I found it helpful to consider the implied or described solution to

student struggle. Meanings of student struggle categorized under the “traditional” parent code generally view the resolution of student struggle as being told the correct answer or strategy or having the correct answer or strategy demonstrated. In other words, a more knowledgeable person fixes or corrects a student’s “not knowing” by transmitting their knowledge to the student.

Finally, talk coded as “student exploration” under the parent code of “Knowledge-giver/Teacher-centered” captured meanings of student exploration in which exploration is taken to mean students are shown or given multiple tools and strategies so that they can select the best one to solve a given problem.

In the domain of Student Learning and Teaching, another set of codes captured meanings that represent a more constructivist view of teaching and learning. These were labeled “Mediator/Student-centered” to describe an approach to teaching and learning in which students’ construction of knowledge takes primacy over teachers’ transmission of knowledge. The broad meaning of teaching according to this conception involves facilitating opportunities for students to build understanding through activity and interactions with the teacher and other students.

Talk coded as “Reasoning and Ideas” captured instances in which TLs’ talk reflected a meaning of learning that emphasizes applying prior understandings to reason through ideas. Talk coded in this category describes learning as a process of connecting prior understandings to new information, and the role of the teacher is seen as facilitating opportunities for students to make those connections. Included under this code are instances in which value is placed on reasoning processes instead of correct answers.

Talk coded as “Struggle” under the “Mediator/Student-centered” parent code captures instances in which student struggle is associated with deepening understanding by connecting

ideas. The solution to this type of struggle is not for teachers to tell students the correct answer but prompt them to further evaluate their thinking in relation to new ideas. According to this view, struggle is not negatively associated with “not knowing,” but rather with a process of coming to know more by evaluating and building upon prior understandings.

Similarly, talk coded as “exploration” in the constructivist category captures instances in which students have opportunities to “struggle” or explore the connections between new and prior ideas, problems, and strategies. This meaning of exploration emphasizes surfacing students’ understandings and misunderstandings and facilitating opportunities for students to build upon those ideas by testing and exploring conjectures.

Codes for the domain of Meanings about Teacher Learning and Facilitating are described in Table 7. Child codes in this domain were also aggregated by whether the meanings described in each code reflected a more constructivist or traditional view of teacher learning. The parent code representing more traditional meanings of teacher learning was labeled “Accumulation of Tools and Strategies” and included child codes for “struggle,” “talk,” and “tool/strategy focused.” The parent code representing more constructivist meanings was labeled “Coconstructed” and included the child codes “struggle, talk, and content-focused.”

Talk coded as “tool/strategy-focused” under the “traditional” parent code captures instances in which TLs’ talk suggests that teacher learning primarily means that teachers identify and accumulate new tools and strategies for teaching. Not included under this category are instances in which tools and strategies are problematized, evaluated, and/or tied to ideas of student learning. Rather, these codes capture instances in which the accumulation of tools/strategies is viewed as an end to itself, without connections made between strategies and broader learning ideas.

Table 7. Coding for meanings about teacher learning and facilitating

Traditional: Accumulation of tools & strategies		Constructivist: Coconstructing understandings	
Tools & Strategies	Captures instances in which teacher learning means identifying effective tools and strategies for teaching.	Content-focused	Captures instances in which teacher learning means exploration of content (as it relates to teaching)
Struggle	Captures instances in which teacher struggle is described as an opportunity to correct a misunderstanding or seek out a new tool or strategy	Struggle	Captures instances in which teacher struggle is described as opportunities to deepen understanding (often of the relationship between mathematical ideas and/or instruction)
Talk	Capture instances in which teacher talk in learning is described as opportunities to exchange tips, tools, and strategies	Talk	Captures instances in which teacher talk during learning means collective exploration and exchange of ideas

Talk coded as “struggle” under the “traditional” parent code captures instances in which TLs’ talk suggested a meaning of teacher struggle, in which teacher’s struggle means teachers do not yet know something that may be quickly found out by consulting a colleague, administrator, or someone with more knowledgeable about a particular topic. Common examples of talk coded under this category include references to teachers not knowing the definition of a word or the meaning of a standard. Like with student struggle, resolution of this kind of struggle may be instantaneous, since teachers only need to be told the piece of information they are missing.

Finally, traditional meanings of “talk” capture instances in which TLs’ descriptions of the purpose of teacher talk in lesson study emphasizes the identification and exchange of tips, tools, and strategies, with little exploration of the reasons behind the use of particular approaches. These codes may reflect a meaning of talk as the sharing of ideas, without reference to building

upon one another's ideas or critically evaluating ideas. These codes may include instances in which TLs' talk suggest that the facilitator's role is to facilitate the exchange of ideas, tips, or strategies.

Under the constructivist category of Meanings about Teacher Learning and Facilitating, talk coded as "content-focused" include all instances in which a TL expressed a meaning of teacher learning in which TLs examine their own understanding of content and how that relates to their teaching. While a content-focused meaning of teacher learning may not inherently reflect a constructivist view, my analysis did not uncover any instances in which a TL suggested a meaning of teacher learning focused on content that did not *reflect* a constructivist approach.

Meanings coded as "struggle" in the "constructivist" category of teacher learning/facilitating reflect a view of teacher struggle in which teachers discuss and evaluate current understandings in light of new information that may conflict with those understandings. Teacher struggle according to this definition is not a problem to be fixed, but an opportunity to deepen understanding through a process of reflection and inquiry.

Similarly, teacher "talk" in this category captures instances in which TLs suggest that teachers' talk in lesson study means an opportunity to engage in the exploration of ideas, where exploration is defined as discussing the reasons behind particular ideas, strategies, or approaches to teaching. Also included within this code are instances in which TLs' talk suggests that the role of the facilitator is to probe exploration and evaluation of ideas.

By noting meanings that followed a similar theme and were frequently observed, I was able to develop a general view of student learning/teaching and teacher learning/facilitating for each teacher and identify key meanings associated with those views. Perhaps reflecting the dynamic nature of meanings, each TL expressed meanings that were at times contradictory to

meanings they expressed elsewhere in the data. To make sense of these contradictions, I employed several strategies. First, I revisited negative instances in the context of larger blocks of talk to ensure that my coding accurately reflected the intended meaning. I also allowed some talks to be coded as reflecting both a constructivist and traditional view of teaching and learning, since my intention was never to dichotomously describe TLs' meanings, but rather to capture where their meanings primarily fell along a traditional/constructivist continuum. Finally, throughout this and all phases of the coding process, I was able to share my coding with and receive feedback from the lesson study research team, who also helped me talk through negative instances and clarify my coding scheme.

Phase 2: Opportunities to Learn

To identify teachers' opportunities to learn, I drew from research on the kind of learning experiences that support teachers' learning in reform contexts. As described in Chapter 2, this literature identifies the importance of opportunities for teachers to experience dissonance, or cognitive conflict, related to their current understandings of teaching and learning and engage in dissonance resolving through a process of evaluating and connecting current understandings with new evidence (Ball & Cohen, 1999; Cochran-Smith & Lytle, 1999; Opfer & Pedder, 2011; Thompson & Zeulli, 1999). This approach informs a definition of teachers' opportunities to learn as opportunities to engage in dissonance resolving related to problems or issues of practice. In alignment with my sociocultural approach to understanding teacher agency, this definition sees dissonance resolving opportunities as potential moments for teachers to shape new meanings related to teaching and learning as they evaluate current meanings and understandings in light of new evidence.

Thus, to identify opportunities to learn, I searched planning meeting transcripts for conversations in which competing ideas, meanings, or understandings emerged, considering these as potential sources of dissonance. Interestingly, I found that while in each lesson study cycle, multiple sources of dissonance may develop, each cycle was defined by the repeated re-emergence of competing ideas around a particular idea or approach. I took this as strong evidence of potential for teachers to experience and learn from dissonance related to the debated topic and focused my analysis on key episodes from each cycle in which that potential source of dissonance surfaced and resurfaced. I defined key episodes as moments in which competing ideas temporarily composed the primary topic of conversation. I exported each of these key episodes into an excel spreadsheet to create what Horn and Little (2010) described as a *conversation map*. In my case, this initially consisted of a chart marking divergent ideas and narratively describing their variation. In the next round of analysis, this simple chart was expanded upon to investigate how facilitators shape opportunities to learn.

Phase 3: Enactment/Facilitation

Having identified teachers' opportunities to learn, I then sought to understand how TLs' facilitation helped to shape—support or hinder—those opportunities. To code facilitators' talk, I returned to my conversation maps of key episodes of potential dissonance guided by the questions:

- What seems to be the purpose of facilitator talk during this conversation?
- How does facilitator talk in this task reflect meanings about teaching/student learning and/or teacher learning?

This first round of this analysis consisted of a brief narrative description of the purpose of a talk turn (in one column) and a phrase/phrases describing any meanings about teaching and learning

suggested by the talk turn (in another column). To better understand how to classify the relationship between identified facilitator moves and opportunities to learn, I revisited literature on teachers' talk and professional learning. Comparing this literature to my findings, I refined my descriptions of the purpose of talk into two categories, partially informed by Slavit, Nelson, and Deuel's (2013) descriptions of dialogical stances towards student-learning data:

1. Procedural/clarifying: Describes facilitator moves focused on moving the conversation forward and/or clarifying *what* should be done without consideration of the beliefs and assumptions underlying an approach.
 - a. Glossing over: Describes facilitator moves that minimize cognitive conflict by glossing over or failing to acknowledge differences between ideas (Thompson & Zeulli, 1999)
 - b. Sharing-not connected: Describes facilitator moves that share an experience or anecdote without clearly connecting it to a broader meaning of teaching and learning.
 - c. Prompting-what: Describes facilitator moves that prompt teachers to decide what to do, clarify what they mean, or share what they think should be done.
2. Building/Connecting: Describes facilitator moves that build on other teachers' ideas and either explicitly connect those ideas to other ideas or evidence or create opportunities for teachers to connect ideas and/or evidence.
 - a. Reframing⁴: Describes facilitator moves that reframe problems and concerns by *connecting* them to different meanings related to teaching and learning (Bannister, 2015).

⁴ Although talk aimed at "reframing" may also be used in ways that reflect procedural/clarifying goals, all talk coded as "procedural-reframing" also fell into the category of "glossing over," so these codes were collapsed.

- b. Sharing-connected: Describes facilitator moves that share an experience or anecdote with the clear purpose of connecting it to a broader goal/idea.
- c. Prompting-why: Describes facilitator moves that prompt teachers to discuss why to use a certain strategy, why a certain approach is valuable, or why they think students may/may not struggle.

While I found that the broader categories of procedural/clarifying and building/connecting captured the purpose of most facilitator moves, defining specific purposes such as glossing over, sharing (connected/not connected), and reframing helped further capture nuances within each approach. This coding illuminated notable differences in each facilitator's approach and indicated ways that facilitation reflected TLs' meanings of teaching and learning.

Comparing Cases

Finally, the last part of my analysis was aimed at identifying and explaining similarities and differences between the two cases. Because analysis of each case occurred concurrently throughout all phases of the analysis, comparison served as a useful way to interpret and understand my data throughout the analysis. However, in this final phase, I was especially interested in systematically comparing cases to identify themes related to how the nature and agency of TLs' agency shapes opportunities to learn. Cross-case analysis was facilitated by first writing detailed within-case memos that I used to create an outline of the defining characteristics of the nature and enactment of each teacher leader's agency, as well as opportunities to learn within each group. Graphic representations of the data were also useful for comparing cases in this phase, especially concept maps and Venn diagrams. These activities allowed me to identify common themes and served as a reference point to return to the data, seek for negative examples

that might disconfirm those themes, and strengthen the nuanced understanding of differences and similarities between groups (Johnson & Christensen, 2008).

Subjectivities

My study of this topic was especially informed, and in some ways limited, by my experiences as a former teacher and current researcher of lesson study in Florida. My experiences as a teacher sensitized me to the challenges I perceived for the study's participants and made it difficult or even impossible to objectively describe teachers' actions. This was particularly so because I was keenly aware of the multiple, competing demands that influence teachers' actions. Because both Kate and Elena each have over twenty years more teaching experience than I have, I recognized and respected the value of their experience and expertise and often found myself slipping into a role of learning *from* their meanings and facilitation instead of learning *about* their meanings and facilitation. This slippage made it challenging to take the critical perspective to their agency that I described as necessary to better understand how to support teachers' agency.

Relatedly, my role as a researcher in the multi-year lesson study project meant that I spent a considerable amount of time interacting with each TL and her teams as I observed their meetings and classroom practices and conducted interviews. Over the course of these interactions and observations, I naturally developed conceptions about each TL, both personal and professional. While on the one hand, these interactions helped me to develop a more nuanced understanding of each TL, they also resulted in the sort of subjective judgements that occur as the result of compatibility with particular personality types and shared experiences.

To counteract each of these biases and any others that might color my analysis or interpretation, I attempted to maintain a consistent focus on the theoretical premises that guided

my analysis. I also sought out negative instances to counteract all major findings and took advantage of the diverse perspectives of my research team to receive feedback and invite alternative interpretations of my data.

Conclusion

This study employed a qualitative comparative case study design to add to our growing knowledge of teacher agency in instructional reform by exploring the nuances of the nature and enactment of TLs' agency as they facilitate lesson study and shape fellow teachers' opportunities to learn. By comparing the agency of two TLs' as they facilitate lesson study groups within very similar contexts, the design of this study illuminates ways that teacher agency may vary and lead to differences in opportunities to learn. This type of study was not only warranted for its uniqueness, but for what it might contribute to our knowledge of the relationship between teacher leadership, teachers' agency, and collaborative professional learning in instructional reform contexts.

CHAPTER 4

FINDINGS

This chapter describes findings related to the overall research question of how TLs exercise agency in lesson study and the two subquestions:

1. What meanings do teacher leaders construct regarding their lesson study practice?
2. How do those meanings shape teachers' opportunities to learn in lesson study?

