

**A Case Study of One History Teacher's Problem Solving
in the Context of Collaborative Reflection**

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THESIS
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LIST OF ABBREVIATIONS

IRE	Teacher Initiation-Student Response-Teacher Evaluation
IRF	Teacher Initiation-Student Response-Teacher Follow Up
PCK	Pedagogical Content Knowledge
PDE	Productive Disciplinary Engagement

SUMMARY

Understanding how teachers identify and address authentic, domain-specific problems of practice on an ongoing basis is fundamental to informing researchers and teacher-educators about how teachers learn. However, despite widespread agreement in the literature that teacher learning is situated and that teachers learn through reflection, very few studies actually investigate how teachers attempt to iteratively solve problems of practice in relation to the particulars of their context. There is also scant research on changes over time in reflective processes, instruction, or their relationship to what teachers regard as problems of practice. The current longitudinal case study closely examined one middle school history teacher's ongoing process of reflection in collaboration with researchers (mainly the author) and how discussion of problems of practice that emerged in these reflections impacted the teacher's knowledge and practices over a two-and-a-half-year period of time. Thus, this study takes a teacher-centered approach to exploring teacher learning, investigating the specific problems the teacher identified as important and her process of solving these problems in her classroom.

The findings from this case study of teacher learning reveal a complex interplay among opportunities to learn, design, enact, and reflect. Findings from the study indicate that the teacher's framing of problems generally progressed from a focus on facilitating inquiry-based historical discussions, to a focus on engaging students in discipline-specific inquiry practices, to a focus on getting students to take a more active role in deepening their historical inquiry processes. These shifts in framing were found to be related to changes in the teacher's own knowledge and understanding of historical inquiry, her explorations of instructional practices for supporting students' historical inquiry, and her reflection on enactments of them. The courses of action the teacher took to address problems of practice aligned well with theoretical models of

practitioners' reflection, including defining problems, developing solutions, testing solutions, and either experiencing resolution or redefining the problem. The teacher's courses of action differed depending on the nature of the problem. These various findings offer insights about considerations for supporting teacher professional development and methodological considerations for studying teacher reflection, learning, and change.

1.0 INTRODUCTION

Research indicates that teacher professional development is most effective when it is active, collaborative, ongoing, and situated in authentic practice (Darling-Hammond, 1998; Little, 1993; Webster-Wright, 2009; Wilson & Berne, 1999). However, most schools or professional development programs do not meet these scholarly criteria. Instead, many teachers' professional development experiences are sporadic, disconnected, and do not provide many opportunities for reflection about contextual, domain-specific practice. Furthermore, research on teacher learning is often "decontextualized from practice" (Fishman & Davis, 2006, p. 538). That is, research and professional development lag behind theory about teacher professional growth (Webster-Wright, 2009).

Teachers are commonly pressured to make core changes to their practice (Spillane, 1999), such as shifting from traditional to inquiry-based approaches in content area classrooms, but with little support in the way of addressing problems of practice that emerge in attempting to facilitate such changes to their practices. Teaching is complex, as it continually presents problems of practice with no given formula or prescription for solving. Teachers are constantly faced with having to make decisions in "widely varying contexts" (Davis & Krajcik, 2005, p. 4) and these problems differ depending on the specifics of the context. Thus, teachers who aim to grow professionally regularly and systematically attempt to identify and solve authentic, situated problems of practice through reflection. Reflective practitioners engage in the rigorous, iterative process of enacting changes to instruction based on assessment of problems and contemplating on the outcomes to inform subsequent instruction (Dewey, 1933; Schön, 1983). Reflection involves "deliberate thinking about action with a view to its improvement" (Hatton & Smith,

1995, p. 40). The process is ongoing, arduous, tied to the context, and necessitates deliberation with others.

Research about how teachers identify and address authentic, domain-specific problems of practice on an ongoing basis is fundamental to informing researchers and teacher-educators about how teachers learn. A deeper understanding of teacher learning in this area in turn serves to inform the landscape of teacher professional development. The current longitudinal case study closely examined one teacher's learning and her related reflection process over more than two school years. Specifically, this study describes the teacher's ongoing process of reflection in collaboration with researchers (mainly the author) and how discussion of problems of practice that emerged in these reflections played a role in changes to the teacher's knowledge and practice. This case study affords the exploration and description of one teacher's professional learning in relation to the particulars of her experiences and specific context, allowing for detailed descriptions of her specific experiences and how she addressed specific problems of practice that emerged in her attempts to change core dimensions of her instruction.