Findings are organized by research question so that thematic comparison of each teacher leader can illuminate differences in TL meanings' and how those meanings shape teachers' opportunities to learn within each group. Broadly, I explain that TLs exercise agency in lesson study by enacting distinct meanings of teaching and learning that shape (and are shaped by) their approach to facilitation.

In the case of Elena, her meanings related to lesson study reflect the constructivist-inspired approaches to teaching and learning advocated by research and some recent policies aimed at instructional improvement (Ball & Cohen, 1999; Richardson, 1997). In her facilitation, Elena's strong vision of what teaching and learning should look like serves as a source of expertise that guides her to notice and leverage moments of cognitive dissonance as an opportunity to deepen teacher learning in her lesson study group. She facilitates conversations that create opportunities for teachers to shift and deepen their understanding of teaching and student learning as they resolve dissonance by connecting their current understandings to ideas and information shared during lesson study. In the case of Kate, her meanings related to lesson study reflect a fusion of traditional and constructivist approaches. Kate views learning as the accumulation of tools and strategies to solve problems, and over the course of her ten years of lesson study practice, she has accumulated constructivist tools and strategies without fully

shifting her view of learning to reflect the constructivist meanings undergirding mathematics reform. Importantly, her meanings retain a focus on solutions instead of connecting ideas to deepen or shift understanding. Thus, when potential moments of dissonance surface in Kate's lesson study groups that question teachers' beliefs about teaching or learning, she responds by focusing on the effectiveness of tools and strategies to guide students to the correct answers, instead of engaging teachers in resolving the dissonance by connecting new and old understandings and information. This shapes opportunities to learn characterized by evaluation of how well a particular strategy helps students identify the correct solution, but it limits teachers' opportunity to explore how and why certain approaches to teaching and learning may support students' conceptual understanding.

RQ1: Meanings

To understand the ideas and motivations that undergird and compose TL's agency, I investigated the meanings that teachers make in relation to their lesson study practice. This analysis revealed four types of meanings across two domains that stood out as particularly salient for both teachers. They are: 1) meanings about student struggle and 2) meanings about classroom discourse, which make up the domain of student learning/teaching, and 3) meanings about teacher struggle, and 4) meanings about teacher group discourse, which make up the domain of teacher learning/facilitating. These meanings related to and significantly contributed to each teacher's general view of student learning/teaching and teacher learning/facilitating.

Although I identified notable divergences in each teacher's approach to: (1) student learning and teaching and (2) teacher learning and facilitating, on the surface their approach to each—and lesson study's role within that—seems quite similar. For example, both teachers make frequent reference to constructivist learning ideas associated with trends in mathematics reforms

such as “student exploration,” “discovery,” “student struggle,” “inquiry lesson,” and “teaching for understanding.” However, upon closer analysis, particularly of planning meetings and follow-up interviews that probed teachers’ understandings of these concepts, it became apparent that each teacher had very distinct ideas about what those concepts meant. These differences in meanings are an important starting point to understanding each TL’s agency in relation to teachers’ opportunities to learn.

Meanings About Teaching and Student Learning

Because the broad purpose of lesson study is to improve student learning by improving teaching, the meanings TLs construct about the kind of student learning and teaching that characterizes instructional improvement should influence how they engage other teachers in learning through lesson study. My analysis revealed notable but nuanced differences in each TLs’ meanings about student learning/teaching. Elena’s meanings associated with student learning and teaching largely reflect the influence of constructivist teaching ideologies, where the role of the mathematics teacher is to facilitate learning by providing opportunities to explore connections between mathematical ideas and strategies and between new information and existing knowledge. Kate’s meanings, on the other hand, are somewhere in between traditional and constructivist approaches, where, broadly, the teacher’s role is to model the use of multiple strategies and tools that students can practice and use to solve mathematical problems. These strategies and tools have the potentials to reveal and deepen students’ mathematical understanding, yet Kate sees them simply as methods to guide students to the correct answers without recognizing the connections between ideas and strategies. Over the course of my analysis, I found that TLs’ views on student struggle and the purpose of classroom discourse provided key insights into the differences between each TL’s meanings of student learning and

teaching. These differences are detailed in Table 8 below to build the case that differences in these meanings are a key aspect of TLs’ agency that shapes different opportunities to learn in each TL’s lesson study group.

To explore *how* these meanings were shaped based on their prior experience and beliefs, I begin each section with a brief description of how Elena and Kate describe the role of lesson study in influencing their current approach to teaching. Their descriptions suggest that, for each, lesson study was as a key factor in shaping their meanings of student learning and teaching. Thus, while analysis focuses primarily on how these meanings shape their approach to facilitation, it is important to note that these meanings have also been shaped by their participation in and facilitation of lesson study.

Table 8: Meanings about student learning and teaching.

	Elena	Kate
General view	Student learning occurs when students make connections between mathematical ideas, strategies, and solutions. The teachers’ role is to provide opportunities for students to explore those connections and orchestrate discussions that build off students’ prior knowledge and developing ideas.	Student learning occurs when teachers demonstrate that there are multiple tools and strategies that can be used to solve problems. The teachers’ role is to model the use of different strategies and tools and give students opportunities to practice using them.
Struggle	Struggle means that students consider and work to resolve dissonances between previous understandings and new evidence. Struggle is a key part of learning because it allows students to analyze their own thinking and use their ideas to deepen understanding.	Struggle often means students have not yet figured out the correct or best strategy to get to the correct answer. Struggle is a key part of learning, because it helps students identify what they don’t know so that they can figure it out.

Table 8 - continued

	Elena	Kate
Classroom Discourse	Classroom talk means an opportunity to share, evaluate, and apply mathematical ideas. Interactions between teachers and students and among students allow students to evaluate and build off one another's ideas to resolve dissonances between previous understandings and new information.	Classroom talk means an opportunity to identify and correct incorrect answers. Interactions between teachers and students and among students help students find the correct answer or best strategy to solve a problem.

Elena. A recurring theme in Elena's discussion of lesson study is that she credits lesson study as helping her to develop the competencies needed to teach mathematics for understanding. Her frequent references to "teaching for understanding" emphasize the importance of helping students to understand mathematical concepts, not just memorize procedures for producing the correct answer. Her motivation to change her teaching to align with this approach stemmed from a watershed moment as part of professional development workshop (also independently pursued) in which a professor of mathematics education demonstrated the connection between mathematical ideas from 2nd grade to algebra. This caused Elena to realize that her approach to teaching mathematics did not enable students to make those connections—that she herself did not know how to make those connections. She explained, "I had never thought of deeply connecting math ideas all the way from second grade to middle school. But he did that one idea, and it was like, 'What else is out there that you can connect in that way and help children build understanding so they can reason?'" (Interview, 2018). For Elena, lesson study practice is a way to continue the learning that began at that workshop: "I was looking, when I started this journey,

for ways to deepen my own math knowledge so that I could help children see and build those connections through math” (Interview, 2018).

Elena’s description of the way lesson study has shaped her practice sounds very much aligned with the type of changes in instruction envisioned by constructivist-inspired reforms (Ball & Cohen, 1999) and further analysis of the meanings she associates with lesson study suggest this is indeed the case. Collectively, these meanings compose a general view of student learning and teaching that emphasizes reasoning to make connections between ideas. In this view, the mathematics teachers’ role is to provide opportunities for students to explore those connections and orchestrate discussions that build off students’ knowledge and developing ideas. This general view contributes to particular meanings for student struggle and classroom discourse that are helpful to understanding the nuances of Elena’s meaning of student learning/teaching and, eventually, how it differs from Kate’s in ways significant to their approach to instructional improvement.

Meanings about student struggle. For Elena, struggle means that students consider and work to resolve dissonances between previous understandings of mathematics and new evidence, such as mathematical ideas, tools, or strategies. Student struggle according to this meaning is an opportunity for students to analyze their own thinking and use their ideas to deepen understanding. In fact, Elena describes struggle as not only important to learning, but as learning itself:

I tell my students now—they get frustrated when they don’t get the answer or I don’t give them the answer, and my response is, ‘if you’re not struggling just a little bit, then you’re not learning. You’re just practicing something you already know. Struggling is a highly valued experience in this classroom, because it tells us you’re learning.’ That’s a

common conversation with kids, because they get frustrated with the struggle, and just ‘tell me’ kind of stuff. Helping them to understand that the learning is in the struggle, as you struggle, you learn, and you get that ‘aha.’ That’s a good thing, that’s a good moment. It’s funny. I heard a kid just say it the other day to one of the other kids—a fifth grader said to one of my fourth graders: ‘She doesn’t care what you’re answer is. She just wants to know what you’re thinking.’ [Laughs.] And I was like, ‘yeah. That’s about right!’ At that moment, it was not the final answer, it’s what’s happening with the struggle. What are you thinking? Let’s evaluate that. And yeah, I think that’s true all the way around. If you don’t struggle, I’m not too sure you’re learning. (Interview, 2018)

In the anecdote about the fifth grader, we see Elena associates struggle with thinking and describe thinking (instead of correctness of the answer) as something that can be evaluated as a part of learning. This view of struggle is consistent with Elena’s general view of student learning as synthesizing, reasoning, and creating knowledge from previous understandings:

I value the ability to reason very highly. I want my children to be able to reason. I think today there’s a lot of information and knowledge out there, and I can’t expect children to know or people to know all information and all knowledge, so what you’ve got to do is have enough knowledge that you can put together pieces of knowledge and solve a problem. I highly value that as the job of education. I think the process of discovering, of putting together pieces, ideas—that process is an important idea for our children to learn how to do. (Interview, 2018)

This comment suggests that resolution of struggle emanates from the students as they “put together pieces of knowledge and solve a problem.” This means that the teacher’s role is to create situations conducive to that kind problem solving and guide students through their own

process of evaluating, reasoning, and integrating. For Elena, learning how to do this is a central motivator behind her practice.

Combining these ideas, we can see that lesson study for Elena is a means to learn how to support what has been described elsewhere as students' "productive struggle," or attempts to make sense of mathematical ideas (Warshauer, 2015). Hiebert and Grouws (2007) described this kind of struggle as "restructuring one's mental connections in more powerful ways" and tracing the idea's constructivist roots, identified it as a key feature for promoting students' conceptual development of mathematics. In fact, Elena's view of struggle essentially defines struggle as a particular type of thinking, and her definition sounds very much like the definition of thinking described by Thompson and Zeuli (1999) as the "inner intent" and "essential point" of current reforms:

By "think," we mean that students must actively try to solve problems, resolve dissonances between the way they initially understand a phenomenon and new evidence that challenges that understanding, put collections of facts or observations together into patterns, make and test conjectures, and build lines of reasoning about why claims are or are not true. Such thinking is generative. It literally creates understanding in the mind of the thinker (p. 346).

This definition illustrates how Elena's meaning of struggle in student learning strongly aligns with the vision of current reforms. Her view of struggle has specific implications for the meaning Elena attributes to discourse in student learning, and together her views of struggle and classroom discourse form an important aspect of the nature of her agency in lesson study.

Meanings about classroom discourse. Another way to understand the meanings Elena makes about student learning/teaching concerns the meanings she makes about the purpose of

classroom discourse, or talk between teachers and students and between students and students. Both Elena and Kate make frequent mention of ways that lesson study has both influenced the way they talk and interact with students and the way they have learned to listen and respond to students' talk. However, their meanings of classroom discourse differ in significant ways. Like her view of student struggle, Elena's meanings related to classroom discourse align with constructivist reform ideas about the kind of talk that should occur in mathematics classrooms.

For Elena, classroom discourse is an opportunity to surface, share, evaluate, discuss, and apply mathematical ideas. In the following interview excerpt where Elena defines what she means by teaching for discovery, she succinctly describes an approach to classroom discourse that she consistently espouses in interviews and planning meetings:

For me a discovery lesson is, you present a situation that children can understand. They can enter that situation. They can understand it well enough to play around with the ideas. And if they can understand the context and understand the parts of the conversation well enough to play around with it, the kids can play and discover—I'm saying play—*explore* and discover with those ideas, and then you come back together as a group and let them present what they discovered, and then it's your job as a teacher to focus on the ideas that you want them to learn, that you expect them to learn, so you end up guiding that conversation, and that becomes the summary of the lesson. (Interview, 2018)

Here, we can see that Elena views the role of the teacher in classroom discourse as guiding conversations in ways that allows students to connect their "discoveries" with the mathematical ideas underpinning the lesson. Student conversations with one another are described as "play" and "exploration" as they problem solve about a given situation.

Elena’s descriptions of the relationship between lesson study and classroom talk further illuminate Elena’s view of the purpose of classroom discourse. For Elena, lesson study is not only a way for her to learn how to surface and guide student ideas in discussion, but it is an opportunity to *actually* surface student ideas via the research lesson and discuss those ideas—and implications for instruction— with her lesson study group. For example, reflecting on the success of a research lesson, she explains:

I think these students, this lesson brought out the ability of these students to communicate. These were first graders. They are six years old. And they were talking math extremely well. They were very comfortable in trying to explain their ideas. Very few of them just did the [shrugs her shoulders] or “I just did it,” “It just happened.” They were reaching to communicate their ideas. That’s the climate in the classroom, that’s what that teacher has built, but this lesson brought out their ability to communicate and probably helped develop it in some way. That’s one of the benefits I saw for this lesson and these children. (Interview, 2016)

In this example, we see that Elena values “talking math,” which she defines as students’ explaining their ideas and attributes to a classroom culture built by the teacher. Later in the interview, while praising the teacher who taught the research lesson, she further points to the teachers’ role in surfacing these ideas:

I thought [the teacher] did a great job with her questioning. She was constantly asking them: “Why did you do this? What happened to you? Why did you do that?” So I think [the teacher] with her questioning pushed the children to reason about the numbers, to reason about what was going on. (Interview, 2016)

This comment shows the importance Elena assigns to teachers asking probing questions, where the purpose of those questions is to “push” students to reason about mathematics. Applying the definition of thinking/struggle presented above, she praised this teacher’s questioning as an opportunity for students to surface their ideas and evaluate their thinking. The surfacing of previous understandings creates the potential for those ideas to be considered in light of new evidence, setting the stage for the dissonance that Elena associates with the kind of student struggle she sees as key to learning.

Elena’s reflection on that lesson also shows that she not only sees the surfacing of student ideas as valuable for students’ learning but also for teachers’ learning. In a separate interview about another lesson study cycle, Elena explains that surfacing student ideas via the research lesson is a way to build professional knowledge about teaching and learning:

I think the discussion today, if we were to address this topic again, I think we would be able to come up with a unit at this point in time, because we listened to children’s understanding of this idea and we have the opportunity to speak with other professionals and their ideas about it, about the children’s reaction.’ (Interview, 2015)

This comment illustrates how Elena not only sees classroom talk as a way to surface and leverage student ideas in discussion, but, in the context of a research lesson, as a way for teachers to build knowledge about teaching mathematics by investigating the student thinking surfaced in class discussions. In fact, in this comment, she is specifically suggesting that the sequence of instruction around a particular mathematics topic should be determined by how students respond to and connect mathematical ideas related to the topic.

Thus, like her view of student struggle, Elena’s view of classroom discourse is strongly aligned with the constructivist-inspired vision of mathematics instruction promoted in current

reforms (Ball & Cohen, 1999; Core Standards Website, 2018; NCTM, 2018; Wilson et al., 2017). Classroom discourse is a means for students to generate knowledge about mathematics as they interact with fellow students and teachers. The teachers' role is to create moments of disequilibrium between previous understandings and new evidence and guide conversations in ways that help students to make connections between mathematical ideas and strategies. In the process, new knowledge may be generated for teachers too. Combined with her view of student struggle, Elena's meaning of classroom discourse composes a general view of student learning/teaching that I argue is a key aspect of the nature of Elena's agency. Eventually, I suggest that Elena's meanings of student learning and teaching relate to her meanings of teacher learning/facilitating in a way that shapes her facilitation of lesson study and teachers' opportunities to learn in her lesson study groups. However, first, I describe the results of my analysis of Kate's meanings of student learning/teaching to highlight key differences in their approach.

Kate. Like Elena, Kate describes the way she teaches now as “profoundly different” because of what she has learned through her lesson study practice. She describes these changes as major a shift away from traditional approaches to teaching towards a more constructivist approach and credits lesson study for helping her to notice student thinking, allow students time to struggle and think during lessons, and, like Elena, teach for mathematical understanding. For example, speaking about how her teaching has changed via lesson study, Kate explains,

Through lesson study, that has also helped me to feel like, you know what. If they get it--they're going to get it. I'm going to try to find a way. There are all the different ways. My hardest thing was to say that it's okay for them to struggle. I always wanted to go there and help them: “Oh. Don't struggle.” But now I relish the struggle, and that's the

biggest change in the way I teach now. When they struggle, I'm so happy. (Interview, Spring 2018)

In another comment from a few years prior, Kate makes a similar statement about how lesson study has changed her approach to classroom discourse:

And what I've learned a lot from lesson study, that's really so important, is to listen to kids, how they speak. Because they have taught me so much about the way I teach, by listening to them talk. I go around each group, and I write things down that they say. I got a very good handle of who says what now, because I listen to my students talk to each other. And before, I was a teacher who never allowed extra talking to each other. I didn't know that was so valuable. And lesson study taught me how valuable it is for students to talk to each other, and for students to learn from each other. (Interview, Spring 2015)

These comments indeed suggest that Kate has shifted to a more constructivist approach to teaching via her lesson study practice. However, my analysis of the meanings Kate attributes to her lesson study practice and their manifestation in group conversations show that although lesson study is a way for Kate to explore constructivist teaching ideas, she has not fully shifted her teaching to a constructivist approach.

Instead, Kate's approach to student learning/teaching and teacher learning/facilitating reflects a unique view that fuses constructivist and traditional approaches. Her general view of student learning/teaching sees student understanding of mathematics as emerging from classroom interactions in which teachers and/or students model multiple correct ways to solve a problem. While, in Kate's view, students may sometimes explore multiple ways to reach a solution, the emphasis remains on finding an effective procedure to reach the correct answer. What is *not* emphasized in Kate's meanings of student learning/teaching is conceptual

connections between ideas and strategies and how they may be built upon to enhance understanding. Exploring Kate's meanings related to student struggle and classroom discourse further illuminates how her meanings of student learning/teaching reflect a fusion of constructivist and traditional approaches that shapes her approach to facilitation and her group's learning opportunities in lesson study.

Meanings about student struggle. In many ways, the way Kate talks about student struggle sounds very much like how Elena's describes student struggle. In the quote from above, for example, Kate describes student struggle as something positive, and, like Elena, associates it with student thinking/learning. However, a closer analysis, particularly of the sources and solutions Kate assigns to student struggle, suggests Kate's meaning of student struggle differs significantly from Elena's. For Kate, student struggle means that students have not yet figured out the correct answer and are working on a way to find a solution. This is often attributed to teaching—either students have not been taught a particular idea or strategy yet or the way they were taught was not adequate—but struggle may also emerge from a student mindset in which they expect instant answers. The teacher's role in relation to student struggle, then, is to identify the strategy or tool that may help students get to the correct answer and give students time, motivation, and contexts to attempt to find solutions. Several aspects of this are exemplified in the following quote, in which Kate has just been asked about the role of struggle in student learning:

For me, it teaches a lot of skills: perseverance, thinking through a situation. I have kids who won't even read the question and say, 'I don't get this.' It's just ingrained. Right away. 'Did you even read the question?' 'Well, no.' So I think it's important to make them think and have some independent think time, and then I think it's really important to

have kids discuss and talk about it and struggle through it together and get ideas from each other, then explain why they are doing it. Because sometimes the way they explain it to their peers compared to the way I explain it—sometimes a kid can say it in words and some other kid will go, “aaah.” So when you struggle in math, it really develops your mental muscle, and I think kids nowadays don’t have any mental muscle. Everything is we want it right now. Sometimes you got to work for something. It just teaches all problem-solving skills, not just in math, but in life, before you jump right in and solve their problem (Interview, Spring 2018).

Here again, much like Elena, we see that Kate associates struggle with thinking. However, in this comment we also see evidence that struggle means reading the question and thinking about the answer, perhaps talking it through with a peer, and asking the teacher for help. Implicit in many of Kate’s mentions of student struggle is the idea that struggle is what happens before students get the correct answer—either from a fellow student or the teacher. For example, in the statement about why she relishes struggle, she says of students, “they’re going to get it. I’m going to try and find a way. There are all the different ways.” In a similar comment, she says, “that was my hardest thing too. Was to let go and let kids struggle and let kids *figure it out*, so I think that for all of us who are just natural-born helpers, that’s the hardest thing.” Elsewhere, she says, “if I am free and let them think, then they are somehow going to get this answer by some way.” These comments suggest that, for Kate, struggle means that students figure out the answer or think through a solution, but the emphasis is on identifying a solution and not the process of synthesizing, evaluating, and reasoning that might precedes the correct answer.

This is subtly but notably different from Elena’s view of student struggle as surfacing and evaluating student thinking so that students can build on their own ideas and others’ ideas. One

way to see this difference is by considering how Kate describes the resolution of student struggle. Where Elena largely describes solutions as emanating from students as they analyze their own thinking, Kate's descriptions of resolutions usually suggest that either the teacher or a student will solve the problem. Consider, for example, the above quote where she says, "I'm going to try and find a way" or where she explains that "sometimes a kid can say it in words and some other kid will go, 'aaah.'" Both examples suggest that struggle can be fixed by someone else. This is further illuminated by analyzing Kate's meanings about the purpose of classroom discourse.

Meanings about the purpose of classroom discourse. The purpose of classroom discourse was also a key theme in Kate's discussion of lesson study. On several occasions, Kate describes how lesson study has changed the way she interacts with students in her classroom. My analysis of what she means by this suggests that Kate sees the purpose of classroom discourse as an opportunity to evaluate student understanding and, especially, identify student mistakes as they talk to one another and fix those mistakes as the teacher talks to students or as students talk to students.

For example, in the following excerpt where Kate discusses one way that lesson study has changed her approach to classroom discourse, we see evidence that she sees student-student talk as a way for students to teach and correct each other:

Now I do something when they talk to each other, about multiple times a day now, I really like to listen to what they say to each other. You know, it's one thing when they say it to me, the same kid that raises his hand all the time, but if—I really have a hard class this year, who are really, really struggling. And when I listen to them give ideas to each other, and how they go about teaching each other, and how they go about correcting

each other, or if they are both lost together—you know, that’s just as powerful, to see them both lost together, and to see what they’re saying, so I can talk about that as well as the successful ones. (Interview, Spring 2015)

This comment also provides insight into the role of the teacher in classroom discourse. In the sentence about students who are “lost together,” Kate suggests that she can listen to students’ talk, so that she can address misunderstandings. This idea is clarified below:

You can listen to what they say, and see what they think, and now you can tweak your words based on what you know they’re thinking.’ Or you can find a misconception now, based on how you hear them think. (Interview, Spring 2016)

The subtle difference between Elena and Kate’s approach to classroom discourse is that Elena sees classroom conversations as opportunities for students to surface and connect ideas and strategies by talking with their peers and through the teachers’ strategically orchestrated conversations. Kate’s descriptions of classroom discourse show that she sees it as more oriented towards identifying and fixing misconceptions. Said differently, Kate does not intentionally aim to foster cognitive dissonance among her students so that they can investigate its sources and build on another’s ideas to generate and deepen understanding. Instead, she sees competing ideas—right answer versus wrong answer or strategy A versus strategy B—as opportunities to either identify the “best” option or demonstrate that there may be more than one good option. Missing from this approach is a more in-depth discussion of the relationship between ideas, answers, and strategies. For this reason, I describe Kate’s meanings of student learning/teaching as a fusion of constructivist and traditional approaches because she has largely, but not fully, embraced a meaning of teaching and learning that reflects constructivist-inspired visions of teaching.

That teachers may respond to learning about instructional improvement by fusing old ideas with new ideas has been well-documented in teacher professional learning literature (Cohen, 1990; Cuban, 1984; Thompson & Zeulli, 1999). In one of the clearest examples, Cohen (1990) describes the case of Mrs. Oublier, whose “classes present an extraordinary mélange of traditional and novel approaches to math instruction” (p. 312). Although Mrs. Oublier claims to have completely changed her approach to instruction to reflect new ideas of teaching mathematics for understanding after attending a workshop on her state’s new approach to mathematics teaching, Cohen finds that she is actually implementing some new, constructivist-inspired strategies, while largely leaving previous, more traditional meanings of teaching and learning untouched. Kate, on the other hand, is not implementing what someone else taught her to do in a workshop or applying strategies while missing the ideas. She is actively learning about and practicing constructivist approaches via lesson study in a self-initiated group. My analysis suggests that within this collaborative context, she has constructed new meanings about constructivist approaches to student learning/teaching. However, importantly, her new meaning misses a key ingredient because it does not fully recognize the role that surfacing, leveraging, and resolving conflicting ideas by guiding students to make connections between ideas and strategies may play in deepening students’ understanding of mathematics.

Also, while Kate may recognize the value of letting students discuss mathematical ideas, listening to student thinking, and promoting students’ understanding of mathematics, she has not confronted how those approaches may sometimes be at odds with her focus on correct solutions. This is much like the case of Mrs. Oublier, but whereas Mrs. Oublier is limited by a lack of ongoing professional learning and a shallow understanding of mathematics, Kate is not limited by those factors and her adoption of constructivist approaches has progressed further than Mrs.

Oublier's, whose practice suggests that she has adopted constructivist strategies without actually shifting her meanings of knowing and learning (Cohen, 1999). For example, Mrs. Oublier does not invite students to discuss mathematical ideas. Kate has recognized the value of student discussion as a way to investigate student thinking, but she does not emphasize the "centrality of thinking as the process through which conceptual learning takes place" (Thompson & Zeulli, p. 352). More specifically, she does not emphasize how guiding students to connect ideas and strategies may deepen their understanding of mathematics. Below, I argue that this fusion of constructivist and traditional approaches—where a key missing ingredient is a focus on thinking through the connections between ideas and strategies—shapes and is shaped by her approach to facilitation and teachers' opportunities to learn in lesson study as I discuss and contrast Elena and Kate's meanings about teacher learning and facilitation.

Meanings about Teacher Learning and Facilitating

As with their meanings about student learning/teaching, each TL's meanings about teacher learning and facilitating were notably different, despite many surface similarities, including emphasis on the importance of investigating student thinking, reading and discussing research, and providing spaces for teachers to collectively discuss struggles related to teaching. Analysis revealed that the purposes of investigating student thinking, reading research, and discussing struggles varied by TL in a way similar to the variations observed in meanings about student learning and teaching. Again, Elena's meanings related to teacher learning and facilitating reflected a more constructivist approach. For teachers, she equates struggle with teachers' experience of dissonance as they encounter evidence that challenges their previous understanding of teaching or mathematics (see Table 9). Group discourse is an opportunity to surface and work to resolve that dissonance. Kate's meanings reflect a unique view combining

traditional and constructivist approaches, where collaborative group discourse is a way for teachers to add to their existing repertoire of tools and strategies for teaching. Struggle in this view means teachers have identified the need for a new tool, strategy, or clarification but have not yet located the best source for the solution. Rooted in each TL’s meanings of student learning/teaching, TL’s meanings of teacher learning/facilitating are especially important for understanding how TLs exercise agency in lesson study, because they provide a source for understanding why TLs approach facilitation in particular ways.

Table 9: Meanings about teacher learning/facilitating.

	Elena	Kate
General view	Teacher learning means teachers evaluate and reflect on their current approach and explore ways to improve their teaching.	Teacher learning means teachers can add (or change) tools and strategies to their existing teacher repertoire.
Struggle	Struggle means that teachers experience a disequilibrium between their current practices and beliefs and new evidence such as student work or subject matter. This is normal and, over time and with supportive guidance, can lead to a deepened understanding of the relationship between mathematical ideas and pedagogy.	Struggle means that teachers do not know or understand something (e.g. a standard, teaching method, or definition of a word). This is normal and it is okay to ask a colleague or expert who does understand to explain.
Group Discourse	Teachers’ collaborative discussions ideally mean that teachers have opportunities to evaluate and develop their knowledge about content and pedagogy. It is also an opportunity for teachers to share ideas based on their experiential knowledge of students.	Teachers’ collaborative discussions mean that they can exchange ideas about effective tools and strategies and clarify one another’s misunderstandings.

Elena. Above, I described how Elena’s views of student learning/teaching largely align with the type of mathematics instruction promoted in constructivist-inspired reforms. In this

section, I highlight how similar meanings about teacher learning/facilitating also significantly shape the nature of her agency in lesson study. I argue that these meanings reflect and compose a general view of teacher learning/facilitating in which teacher learning means that teachers evaluate and reflect on their current approach and explore ways to improve their teaching. For Elena, this often entails exploration of content and investigation of student thinking.

Teacher struggle. My analysis of Elena's meanings related to lesson study showed that, much like her view of student struggle, Elena sees teacher struggle as the result of a disequilibrium, or dissonance, between teachers' current understandings, practices, or meanings and new evidence such as student work or subject matter. This type of disequilibrium is inherent in the improvement process, which Elena sees as dependent on deepening teachers' understanding of the relationship between mathematical ideas and pedagogy. Elena's meanings related to teacher struggle seem to stem from her own experiences, which illuminate two ways that teacher struggle may manifest as an important part of professional learning.

One way that Elena describes teacher struggle is as a result of realizing that there is a problem with their current approach to teaching. Elena describes the moment that she realized her previous approach to teaching was ineffective as, in her words, an "oh damn!" moment:

That's just what it was: How can I get to this point in my life and not know of this? And I actually remember when [the professional development presenter demonstrated the relationship between mathematical ideas], I put my head down in my hands, like this, and he came over to me, and he patted me on my back, and I looked up at him and I said, 'I didn't know this! How could I not know this?' (Interview 2018)

Here and elsewhere, Elena describes experiencing disequilibrium as a result of realizing that her own content knowledge about mathematics was lacking. For Elena, this was a problem because

she could not apply the student-centered teaching approaches she was learning about without content knowledge:

Because how do you build a discovery lesson if you don't understand underlying ideas?

Or how do you guide and how do you think of the questions to ask students in a

discovery lesson if you don't understand the underlying ideas? (Interview, 2018)

For Elena, this moment of struggle was important because it was the catalyst for a major change in her practice. In fact, she implicates the lack of a disequilibrium of this type as a major obstacle to instructional improvement:

That's our problem right now. We have so many teachers who think they know the content knowledge, and they're not worried about improving, and that's stopping their growth as a teacher. They figure they got it, they can present it, and that's deeply stopping them, because they don't realize that there's another idea underneath that they should focus on or what idea is coming up next and how to prepare children for what's coming up next. They think they know, but they don't really know. (Interview, 2018)

In this comment, Elena points to another manifestation of teacher struggle in professional learning. If first teachers must realize that there is a problem with their current approach to teaching, and, if, like Elena, that problem stems from a lack of understanding of content knowledge, then future struggles will occur as teachers attempt to grow their knowledge of the relationship between content and pedagogy, or as they "uncover the ideas underneath" the content they want to teach.

Elsewhere, Elena describes this type of teacher struggle as wrestling with ideas:

I go back to, since we talked about it, to Dr. Jacobov's presentation. The first thing he did was to give us a problem and we solved it, and we had teachers in there from k-8, so we

solved it at multiple levels and in multiple ways, but we wrestled with the ideas ourselves, before he started presenting, and I think as a teacher, that definitely helped me understand what was being presented. I think it's true for teachers everywhere. If you wrestle with some ideas before you have to pull out the important knowledge, it will help you learn those ideas. It'll stick with you better. (2018)

This comment reveals the parallel between Elena's view of student learning and teacher learning. To better understand how mathematical ideas are connected and how to help students make those connections, teachers must wrestle with those ideas as well:

When you're doing it yourself, you learn to appreciate the kid who flat out could not make the connections, could not see it. Because you're going to hit a time when you can't. You know that frustration, so I think that helps you be more tender with the child who doesn't get it, because you know you've done it yourself. I do think teachers need to experience it. If you're going to teach with a discovery method, you should experience it yourself first. (Interview, 2018)

Elena's assertion that "you're going to a hit a time when you can't" shows that she sees struggling over the connection of mathematical ideas as normal for teachers too. Her meaning of this type of struggle as "wrestling" with the connection between ideas suggests that, like with student struggle, resolution to teacher struggle may emanate from the teachers experiencing the struggle. As the excerpt below illustrates, Elena's talk related to teacher struggle draws on language that reflects a view of learning that is gradual, learner-driven, and, sometimes difficult:

It's very important for you to admit that you don't know something and realize it because then you start the search of, 'how do I make this better? How do I take care of that very difficult part?' I would like all teachers to be able to say, 'Oh! I got this great 'aha' about

multiplying fractions and now I understand it!’ That would be the ideal, but in reality, that just may not happen, and as long as those teachers are okay with it, I’m surely okay with it, because I think it is a complex idea. And it’s something that we just need to keep working on, to figure out how to make it easier to understand. (Interview, 2018)

Notice, for example, how Elena describes the solution to not knowing something as “starting a search” instead of *finding* an answer. In that comment, she is discussing how the teachers in her lesson study group described the topic chosen for study as difficult, and her response that “it’s something that we just need to keep working on” reflects how she sees teacher learning as gradual. This also seems to stem from her own experience. Of her own professional learning, she says,

Once we saw our own gap, that’s when it became, ‘oh. Okay. We have to improve there.’ And it happened over years. You have to think this journey really happened for me around 2000, 1998, so it happened over a period of time” (Interview, 2018).

This idea—that teacher learning may be gradual—is a key reason why continuous professional learning experiences such as lesson study have been promoted, since they recognize that teachers’ learning represents a continuous interaction between teachers’ current meanings of teaching and learning and their experiences with students and new ideas (Opfer & Pedder, 2011; Vescio, Ross, & Adams, 2008).

In sum, for Elena, struggle in teacher learning means teachers may experience a disequilibrium in their current understanding of teaching and new evidence—ideas or strategies—that conflict with that understanding. This reflects a general view of teacher learning characterized by reflection on and evaluation of current practice. This view of struggle stems from Elena’s own professional learning experiences but it is also reflective of her constructivist

view of student learning and teaching, where teachers must better understand content in order to help students make connections between mathematical ideas. Elena's meanings related to group discourse reflect similar ideas.

The purpose of group discourse. .My analysis of Elena's meanings related to the purpose of group discourse show that, for Elena, group discourse in lesson study means that teachers have opportunities to evaluate and develop their knowledge of content and pedagogy via conversations with other teachers about student understanding, mathematical ideas, and teaching. It is also an opportunity for teachers to share ideas based on their experiential knowledge of students. In both cases, the role of the facilitator is to ask questions that enable teachers to probe and evaluate their thinking and make connections between mathematical ideas and teaching. In Elena's words, "a facilitator is a bit like being a teacher, you don't want to tell; you would like to question, bring out the knowledge of the other person" (Interview, 2016). Here again, we see the influence of Elena's constructivist approach to teaching and learning, where the teacher, or facilitator, in this case, is tasked with surfacing the student's (or fellow teacher's) knowledge. When teachers' current understandings are surfaced, they can be problematized and evaluated in relation to new evidence or information, which may serve to deepen or transform teachers' understanding.

Elena describes the task of creating these types of discussions as a challenge, because she wants to honor teachers' thinking and respect their ideas, but explains "I get frustrated with conversations that stay at a shallow level: 'should the paper be yellow or white? Well, if we used yellow paper, then it would stand out a little more.'" And you go [makes sound of frustration]" (Interview, 2018). Discussing a lesson study cycle in which she worried the conversation was too shallow, Elena reflects:

I believe I need to be quiet, and I don't think it's good for me to just spout wisdom, or spout the things that I've learned, because what we're trying to do is to change their thinking and have them have the "a-has," so I'm trying very hard, harder than usual, to think of questions to ask that might prompt thinking rather than just saying "well if you did it this way, so and so would happen" or "we've done this in the past, blah, blah" and not go in that direction, but to try to craft a question, which would cause them to think. You're always doing that as a facilitator – to try to craft questions that would cause people in the group to think and discuss – but I think it's even more so with this group, and I don't want to be just espousing my knowledge. So I have to be careful to pull back a little bit, and let them go with their thinking. (Interview, 2016)

Here, Elena seems to be describing an attempt to create the kind of struggle, or disequilibrium, that she experienced about her own teaching when she first began her lesson study practice. She wants the teachers in her group to "have their own a-has" as they identify the sources of their own struggle, or disequilibrium. But she has learned that teachers sometimes need a "push" to prevent conversations from staying at the shallow level.

My analysis suggests that Elena's facilitation is guided by her navigation of three challenges that she has perceived over the course of her many years of facilitation: 1) teachers' inexperience with deeper conversations about content and pedagogy, 2) teachers' lack of background knowledge related to the pedagogical or mathematical topic, and 3) lesson study topics and/or tasks that are not conducive to exploration of ideas. Understanding each of these challenges sheds further light on how Elena sees the role of the facilitator in group discourse.

First, discussing the group she worried about in the previous quote, she explains that, because several of the teachers had not participated in lesson study before, they were not used to those kinds of conversations:

It's a much slower process to try to have a rich discussion about what is happening with the mathematics and the children's thinking. The tendency is "well, my kids will do this", and they'll say "my kids will do--," but not answer the "why—well, why do you think your children are thinking this way? And they are not used to analyzing children's reaction and just thinking about children's thinking. (Interview, 2016)

This suggests that the facilitator must explicitly attend to guiding teachers through conversations that probe them to consider the reasons behind students' reactions.

Second, Elena further suggests that a lack of "background knowledge" may also lead to shallow conversations. Discussing teachers' selection of a mathematical topic for the research lesson, she explains:

I think it's kind of like with the kids, I can sit here and tell that teacher why that's not a good idea, and first of all, she's probably going to get in a huff, because there I am acting like I know more than she does, and second of all, she may not understand me. She may not have enough background knowledge to understand what I'm talking about, why that idea is so easy and wouldn't require any deep thought. And if she can't get there, then I would try to go where she is and see what we could do. (Interview, 2018)

Another way to describe what Elena is explaining here is that a lack of background knowledge of a particular topic might lead to a failure to create dissonance—in this case, because the teacher might not understand why some mathematical topics (Elena cites the classification of triangles as an example) might not foster in-depth conversations about the relationship between content and

pedagogy. While this might seem like a difficult challenge for a facilitator to overcome, Elena references the importance of meeting learners where they are. This approach is related to her meaning of struggle and her view of learning as gradual and suggests that just as teachers need to know their students in order to respond to their learning needs, facilitators must also recognize where teachers are located along a learning progression.

At the end of this comment, Elena suggests another challenge to meaningful group discourse when she references an idea being so easy that it “wouldn’t require any deep thought.” Here, Elena is referring to the importance of choosing a lesson study topic that provokes deeper conversations about student learning and mathematics. This is indicative of a third challenge to the kind of group discourse Elena hopes for in lesson study, which is that the nature of tasks might not be conducive to “deeper” conversations. In addition to the above example of choosing a lesson study topic that is not challenging, she also expresses concerns that this may happen if teachers choose research articles that are not challenging. This suggests that in order to enable group discourses that surface teachers’ understandings and provide a context to evaluate those, the facilitator must also structure tasks in a way that more easily leads to such conversations.

In sum, for Elena, the purpose of group discourse in lesson study is to surface teachers’ understandings of teaching and mathematics, enabling potential moments of dissonance as teachers are presented with new evidence and guided to evaluate previous understandings in conversations with fellow teachers. Elena’s meaning of shallow conversations and the challenges she describes in relation to them reveal that she sees conversations as shallow when they do not provide opportunities for teachers to surface and problematize their current understandings, which means that the facilitator must explicitly attend to creating conditions for group discourse that help overcome such issues.

Kate. Above I described Kate's meanings related to student learning and teaching as key to understanding the nature of her agency, identifying a unique approach to teaching and learning that combines constructivists and traditional approaches to teaching. In this section, I highlight how Kate's similar meanings about teacher learning/facilitating also significantly shape the nature of her agency in lesson study. Again, I focus on meanings about struggle and discourse as central to understanding the nature of Kate's agency. I describe how Kate's meanings about teacher struggle and group discourse reflect a general view of teacher learning where learning means that teachers can add tools and strategies to their existing teaching repertoire. This view has specific implications for Kate's role as a facilitator in lesson study.

Teacher struggle. My analysis of Kate's meanings related to teacher struggle in lesson study showed that Kate sees teacher struggle as instances in which teachers do not know or understand something, such as the meaning of a standard, teaching method, or definition of a word. The solution to this type of struggle is to seek out a colleague or expert who can help you understand. Like with student struggle, Kate associates this type of struggle with learning, although when talking about teacher learning, there is less of an emphasis on thinking and more on not knowing:

You have to tell people, 'you're not going to know sometimes all the stuff. I teach fourth grade. I took college a long time ago. I forgot. Things have all changed—Common Core and now it's all explaining, and sometimes you're just not going to know.' So it's okay, you just say it. You're not going to know...I think that's—I don't think that people generally do in education look down on you in education if you don't know an answer, so I think we've just had good experience, because first of all, we're okay with saying we

don't know. And the [Knowledgeable Other] didn't make us feel unintelligent because we didn't know.

In this comment, Kate emphasizes that it is okay for teachers to not *know* things. Her reference to college suggests that content might be one thing that teachers do not know or remember, and the reference to Common Core suggests that changing standards are another source of not knowing. Like with student struggle, Kate's view of teacher struggle is also illuminated by examining how she describes solutions to teacher struggle. In the same interview, she suggests a solution to teacher struggle when she describes calling back a knowledgeable other to say "Can you help us a little more? We don't know what you mean." She relates asking him to clarify a question, which instantly solved the problem of "not knowing." Elsewhere, she also describes the solution to not knowing as consulting someone else and/or asking for clarification:

I think that the culture at [our school] is one that "hey, if you don't get something, you just go ask a colleague." We're not embarrassed to call and say we don't know what this means. And so I think that it's just a culture in your school, and in your group, and in your grade level that you just have to say, "I need help." I try to make that culture in my classroom the same. Who cares? We all make mistakes. If we don't learn from our mistakes, then we're not really learning. So I think that's the most important thing for us is that we trust each other so much.

Another important view of teacher struggle is also suggested in this quote. Although subtle, Kate's use of the word "mistakes" instead of "misconceptions" is important and indicative of her approach to teaching and learning. Mistakes may result from inattention or temporary lapses in concentration, but misconceptions can be seen as incomplete understandings, or understandings that differ from expert conceptions. The solution to mistakes may be internal or external and

quickly “fixed” but resolving misconceptions may involve a more complex process characterized by a “gradual process of conceptual change” (Smith, Disessa, & Rochelle, 1994, p. 116).

Kate’s use of the word “mistake” here is not incidental. It arises in conversations about student learning as well. In fact, in planning meetings and interviews, my analysis showed that Kate is much more likely to use the word mistake and words such as “correct” or “wrong” that indicate a view of understanding that focuses on the product of learning (solutions) instead of the process.

A view of teacher struggle that focuses on correcting teachers’ mistakes or quickly identifying “solutions” differs in some ways from the reasons that research has advocated for continuous collaborative professional learning communities such as lesson study, because it does not emphasize the importance of engaging in a reflective process of inquiry in which:

the point is for teachers to consider and reconsider what they know and believe, to consider and reconsider what it means to know or believe something, and then to examine and reinvent ways of teaching that are consistent with their knowledge and beliefs” (Cochran-Smith & Lytle, 1999, p. 272)

Kate’s meaning of teacher struggle does not focus on investigating, interpreting, and sometimes reinterpreting the sources of struggle and what that means for instruction. This view will have specific consequences for how she sees the purpose of group discourse in lesson study, and ultimately, for how her facilitation shapes teachers’ opportunities to learn.

The purpose of group discourse. My analysis of Kate’s meanings about the purpose of group discourse in teacher learning show that Kate sees group discourse as an opportunity for teachers to share and exchange ideas about effective tools and strategies as they collectively design an effective lesson to promote student learning. This means that, for Kate, the role of the

facilitator is to create opportunities for teachers to exchange ideas and ensure that teachers are on track to create a high-quality research lesson. Notably, what this does *not* mean is that the facilitator's role is to create opportunities where teachers' current understandings are problematized and investigated.

In fact, at multiple points, Kate emphasizes that she is not trying to change the way teachers' think. For example, discussing how she would respond to teachers who do not share her views of teaching, she says, "I say, you know, we're not trying to tell you how to teach. We're just giving you many tools to think about giving children different tools." In this comment, Kate ties her approach to facilitating to her approach to teaching, where both are characterized by giving learners more tools. However, whereas in her classroom, this might mean that Kate takes on a stronger "telling" role as a teacher, in her lesson study group, she describes seeing herself as an "equal participant":

I'm just a participant. I think in the beginning, I am just a facilitator in that I just kind of get things rolling and I keep the organization of the lesson study going, but in our meetings, I become just a participant. I don't think I'm any kind of different participant than the rest of the people, except that I'm the organizer and the contact person, that kind of stuff. In the beginning, I say "everybody bring your research, and when we get off task, I get us back on task. (Interview, 2016)

This reflects a view of teacher learning that it is more additive than transformative, and, like with Elena, is rooted in Kate's own professional learning experiences. Elaborating on this approach, Kate explains:

Right away, people are defensive. It's true. They are defensive, so you have to kind of soft pedal it a little bit and say, "this is just our tool." Just think about this. Take one thing

away from what we've told you. We're not asking you to change all the way you teach. And maybe you can do it one time, maybe it's not the algorithm you do some flexibility with, maybe it's something else and you just start to do a little bit at a time. One thing. And maybe they would start to see that, "hey, you could let go a little." Because that was my hardest thing too. Was to let go and let kids struggle and let kids figure it out, so I think that for all of us who are just natural-born helpers, that's the hardest thing.

(Interview, Spring 2018)

In this comment, Kate explains that because she had a difficult time "letting go," it may be better to guide teachers to changes in teaching one strategy at a time. She also expresses concerns that teachers will be defensive if they feel their way of teaching is being questioned, a theme she returns to when she says, "If you told me, 'okay. [Kate]. I hate the way you teach.' And then you came and tried to tell me how to teach, I might feel a little defensive about that too" (Interview, 2018).

Another important aspect of Kate's meaning of group discourse is also suggested in this comment. If what Kate hopes to accomplish is to share effective tools and strategies for teaching mathematics, then the focus of group discourse will be on how to design an effective lesson. This might seem like an obvious focus of any lesson study group, but with the case of Elena, we have an example of a group whose purpose is more focused on designing a lesson that allows them to better understand student thinking of a particular topic. Kate also hopes that the research lesson will provide this kind of opportunity, but at multiple points, she suggests that that goal is secondary to designing an effective lesson. For example, in 2015 describing her goal for the lesson study cycle she says: "I hope we'll learn if this was an effective way to teach fractions greater than one." She further explains that she wants the group "to come away with a good

feeling like, ‘huh! That was a good lesson.’” This focus on designing a good lesson creates a specific purpose for group discourse that lends itself to the exchange and evaluation of strategies, as teachers work together to collectively fix students’ misunderstandings of mathematics.

Collectively considering Kate’s meanings about the purpose of group discourse, several key aspects emerge. Importantly, the facilitator provides minimal guidance outside of pacing and organization. This is rooted in a view of group discourse in lesson study in which the primary purpose is to build an effective lesson that demonstrates the usefulness of a particular strategy and builds teachers’ confidence to try that strategy. This is accomplished by exchanging and evaluating ideas for the lesson and sometimes consulting outside experts when clarification is needed. This view of group discourse is related to Kate’s view of student learning and teaching. If the teachers’ role in teaching mathematics is to surface and fix student misunderstandings over the course of a lesson, then lesson study is a way to identify effective strategies to do so. As I will describe below, Kate’s meanings related to student learning/teaching and teacher learning/facilitating interact via the enactment of her agency via facilitation of lesson study. This leads to opportunities to learn in Kate’s group that are quite distinct from those in Elena’s group.

RQ2: Opportunities to Learn

My analysis of TLs’ agency at the level of meaning-making revealed that each TL has constructed distinct meanings about teaching and learning. These meanings are an important aspect of TLs’ agency because they manifest via another level of agency—that of talk and action—as TLs facilitate lesson study. This is the level of agency where TLs may shape teachers’ opportunities to learn as they manifest their meanings about teaching and learning via their approach to facilitation. To analyze how TLs’ talk and action may shape opportunities to learn, I focused analysis on episodes from planning meetings in which contradicting ideas surface. Such

episodes are key moments for teachers to experience the kind of learning research has identified as essential to instructional improvement since teachers' experience of dissonance between existing beliefs and practices and new evidence may catalyze a transformation in their ideas of knowing, teaching and learning (Thompson & Zeulli, 1999). As such, they are also key moments for TLs to exercise agency as they facilitate conversations that require improvisation and responsivity as they respond to potential dissonance.

My analysis of how TLs' meanings shape opportunities to learn in lesson study revealed that Elena and Kate's distinct meanings of student learning/teaching and teacher learning/facilitating informed significantly different approaches to facilitation that shaped very different opportunities to learn for teachers within their groups. In alignment with her meanings of teaching and learning, Elena's approach to facilitation is characterized by an attempt to promote a specific vision of teaching and learning and surface and resolve cognitive conflicts related to this vision. This approach leads to opportunities for teachers in her group to reconsider their beliefs about teaching and learning and deepen their understanding of content and pedagogy. Kate's approach is characterized by an attempt to equip teachers with new tools and strategies by designing an effective research lesson. This shapes opportunities to learn that are limited in their capacity to shift teachers' beliefs about teaching and learning. Exploring exactly how these approaches to facilitation lead to distinct opportunities to learn reveals important keys for understanding the relationship between teacher leadership, agency, and instructional improvement.

To describe differences in facilitation and opportunities to learn, I describe key episodes from Elena's 2016 cycle and Kate's 2015 cycle in which teachers in each group discuss students' exploration of multiple strategies. For both groups, these conversations emerge organically over

the course of the lesson study cycle, as a result of teachers' own questions and concerns. The striking similarity between the topic of these conversations makes these conversations an ideal way to present cohesive and illustrative examples of how each TL's agency shapes teachers' opportunity to learn in lesson study.

Elena

Based on her meanings of teaching and learning, which stem from her own professional learning experiences over time, Elena uses her facilitation of lesson study to create opportunities for teachers to advance their understanding of the relationship between teaching and learning. Reflecting her view that "if you're not struggling, I'm not too sure you're learning," Elena intentionally fosters opportunities for members of her team to struggle with ideas and then guides them through a process of dissonance resolving that engages teachers in evaluating the relationship between new ideas and their own experiences and thinking. To achieve this, when moments of dissonance arise, Elena responds by probing teachers to make connections between their experiences with students and new information shared or generated by the group. Ultimately, this approach creates opportunities for teachers to both learn and unlearn as Elena advocates ideas that may challenge their current approach to teaching and deepen their understanding of content and its relation to pedagogy.

Elena's approach to facilitation is characterized by her active promotion of a specific approach to teaching mathematics, in which the goal is to help students develop an understanding of the ideas behind mathematical strategies, as opposed to merely learning how to execute algorithms correctly. Elena's belief in and active promotion of this approach has the effect of serving as a conceptual tool (Grossman, Smagorinsky, & Valencia, 1999) that Elena draws upon to guide conversations when dissonance arises. Said differently, Elena's strong belief

in this approach to teaching and learning mathematics serves as a source of expertise that helps her notice and attend to potential opportunities to learn as she guides teachers through a process of dissonance resolving characterized by connecting experiences, ideas, and evidence (National Research Council, 2000; National Academies of Science, Engineering, and Mathematics, 2018).

Elena’s facilitation of conversations about students’ exploration of multiple strategies during the 2016 cycle is a cohesive illustration of how this unfolds over the course of lesson study. The seeds of this conversation, in which teachers discuss how, why, and if early elementary students should be allowed to generate multiple strategies to solve mathematics problems, are planted early on in the first meeting of the cycle. As teachers discuss a book chapter that Elena has assigned, one teacher, Melissa, describes underlining a passage about giving students opportunities to “invent ways to solve a problem.” Elena enthusiastically agrees that this is important and explains why:

Elena: ...I loved this idea of kids coming up with their own strategies, how did you solve it, and I think it gives them empowerment, they feel like ‘Look what I can do!’—

Melissa:—‘no one came up with this!’ Right [laughs].

Elena: Yeah! And really that idea of ‘I can use what I know to solve something new,’
Wow! What an important learning idea that is, for any subject area. Go figure out what you know, and then how could you use that [hits table] when this situation comes up.

That’s a powerful tool. (Planning Meeting 1, 2016)

Here, Elena builds on Melissa’s comment and connects the idea in discussion to a larger learning goal of helping students use what they know to solve something new. This is a key aspect of Elena’s facilitation that directly reflects her meanings of teaching and learning. Because she has a strong vision of what mathematics teaching and learning should look like—and why—she

draws upon that vision as a conceptual tool to inform her responses, either by explicitly connecting teachers' ideas to larger learning goals, as in this example, or by guiding teachers to make their own connections, as will be illustrated below.

As the 2016 cycle unfolds, Elena's team repeatedly returns to the topic raised here about "multiple strategies." At first, as in the above and following example, it is another teacher who surfaces the conversation. However, as it becomes clear that most of the teachers in the group do not fully share or understand Elena's (or one another's) meanings regarding the importance of multiple strategies, Elena capitalizes on this dissonance to create opportunities for teachers to connect their learning and planning in lesson study to the idea that it is valuable for students to generate multiple strategies.

For example, in the following excerpt from a discussion about the goal of the research lesson, several teachers express a concern and/or misunderstanding regarding the idea of allowing students to generate multiple strategies. This conversation reveals a dissonance between that idea and teachers' experiences with students and/or understandings of why to teach multiple strategies. Elena's response reframes teachers concerns into a topic of inquiry and sets the stage for future conversations aimed at engaging and resolving the dissonances surfaced here.

Manuela: They're afraid of failing on their own.

Melissa: And if I said, 'Do it on your own. Show me different strategies,' they want 'which strategy do you want me to use?'

Manuela: And sometimes, they don't want to listen to a different way of doing it, because they know how to do it, and their way is good. And that's it. They don't want to broaden—So, they're afraid to try something different. Because they already know what they can do.

Melissa: Right. And that's why I think it's so important that we're showing all the strategies now. Before we just taught one way, and that was it. That's how you do it. And now, we're showing them all these different strategies. They work for some, not for others. Then, their favorite part is when you learn all these strategies, and I said, 'Well, what strategy would you like to use?' That's their favorite. That's usually when they take it on their own. But when I said, 'You've got to use this strategy today; or this strategy today'—

Carmenza:—that's when you find resistance.

Melissa: Yes.

Manuela: Well, um, for us—you know, our kids are a little bit different from your kids this year because your kids are going to be advanced in math—but 1st grade, when you show them different strategies, they want to find the one that it's the easiest for them, which is ok, but they tend to use the same one over, over, and over, again. Even if you might have 10 strategies out there—

Melissa:—right

Carmenza:—they don't want something new

Manuela: They'll go: '2 + 3; [finger counting] 1, 2, 3... 1, 2 [five hand gesture].'

Because they're safe in doing that. And I think when their minds are so young, they're afraid to jump out. I don't think they know how to jump out. Even if we've done these problems, these five different ways, for 20 weeks, they're afraid to jump out. I don't think they trust themselves to know it's ok. I don't think that they know that they know how to choose a problem, a strategy.

Elena: And I think that's not just the learner, that's a human being problem, because I know adults that are that way, they have abilities that they are not using because they're afraid to fail, afraid to explore, afraid to step out. I mean, we all have felt that way about some things. But I really think it's important to deal with this idea.

Elena's immediate response to the dissonance that has just surfaced is to connect the challenges described by teachers to a more general "human being" problem. This reframes the problem away from being based on a developmental trait, as initially suggested by Manuela, to the generalized problem that learners of all ages "have abilities that they are not using." This is an important distinction because when teachers view challenges to ambitious instruction as stemming from the fixed traits of their students, they may not feel it is worth the time and effort to attempt those approaches (Horn, 2007; Wilson et al., 2017). On the other hand, if teachers believe the ability is there, they can help students develop the capacity to apply that ability. Elena hints at an awareness of this issue when she describes adults as also "afraid to fail, afraid to explore," subtly prompting teachers to reflect on how they too may have abilities they are not using by saying, "we have all felt that way about some things."

After reframing the concerns expressed by the team, Elena legitimizes those concerns and converts them into a topic of inquiry by asserting "it's important to deal with this idea." Like reframing the problem, this has the effect of positioning the concerns as something that teachers may be able to attend to via instruction. As Horn and Little (2010) explain in their analysis of teachers' talk in collaborative learning, this turned the conversation "toward teaching", creating affordances for teachers to explore the relationship between their concerns, content, and pedagogy (p. 192).

Immediately following this conversation, more sources of dissonance are surfaced as teachers continue to discuss students' learning needs. In this excerpt, we again see Elena notice the emergence of conflicting ideas and plant the seed for resolving that dissonance by prompting teachers to consider *why* to use multiple strategies:

Melissa: Sometimes, towards the end of when I have taught five strategies, I'll give them five problems, and they can only use one strategy—you know, each strategy one time. So all five problems have to be done with a different strategy. So I make them use all strategies.

Manuela: Yeah, but intellectually, some of them might not be ready to do all 5 strategies.

Allie: Some of them are still recounting—

Manuela:—they're still recounting. Even though we've... you know, that's good in theory. But to say, you can only use one-on-one, you'll literally have some kids crying, 'I can't do it that way. I can't do it that way.' If you sit down with them and say, 'Remember' and you guide them through it, they will be able to do it. But then to give them another problem to do it, and say 'Ok, you did it this way, now you try it this way.' They'll sit and look at you [makes a perplexed face] you know.

Carmenza: At this point, if they have a strategy that works for them, I think that's the whole goal. As long as they're building later on—I'm not saying... you expose them, and they find what works for them. And then, kind of build upon that.

Melissa: But the only thing with that is that, sometimes, a certain strategy is later used for a reason—they have to learn that way [pause]. You know what I mean?

Carmenza: And I think that's my biggest issue with, you know... if they get the answer, how they did it—it doesn't matter how they got the answer. Just like, if they know, if

they can figure out what $2 + 2$ is, whatever strategy they use, and they get the right answer—what’s the problem? You know [laughs]. It is going back to that too.

Elena: And I put that up over there, and I really think we should go back and talk about why: what’s the value of using different strategies? But I do agree with you; I think it’s important to identify as a teacher.

By this point in the conversation, a fertile context for engaging in and resolving dissonance has emerged. More challenges have been expressed and several meanings related to using different strategies have surfaced, all of which differ from Elena’s description of letting students generate multiple strategies so that they can make connections between them. Carmenza’s comments, in particular, are a criticism of the idea that students should know how to solve problems using more than one strategy. Because Elena has strong ideas about why students should explore multiple strategies—in fact, she has already explained this to some extent at the beginning of the meeting—it is notable that she does not seize this opportunity to, in her words, “spout wisdom, or spout the things I’ve learned” (Interview, 2018). Instead, she reframes Carmenza’s “What’s the problem?” question—meant rhetorically and as a criticism—responding that she agrees with her that it is “important to identify” why students should be familiar with multiple strategies. This also reflects Elena’s view of learning as building on current understandings to deepen or create new understandings. Instead of positioning Carmenza’s belief as “wrong,” Elena positions it as an idea that can be built upon.

Elena notices an opportunity to revisit the conversation in a later moment when teachers seem to be moving towards glossing over the discrepancy—between the idea that students should explore and create their own strategies and concern that students are not able to do so—

by selecting an activity that highly structures—and potentially limits—students’ “exploration” of multiple strategies. Seizing on a teacher’s mention of the word strategies, Elena prompts:

I do think, because we keep talking about different strategies, and I think it’s important to get clear on why... why use different strategies? So, if we’re doing—if we’re teaching children how to add, why do we make a ten... ‘ $5 + 8$, I’ll take a 5 and make 10 plus 3 more’... The make a ten strategy. Why ‘ $5 + 8 =$ [counting fingers] 9, 10, 11, 12, 13.’ Why give them different strategies? What’s the purpose in it?

Elena’s response prompts teachers to connect the use of multiple strategies to a learning goal. This creates an opportunity for teachers to generate and build upon their own understandings—and those suggested by the group. Where, above, Elena reframed the conversation to connect teachers’ concerns about multiple strategies to the broader learning problem of untapped capabilities, in this case, Elena’s prompt orients the question towards connecting the use of multiple strategies to a goal related to mathematical understanding.

Using the “multiple strategies” conversation as an example, we see how Elena’s meanings of student learning/teaching and teacher learning/facilitating functioned as a source of expertise that Elena used to shape teachers’ opportunities to learn. Because of Elena’s knowledge about why and how students’ exploration of multiple strategies may advance their mathematical understanding, she was able to notice teachers’ misunderstandings about teaching multiple strategies and then guide them to connect their beliefs about multiple strategies to students’ learning needs, their own experiences as learners, and the content goals of the lesson. By reframing teachers’ concerns as something important to “deal with” and “identify as a teacher,” she fostered a tone of inquiry in the group, positioning teachers’ conflicting beliefs about how and why to teach multiple strategies as ideas to be built upon. Ball and Cohen (1999) describe a

disposition of inquiry as an important element of teachers' professional learning in reform settings and, in a definition with considerable overlap with Thompson and Zeulli's (1999) description of dissonance resolving, explain it as a stance "that would support their generation of multiple conjectures about an issue in practice, their production of alternative explanations, and their efforts to weigh them rationally" (p. 27).

Positioning teachers' misunderstandings as ideas to be built upon not only reflects Elena's meanings of teaching and learning, but it reflects her goal of empowering teachers and learners of all types. In fact, her statement from the excerpt that opened this section could easily summarize her approach to facilitation:

"That idea of 'I can use what I know to solve something new,' Wow! What an important learning idea that is, for any subject area. That's a powerful tool. (Planning Meeting 1, 2016)

Elena not only recognizes opportunities to build upon teachers' understandings, she recognizes the role that guiding teachers to make connections between current understandings and new evidence may play in advancing understanding. By noticing the learning potential in the dissonances expressed by teachers and converting them into a topic of further inquiry, Elena shapes an opportunity for teachers to use the remainder of the lesson study cycle to learn more about why and how to support students' exploration of multiple strategies. Notably, their inquiry stems from their own problems of practice and builds upon their current understandings to advance their knowledge of the relationship between content, pedagogy, and learning.

Kate

Reflecting differences in her meanings of student learning/teaching and teacher learning/facilitating, Kate's approach to facilitation is quite distinct from Elena's and shapes

different opportunities to learn for teachers in her group. Reflecting a general view of teaching and learning in which learners accumulate a repertoire of tools and strategies that can be used to solve problems, Kate does not necessarily perceive competing ideas as problematic, but rather as multiple potential paths to a solution. As a result, her facilitation is not characterized by the provoking, engaging, and resolving of dissonance. Instead, her approach to facilitation is characterized by prompts focused on which tools and strategies the lesson should include. My findings suggest this approach limits opportunities to learn characterized by dissonance resolving, as Kate's focus on an effective lesson and her hands-off approach to facilitation means potential dissonance is not recognized as an opportunity to build understanding by generating and connecting evidence. While different opportunities to learn may emerge, they are not defined by the kind of active engagement in dissonance resolving identified by literature as key to supporting shifts in instruction (Ball & Cohen, 1999; Thompson & Zeulli, 1999).

This is best exemplified in episodes of Kate's facilitation of the 2015 cycle. Similar to Elena's 2016 group, a repeated theme that emerged over the course of this cycle concerned how much students should be allowed to explore and generate their own strategies to solve problems in the lesson. Reflecting her meanings of teaching and learning, Kate's facilitation of these conversations seeks to honor both (traditional and constructivist) approaches and sees Kate on either side of the argument at different moments. Ultimately, the goal of creating a lesson that minimizes student confusion is consulted as justification to limit student exploration. In the examples that follow, I show how teachers' opportunity to learn *from* students' exploration or *about* students' exploration is minimized as the team focuses on the bigger goal of evaluating whether their selected strategy of teaching the modeling of fractions is effective.

Unlike Elena, Kate does not promote and explore a specific vision of teaching and learning via her lesson study facilitation. Instead, she focuses discussion on the creation of a “good lesson.” Of course, it is completely expected that teachers would hope their research lesson helps students to understand the presented material, but what is notable in Kate’s approach is the consistent focus on the good lesson, which manifests throughout her facilitation. For Kate, the goal of crafting a good lesson serves a similar purpose to Kate’s vision of how to improve teaching and learning. In moments of uncertainty, this will be the goal that Kate and her team reference to resolve (or avoid) potential moments of dissonance.

This reflects Kate’s meanings of teaching and learning, which focus primarily on solutions to problems instead of the kind of thinking that supports problem solving. However, where, for Elena, her meanings serve as a source of expertise that she leverages to support teachers’ opportunities to learn, Kate’s meanings of teaching and learning are more difficult to leverage as expertise because she has not fully acknowledged or resolved conflicts between constructivist and traditional approaches to teaching and, relatedly, sees herself as an “equal participant,” facilitating the exchange of strategies and ideas instead of advancing teachers’ understanding towards a particular meaning of student learning and teaching. This will serve to limit opportunities to learn as teachers engage in conversations primarily aimed at designing a good lesson.

This means Kate’s role as facilitator involves helping teachers decide *what* to do instead of exploring in-depth the reasons behind selecting particular tools, strategies, or approaches. The result is that dissonance is not engaged or leveraged to advance understanding. This is succinctly illustrated in the exchange below, in which the question of how much student exploration to allow is first raised:

Eva: The question is are we just going to give them their kits and say go for it or are we going to do= the teacher is doing some kind of preview and *then* give them their kits?

Kate: **We can do either way.** Last year when I taught area, I gave my students a one-foot square and I gave them a yard square. I said we are going out to that courtyard over there and Ms. Javid wants to paint, she needs to know how much paint, and this is the only tool that you have to measure. They had to find the area of the basketball court... And then at the end, I said that we found the space on the floor, what do we call that? Then I said the word: “this is area.” So you can do it either way, **whatever way that we think is the most effective in this case is the way that we should do it.** (Emphasis added.) (Planning Meeting 2, 2015)

Eva’s question presents an opportunity to explore the reasons behind the two approaches she suggested (let students explore or teach first). It is a potential moment of dissonance as teachers could have come to perceive inconsistencies between the two approaches. However, Kate’s response that they “can do either way” steers the conversation away from the potential dissonance by failing to problematize either approach or connect them to a particular philosophy of learning and teaching. She instead provides an example of a lesson in which she allowed students to explore first, suggesting perhaps that this is an approach she values.

Kate responds similarly later in the same meeting, when, in response to another question about how much exploration to allow, she again shares examples of lessons in which she allowed students to explore first, but then finishes the anecdote with “there is no right or wrong way of doing it, I don’t think.” These examples suggest that Kate may actually believe the lesson should start with exploration, but, reflecting both her hybrid view of student learning/teaching and her view of herself as an equal participant in the lesson study, she fails to connect her experiences

with student exploration to a reason *why* that should be incorporated into the lesson. This has the effect of producing what Slavit, Nelson, and Deuel (2014) characterized as “disconnected talk” or talk in which meaningful learning opportunities are limited because cognitive conflicts are not “actively confronted and collaboratively addressed” (p. 11).

Because Kate expresses the belief that both approaches have equal value, she proposes teachers should choose the option that is “most effective.” Because Kate and her team have not discussed the elements that an effective lesson must include, they default to an implicit goal of minimizing student confusion. Tacit knowledge about what defines effectiveness remains tacit, and therefore is not investigated in a way that might alter or advance the meaning of an effective lesson. This is exemplified in the excerpt that follows, when Kate suggests that students should be allowed to explore multiple ways to compose the number $1 \frac{2}{3}$ using measuring cups. Here we also see an example of facilitation aimed at discussing what to do instead of why:

Kate: If somebody gives you $\frac{4}{4}$ and $\frac{2}{3}$ – that’s *great*. You *want them* to share. And then if somebody gives you $\frac{5}{3}$, you probably want *them* to share. But if somebody gives you a $\frac{1}{2}$ and $\frac{1}{4}$ and $\frac{1}{3}$ and $\frac{2}{10}$, and you know, then you probably don’t want them to...I don’t know, but then maybe they could defend, so maybe...just pick a couple. Just pick a few.

Laura: Yeah, whoever is teaching it, select the ones that are interesting. And then the teaching part is “Let me show you how to model this in a different way, an easier way.”

Kate: Or do we give the cups out and say “can you do this?” Do we give the cups out then at that time and say “can you use this and think about a way to do it?” We don’t know what we are going to get but what do you think? Because we want *them* to physically pour the three-thirds in, don’t we? Don’t you think we do?

Laura: I think we need to show them how you can take the three-thirds and have it be one.

Kate: Have *us* show *them*?

Laura: Show them. I think it's like with gradual release – this is teacher time.

Kate: And then they can do their own and prove it?

Laura: Right. Because I think that it's going to be hard for a third grader to see that.

Kate: Me too.

(Planning Meeting 3, 2015)

In this instance, Kate creates an opportunity for dissonance by suggesting an alternative approach to the lesson. When another teacher disagrees with her, she asks clarifying questions—questions aimed at clarifying *what* the group should do, not *why* they might choose that approach. Instead, Kate could have expanded on why she thought students should be the ones initially filling the cups or further pressed Laura on why it might be difficult for a third grader, which would have generated more evidence for teachers to consider in relation to allowing student exploration of multiple strategies.

Unprompted, Laura does offer an explanation for why to limit student exploration, explaining that it might be too challenging for a third grader, but this evidence—that student exploration might lead to confusion—is not further investigated. Cochran-Smith and Lytle (1999) explain that because teachers' learning is tied to their practice, “teacher learning hinges on enhancing teachers' understandings of their own actions—that is their own assumptions, their own reasoning and decisions” (p. 257). By asking questions focused on what to do, Kate misses an opportunity to prompt teachers to reflect on the assumptions and reasoning behind the strategies they employ and enhance their understanding.

Kate's uncertainty at the end of the opening comment suggests that one reason she may not be guiding teachers towards a better understanding of if/when to allow student exploration may be because she herself is not exactly sure why. Kate expresses confusion about how to respond if a student gives an incorrect answer. Nevertheless, in her next talk turn, she proposes students be given time to "think about a way to do it," showing her awareness of the value of allowing students to explore and potentially struggle. Despite this awareness, Kate does not seem fully comfortable guiding teachers to design a lesson that allows students to productively struggle by trying to generate their own solutions.

Instead, the research lesson is eventually designed so that the teacher shows students (via direct instruction) multiple ways to solve a problem. This appears to reflect Kate's hybrid view of teaching and learning that values exposure to multiple ways to solve a problem, but largely misses the role that making connections between ideas and strategies may play in advancing students' (and teachers') understandings. With a clearer understanding of why to allow students' exploration of multiple strategies, Kate could leverage that understanding to more confidently and effectively guide teachers in her group towards advancing their own understanding. Emphasizing solutions instead of the building upon and connecting of ideas limited teachers' opportunities to engage in productive struggle over the meaning of multiple strategies. This ultimately resulted in a research lesson that also limited *students'* opportunities to productively struggle by exploring multiple strategies.

The result is that teachers' opportunities to learn in Kate's group are characterized primarily by a more shallow evaluation of the strategies the lesson employs, where the implicit criteria for success is based on whether or not students experienced confusion in executing tasks or got the correct answers, without much consideration for the thinking processes that underly

correct—and incorrect—responses. The opportunity to advance teachers’ understanding of approaches that allow more student exploration—and the opportunity to learn by studying students’ response to exploration in the research lesson—is left on the table.

Conclusions

This chapter described how TLs exercise agency in lesson study by enacting meanings of student learning/teaching and teacher learning/facilitating as they facilitate conversations that require improvisation and responsivity to teachers’ competing ideas. In the case of Elena, her constructivist-inspired meanings of teaching and learning inform an approach to facilitation that values the provoking and resolving of cognitive dissonance. This results in opportunities to learn characterized by advancing teachers’ understanding of the relationship between content, learning, and pedagogy. In the case of Kate, her hybrid (between constructivist and traditional) meanings of teaching and learning inform an approach to facilitation that values exchanging ideas to design an effective research lesson. This limits opportunities to learn via a process of resolving dissonance. In the following chapter, I describe how these findings are unique for what they reveal about the relationship between teacher leadership, agency, and collaborative professional learning in instructional reform contexts.

CHAPTER 5

CONCLUSIONS

This study was conducted to contribute to our understanding of the relationship between three factors currently promoted as drivers of instructional improvement: teacher leadership, collaborative professional learning, and teachers' agency. Focusing on the cases of two TLs who are very similar on the surface, yet very different in terms of their beliefs, I described how TLs exercise agency in lesson study by enacting meanings about teaching and learning that manifest via approaches to facilitation that significantly shape opportunities to learn. This chapter further discusses the relationship between cases to describe ways the study may help contribute to our understanding of TLs' agency in collaborative professional learning.

Discussion of Findings

The main insight that emerged from this comparative case study concerns the important role that TLs may play in promoting teacher learning by surfacing dissonance and engaging teachers in dissonance resolving. For both TLs, many of the dissonances that surfaced over the course of the lesson study cycle stemmed from teachers' own wonderings about how to improve instruction. They were not learning opportunities identified and planned in advanced by the facilitators, an administrator, our research team, or a professional development provider. This is precisely the kind of situated problem of practice that TLs may help attend to, not just in more structured learning environments such as lesson study, but in the collegial conversations that occur across a school day and that have been identified as mediators of teachers' learning and reform messages (Camburn, 2010; Coburn & Russell, 2008; Margolis & Doring, 2012; Putnam & Borko, 2000). These unscripted learning opportunities require TLs to improvise and tap into their expert knowledge to notice and respond to opportunities to advance teachers' understanding

of problems of practice. Schon (1995) described this as “the competence practitioners sometimes display in situations of uncertainty, complexity, uniqueness, and conflict,” and explain that these actions reveal a “pattern of tacit knowing-in-action” (p.29).

My findings suggest that an important aspect of this competence relates to TLs’ meanings of teaching and learning, particularly of the role of struggle and discourse in learning. Elena’s meanings composed a coherent vision of teaching and learning, where the process of advancing understanding occurs as current understandings and new evidence are connected, compared, and evaluated. This requires “struggling” or recognizing inconsistencies or incompatibilities between competing ideas or strategies. For Elena, surfacing and resolving these struggles is a primary function of discourse in learning. This vision helps Elena to notice teachers’ misunderstandings, or struggles, and leverage them as partial understandings that teachers can build upon to advance understanding. One way Elena accomplishes this is by reorienting teachers’ conversations by prompting them to consider the reasons why to use a particular approach or strategy. Her questions are aimed at connecting student understanding to teaching and the progression of mathematical ideas.

This is possible because Elena understands how teachers’ various beliefs about teaching and student learning can be connected with their prior experiences and new evidence in ways that lead to resolving dissonance over time. Elena’s own learning journey—characterized by deepening her understanding of the connections between content, pedagogy, and learning—and her many years of experience working with teachers, inform this approach. Because she sees teacher learning as a continuous and gradual process, she does not promote prompt identification of solutions and strategies.

Elena's approach to engaging and advancing teachers' current understandings is precisely the kind of inquiry-based collaborative learning experience that much research has converged on as key to teachers' instructional improvement (Cochran-Smith & Lytle, 1999; Darling-Hammond & Richardson, 2009; Hawley & Valli, 1999; Loucks-Horsley, Hewson, Love, & Stiles, 1998; Putnam & Borko, 2000; Wilson & Berne, 1999). Yet, understanding how to enable such learning experiences within collaborative professional learning environments that check all the right boxes (e.g. job-embedded, content-focused, data-based) has proven elusive for researchers and professional development providers (Opfer & Pedder, 2011). Elena's case advances our understanding by highlighting the role that TLs can play by noticing and leveraging dissonance. This is enabled by a vision of teaching and learning that values dissonance as an opportunity to make new connections between current understandings and new ideas.

On the other hand, Kate also has many years of experience as a teacher and facilitator, though she has not practiced lesson study as long as Elena. Yet, my analysis shows Kate does not use this experience to notice and leverage dissonance as learning opportunities in lesson study. My findings suggest that this is related to the hybrid nature of Kate's beliefs. While Kate values some constructivist approaches to teaching and learning, her utilitarian focus on identifying effective strategies and solutions takes precedence. Research suggests that adopting some elements of an ambitious teaching approach while ignoring others is a common occurrence among teachers in reform environments (Coburn, 2005; Cohen, 1999; Huberman, 1995). Kate's case indicates that this in-betweenness relates to meanings of teaching and learning that do not emphasize the process of connecting and building upon ideas to deepen and advance understanding. Thompson and Zeulli (1999) describe this as the "centrality of thinking as the process through which conceptual learning takes place" (p. 352). Fostering an emphasis on the

process of thinking may be key to further supporting Kate's own shifts in meanings and the leveraging of her expertise.

This is where the multiple strategies conversations make for a particularly interesting example as parallels are noted between each TL's meanings about student learning of mathematics and teacher learning. Kate's talk during facilitation of these conversations suggests that the primary value she sees to teaching multiple strategies is to give students multiple options for solving a problem. Elena, on the other hand, emphasizes the way students can deepen their understanding of mathematics by noting connections between multiple solution pathways and understanding the mathematical idea behind each solution. The same can be said of their approach to teacher learning. Kate seeks to equip teachers with multiple tools and strategies, while Elena guides teachers to make connections between tools, strategies, experiences, and ideas by probing them to consider the reasons undergirding approaches and providing opportunities to bridge current understandings and new ideas.

Elena's approach fosters an opportunity for teachers to reevaluate their beliefs about student learning and teaching as connections are made between current understandings and new information. Kate's approach is not focused on guiding teachers to realize a problem or partial understanding related to their current approach. When competing ideas arise, she does not engage in an in-depth discussion of the reasons why particular approaches are warranted, and she does not guide teachers in her group through a process that could be characterized as engaging in and resolving dissonances related to meanings of teaching and learning. Since shifts in meanings of teaching and learning have been identified as central to supporting teachers' instructional improvement in reform contexts (Cohen & Ball, 1999; Lampert, 1990; Putnam & Borko, 2000),

this is a notable omission, with important implications for research, policy, and practice that will be addressed below.

Reconceptualizing Teacher Agency

In my literature review, I described how recent research and policy reports may have oversimplified the role of teacher agency in instructional improvement by focusing on the quantity of teachers' agency and assuming that more agency will produce positive results (Buchanan, 2015; Calvert, 2016; Lasky, 2005; The Mirage Report, 2016). These studies and reports have focused on teachers' perceptions of agency within policy-influenced structures such as teacher accountability and standardized testing. This focus implicitly emphasizes a conceptualization of agency as a feeling that is more static and structure-dependent than dynamic, complex, and relational. Drawing from sociocultural theory, this study sought to emphasize, and thus better understand, how TLs' agency manifests at the levels of meaning-making and talk/action. This reflects a view of agency in which thought and action are mediated by meanings continuously shaped in interaction with others and environment (Wertsch, 1993). Such an approach allowed me to explore how the nature and enactment of agency may vary between TLs and showed how TLs' agency may shape different opportunities to learn.

The cases of Elena and Kate illustrate the value of conceptualizations of teacher agency that see agency as a dynamic interaction between teachers' meanings and interactions with people and ideas in their context. Both are highly committed TLs who have successfully engaged their peers in a sustained collaborative professional learning activity that teachers in their groups credit with improving their teaching. Following the common definition of agency as capacity to act towards valued outcomes (Ahearn, 2001; Bandura, 2001; Buchanan, 2015; Lasky, 2005; Pyhälto et al., 2012), both of these TLs have displayed a high amount of agency. However, to

effectively support teachers' agency, we need more nuanced understandings of both the capacity and hoped-for valued outcomes that compose agency.

My findings show how, for Elena and Kate, these are intertwined, connected by their meanings about teaching and learning and shaped by group interactions. I showed how differences in their meanings of teaching and learning lead to very different enactments of agency, with the result of distinct learning opportunities for teachers within their groups. Meanings about teaching and learning not only shaped the valued outcomes Elena and Kate sought to achieve, they composed an important aspect of each TLs' capacity to work towards those outcomes.

I also showed how Elena and Kate's agency manifested—and varied—in unscripted moments in which competing ideas arose. This points to the relational and dynamic aspect of agency and underscores the importance of understanding agency in relation to the meanings that undergird it. In collaborative professional learning, unscripted moments may signify key learning opportunities for teachers; they are also moments that require improvisation on the behalf of those leading learning. For TL facilitators, this means their meanings about teaching and learning will interact with the emergence of ideas to influence the nature and enactment of their agency.

These findings point to a need to conceptualize teacher agency as composed by a dynamic interaction between teachers' meanings and emergent ideas as teachers interact with others. This conceptualization of agency is more aligned with the sociocultural theories that undergird most studies of teachers' agency, because it stands to capture the dynamic and context-specific aspects of teachers' agency as they interact with other teachers to make and remake meanings about teaching and learning. My findings suggest this is a useful way to understand linkages between teacher leadership, agency, and collaborative professional learning. Future

theoretical and empirical studies could build on this study to further conceptualize the role of teachers' agency in instructional improvement.

Study Limitations and Future Research

Though effort was made to ensure that findings reflect an accurate portrayal of both cases, the study design limited my observation of many other factors that may shed further light on how TLs exercise agency in collaborative professional learning. For example, the focus on TLs means that analysis of ways that other factors may shape learning opportunities was limited. One such factor worthy of inclusion in future studies is the role of other teachers' in the group. Their meanings and agency should also influence the group culture and the nature of conversations. As TLs interact with and respond to other teachers, this almost certainly further shapes the nature and enactment of their agency and influences opportunities to learn.

Another factor that almost certainly also influenced teachers' opportunities to learn concerns the organizational context. For example, support from school and district administrators, the school culture, and the state policy context are all aspects of the organizational context that would further illuminate findings. School and district administrators help to set professional learning priorities and expectations, and the involvement of principals, via feedback or provision of time and resources, may either facilitate or constrain particular approaches to learning. Because during the period of data collection, the state was transitioning to standards influenced by Common Core and also implementing teacher evaluations based on student achievement, the state policy context may also have influenced TLs' agency and the kinds of opportunities to learn shaped within their groups.

Another limitation concerns the purposive sampling of emergent TLs. These TLs were selected precisely for the potential of their emergent status to illuminate ways that meanings

about teaching and learning manifest in more autonomous learning environments. My broad aim was not to learn how TLs perform their duties in top-down professional learning activities, but to learn how emergent TLs approach their work. Nonetheless, it is possible that TLs' meanings of learning and teaching manifest in different ways in the kinds of mandated roles that TLs often find themselves. The small and purposive aspect of my sample means that my results may not be generalizable, but they can be used to inform future studies that address such issues.

Despite these limitations, my findings indicate some potentially fruitful areas for future research. One such topic that builds upon my current findings concerns investigation of the kind of expertise that TLs need in order to support fellow teachers' learning. While prior research has identified a number of factors such as knowledge of students and context (Ross et al., 2011), knowledge of content (Koellner et al., 2011; Ross et al., 2011), and knowledge of and relationships with teachers (Gigante & Firestone, 2008) as important factors contributing to TLs' expertise, none to my knowledge have attended to how these factors might interact in complex ways to help teachers notice and capitalize on dissonance-resolving learning opportunities. Supporting the development and leveraging of TLs' expertise requires a better understanding of what composes that expertise. While Kate and Elena's cases have helped illuminate important aspects of TLs' expertise, larger samples in more diverse contexts are needed to better inform our understanding of the role of dissonance-inducing and resolving as a component of TL expertise.

Although the focus on opportunities to learn was very useful for what it revealed about facilitation approaches, an important next step is to analyze actual changes in teachers' beliefs and practice as a result of TL's facilitation. Teacher learning outcomes are challenging to record and observe, particularly in a context such as Elena's group, where learning may be gradual and

involve the raising of more questions instead of straightforward solutions. My analysis of this data suggests that teachers' talk in later planning meetings, the debrief, and interviews conducted after the lesson study cycle are all potential sources for analyzing how facilitation approaches influence teachers' understandings. While a well-designed survey is a tempting way to capture changes in teachers' beliefs, the unpredictable nature of the dissonances that emerge as learning opportunities creates a challenge to pre- and post- designs, since it requires anticipating the beliefs that may change. Reflections are another promising source of data, since they provide a venue for teachers to articulate their thinking process. However, reflections, interviews, or any other tools designed to capture the outcomes of dissonance-based learning opportunities would need to be adapted and targeted to prompt teachers' reflection on the topics around which dissonance emerges in the course of conversation.

It is also important to understand how TLs' agency relates to the ultimate valued outcome in instructional improvement: student learning. Examining student learning during the research lesson is one way to use lesson study data to address this research goal. Analysis of students' conversations and responses during the research lesson would illuminate the kind of student thinking supported by the lessons crafted as a result of facilitation approaches. On a larger scale, data would need to be collected that linked the learning of students whose teachers participated in lesson study with the facilitation approaches of TLs. While establishing those links might be challenging, such data could be a useful tool to inform further research and policy.

Another extension of this project that addresses another study limitation is understanding how the group's collective agency shapes and is shaped via facilitation. This would further capture the dynamic and contextual aspect of agency. Existing data with the same groups could be applied to investigate how group members' collective and individual meanings of teaching

and learning also shape opportunities to learn via lesson study. This would entail identifying variations in meanings of teaching and learning between teachers and coding conversations to see how those meanings are negotiated in group interactions to shape collective agency. Such a study could further illuminate how interactions between TLs and teachers shape learning opportunities.

To better understand why Elena and Kate's approaches differ and how to support the development of TLs, it would also be helpful to conduct a more thorough analysis of how Elena and Kate's past and current learning experiences—and the contexts of those experiences—have shaped their meanings of learning and leadership. Additional in-depth interviews designed to prompt further reflection on past and current learning experiences would be needed to complement existing data. Given considerable overlap in how they learned about lesson study, further analysis of how their meanings of teaching and learning were developed before, during, and because of lesson study would add to findings about the nature of their agency, with implications for how to support future TLs and facilitators of lesson study.

Policy Implications for Teacher Leadership in Professional Learning

Despite decades of promotion in both research and practice around the world, we still do not fully understand the mechanisms that might enable effective collaborative professional learning for teachers (Akiba, Howard, & Liang, in press; Opfer & Pedder, 2011). Teacher leaders may have unique potential to mitigate challenges to teachers' sustained and meaningful engagement in instructional improvement, but this study suggests that TLs may need unique policy and learning supports to recognize that potential.

Creating policy pathways for teachers to exercise leadership in collaborative professional learning should entail providing support and preparation for TLs that includes engaging TLs in a

process of surfacing, evaluating, and advancing their own beliefs and understandings of teaching, learning, and pedagogy. My findings suggest that TLs may need guidance on how to evaluate and use their own experiences as a source of expertise in a way that builds upon and respects the ideas and professionalism of their peers. As described above, findings from this study suggests that TLs' meaning about teaching and learning form an important aspect of their leadership capacity. That TLs need time and support to build leadership capacity has been noted elsewhere (Gigante & Firestone, 2008; Margolis & Huggins, 2012; Taylor et al., 2011). This study reinforces those findings and adds the suggestion that TLs need opportunities to evaluate and reflect on their current approaches to teaching, leading, and learning and, importantly, connect their approaches to a broader vision of instructional improvement.

One promising way to do this is by establishing networks of TLs, in which TLs can learn from one another and build a dynamic knowledge base of teacher leadership. This means that practice of TLs should be made public, in much the way that calls for making teachers' practice public has been promoted (Morris & Hiebert, 2011). For example, although Kate has had opportunities to observe Elena as she teaches a research lesson to students, she has not had opportunities to observe Elena as she leads and facilitates teachers. The purpose of such observations would not be to allow Kate to copy the strategies employed by Elena, but to prompt evaluation and reflection on her own approach, and the beliefs that undergird it. My findings suggest that strategies such as modeling dissonance-resolving conversational patterns or providing TLs with a list of recommended questioning strategies may be limited in their ability to support TLs if they are not accompanied by efforts to engage TLs' tacit meanings about teaching and learning and advance and connect those meanings to suggested tools or strategies. This may be facilitated by networking TLs, but it should not be assumed to be in an inherent

feature of TL networks. Instead, explicit attention should be given to engaging teachers' meanings in ways that build upon and advance their current understandings.

Of course, such a proposition is both timely and costly, requiring time away from the classroom, funding for substitutes, and continued opportunities to share and reflect. Video may be one way to mitigate some logistical challenges, but it is also costly. In any case, this study suggests that funding for teacher leadership positions should be accompanied by ways to fund time and space for ongoing teacher-leader professional learning characterized by observation and reflection.

Other ways that TLs may surface and evaluate their beliefs about student learning/teaching and teacher learning/facilitating include professional learning opportunities in which TLs reflect on their own learning experiences over time, how those experiences have shaped their current approaches, and how those experiences align (or not) with new evidence related to teaching and learning. This type of learning is also well-suited to collaboration with other teacher leaders, but skillful facilitation would be key to balancing the need for a supportive environment and conversations aimed at probing and evaluating current understandings—and tying them to TLs' practice. This may be a fruitful area for research-practice partnerships that draw upon the expertise of experienced teachers of teachers and the situated experiences of emerging or practicing TLs to collectively develop and test new knowledge about how TLs can support meaningful learning opportunities for teachers.

Finally, to truly support TLs' capacity to effectively shape teachers' opportunities to learn, evaluation and accountability policies should balance the focus on proof of learning with a focus on engaging in a process of improvement (Margolis & Doring, 2012). For teacher policy, this could mean rewarding evidence of reflection and improvement as well as outcomes of those

efforts. Teacher leaders would also need their roles defined in ways that reflect the goal of continuous improvement instead of the transmission or disbursement of best practices.

In sum, leveraging teacher leadership requires supporting TLs' continual growth via learning opportunities responsive to the unique challenges of teachers leading teachers. At the federal level, these supports could come in the form of competitive grants that reward efforts to engage TLs in networked professional learning activities. State-level policymakers could ensure that systems for evaluating teachers and TLs reflect a focus on improvement as well as proving, create programs to build statewide networks of TLs, and incentivize professional development plans that include time, funding, and learning supports for TLs leading collaborative professional learning. Districts may have a particularly important role to play, since they are usually charged with coordinating professional development offerings, including scheduling and allocating funds. By building in time for TLs to not only attend to the learning of their peers, but their own professional learning, districts could better leverage the potential advantages of TLs as keys to instructional improvement. At the school level, administrators are in a key position to identify emergent TLs and connect them to the kinds of supports that would help them recognize and develop their expertise. Many of these suggestions may already be underway in some areas, but this study suggests that their success may be dependent on the degree to which they engage and advance teachers' meanings of teaching and learning.

In the long-term, further research on the complex relationship between teacher leadership, collaborative learning, and teachers' agency that investigates learning as engaging in dissonance resolving should helpfully inform policies that effectively support teachers' instructional improvement. Building upon this study to inform such research stands to enhance understanding of how to support the development of TLs and how to support teachers'

engagement in professional learning activities that lead to the improved student learning outcomes envisioned by reform.

APPENDIX A
IRB APPROVAL



Office of the Vice President for Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 05/15/2018

To: Cassandra Howard [REDACTED]

Address: [REDACTED]

Dept.: EDUCATIONAL FOUNDATIONS AND POLICY STUDIES

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
TEACHER AGENCY IN COLLABORATIVE PROFESSIONAL LEARNING IN INSTRUCTIONAL REFORM
CONTEXTS

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 05/13/2019 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB0000446.

Cc: Motoko Akiba [REDACTED], Advisor
HSC No. 2018.22095

APPENDIX B

CONSENT FORMS

Teacher Agency in Lesson Study Project: Facilitator Consent Form

Dear Facilitator,

Thank you for your participating in the Teacher Agency in Lesson Study Project. You were invited to participate based on your facilitation of a lesson study team during the 2014-15 and 2015-16 school years. We ask that you please read this form carefully and ask any questions you may have.

The objectives of this project are to learn about: 1) how teachers interact with other teachers during lesson study, 2) how those interactions reflect teachers' values, goals, and beliefs about teaching and learning, and 3) how those interactions influence the group learning process.

Your participation in this project is voluntary. If you agree to be a part of this study, you will be asked to participate in an audio-recorded interview lasting approximately 120 minutes each in which you will be shown video clips of your facilitation of lesson study and asked about 1) group interactions during lesson study, 2) values and beliefs related to learning and instruction, and 3) your perception of the current reform environment in education. A list of specific questions and video clips will be emailed to you before the interview date. If you decide to participate, you can still withdraw from the project at any time.

Interviews will be audio-recorded. To minimize the risk of your responses being shared with colleagues or superiors, all the data collected from you will be treated as confidential to the extent allowed by law, and only the researchers will have access to the data. The data will be stored in password-protected computers and destroyed after ten years. The information gathered through this interview will NOT be shared with anyone outside the project team.

If you decide to participate in this project, you will receive a \$100 Amazon gift card for your time. This gift card will be emailed to you after completion of the interview. There are no other anticipated benefits to you directly, though we hope that this study will benefit the teaching profession by growing our knowledge of how to support teachers' learning.

Please provide your signature if you agree with the following statements:

- I understand the nature of my participation in this project consent to participate in the interview described above.
- I understand that I can withdraw from the project at any time.

Your name _____

Teacher Agency in Lesson Study Project: Teacher Consent Form

Dear Teachers,

Thank you for considering participation in the Teacher Agency in Lesson Study Project. You were invited to participate based on your involvement on a lesson study team during the 2014-15 and 2015-16 school years. We ask that you please read this form carefully and ask any questions you may have.

The objectives of this project are to learn about: 1) how teachers interact with other teachers during lesson study, 2) how those interactions reflect teachers' values, goals, and beliefs about teaching and learning, and 3) how those interactions influence the group learning process.

Your participation in this project is voluntary. If you agree to be a part of this study, you will be asked to participate in an audio-recorded interview lasting approximately 60 minutes in which you will be shown a video clip of your interactions during lesson study and asked about 1) group interactions during lesson study, 2) values and beliefs related to learning and instruction, and 3) your perception of the current reform environment in education. A list of specific questions and video clips will be emailed to you before the interview date. If you decide to participate, you can still withdraw from the project at any time.

Interviews will be audio-recorded. To minimize the risk of your responses being shared with colleagues or superiors, and all data collected from you will be treated as confidential to the extent allowed by law, and only the researchers will have access to the data. The data will be stored in password-protected computers and destroyed after ten years. The information gathered through this interview will NOT be shared with anyone outside the project team.

If you decide to participate in this project, you will receive a \$25 Amazon gift card for your time. This gift card will be emailed to you after completion of the interview. There are no other anticipated benefits to you directly, though we hope that this study will benefit the teaching profession by growing our knowledge of how to support teachers' learning.

Please provide your signature if you agree with the following statements:

- I understand the nature of my participation in this project consent to participate in the interview described above.
- I understand that I can withdraw from the project at any time.

Your name _____

Your signature _____ Date: _____

If you have any question about the project, please contact:

Cassie Howard, Researcher, (_____
Dr. Motoko Akiba, Academic Adviser, (_____)

For questions related to the rights of human subject, please contact:

FSU Human Subjects Office

humansubjects@fsu.edu

(850) 644-8673

The project ID:

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BIOGRAPHICAL SKETCH

Cassie received her B.A. from the University of Mississippi and her M.A. in Latin American Studies from the University of Florida. She has taught in elementary, middle, and high schools, which spurred her interest in how to support and prepare teachers in ways that lead to enhanced, meaningful learning opportunities for all students. Her areas of research interest include teacher professional learning, teacher leadership, teacher agency, and teacher policy and reform.