1.1 Background and Rationale for the Study

The middle school history teacher in this case study, Heidi¹, was a participating teacher in a larger research study, a multi-university research grant focused on helping teachers support students' engagement in argumentation using multiple sources in 6-12th grade history, science, and literature classrooms called Project READI. Project READI developed an approach to teaching and learning processes articulated in a set of learning objectives specific to each discipline, and a set of design principles related to tasks, materials, and instructional processes.

¹ Teacher name is a pseudonym

Heidi was involved in the research project under two different capacities. She was a participating teacher in the Teacher Professional Development Network. The Teacher Network comprised a group of history, science, and literature middle school and high school teachers who met several times a year for professional development around supporting students in argumentation using multiple texts. Heidi was also one of two classroom teachers on the READI History Design Team. The Design Team included the teachers plus researchers, teacher-educators, and historians in iterative cycles of designed based research as a means of developing what became the READI approach. Heidi collaborated in this process and through her implementations provided key insights for the design.

As a researcher on the Design Team, the author (referred to as the researcher) observed in Heidi's classroom and worked closely with her in the iterative design process. The teacher and researcher met regularly to plan her curriculum and to debrief about her instruction, and over time they developed a collaborative working relationship. In the first year of her participation on the project, the researcher started to notice that their planning/debriefing meetings seemed to significantly impact her practice. At the same time, the researcher noticed they seemed to be co-constructing understandings about a somewhat enigmatic territory – what it means to support middle school students' historical inquiry. The meetings became an ongoing, collective inquiry about the challenges of this endeavor and a context for collaborative reflection about how to address these challenges in relation to the specific content, learning goals, and student needs in Heidi's classroom.

A case study of a teacher involved on Project READI in these capacities represents a purposeful sampling strategy for gaining insight into teacher learning. Heidi represents a case of a teacher who consistently reported experiencing noticeable growth in her knowledge and

practice of supporting students' historical inquiry. Heidi represents an "information rich" case because her situation "manifests the phenomenon of interest intensely" (Patton, 1990, p. 171). For Heidi, teaching the content of history and approaching teaching from a disciplinary inquiry stance were both new to her. While Heidi was an experienced teacher in her 11th year of teaching at the start of her participation on Project READI, the bulk of her experience had been in teaching English and language arts. When she started on the project, she had just transitioned to teaching Social Studies/History. Heidi intentionally worked on changing the core of her practice to support students' historical inquiry over a period of many years. Heidi reported that before she started on Project READI, she approached teaching Social Studies from a Language Arts perspective, focusing on reading historical fiction novels and current events. She reported, "It wasn't until I started working on READI that I began to actually transition to teaching history" in her Social Studies/History classroom (email exchange, 4/4/14).

This case study aims to "examine a specific instance but illuminate a general problem" (Merriam, 1998, p. 30) by exploring and describing the particulars of a phenomenon as they occurred in situ. Specifically, this study identifies and describes changes to Heidi's knowledge and practice and how her process of reflection in collaboration with a university researcher facilitated such changes. Teacher learning in this study is conceptualized as changes to knowledge and practice. The way teachers talk about, or frame, problems of practice, reflects their knowledge and practice. Thus, changes in framing of these problems, or changes in what problems are talked about and how those problems are talked about, reflect learning. This case study closely analyzed the specific problems of practice that emerged in the context of collaborative reflection in these meetings, how Heidi framed these problems differently over

time, and how she attempted to solve these problems of practice over time. Specifically, the research questions for the study are:

- What problems of practice emerged for the teacher and how did her framing of these problems evolve over time in the context of collaborative reflection?
- What was the teacher's process of problem solving in the context of collaborative reflections and how did her process play a role in framing problems differently over time?
- How did the teacher's instruction align with the evolution of problem framing and the teacher's problem solving process in the collaborative reflections?

1.2 Overview of the Study

This dissertation is organized in five major chapters. This introduction provides the background and rationale for a case study investigating how a teacher's problem solving process played a role in facilitating change in teaching knowledge and practice. The second chapter explicates the theoretical and conceptual framework for the study and provides a review of related literature. The third chapter describes in detail the research methodology, including a description of the design, context, and methods of analysis. The fourth chapter presents findings from analysis of the teacher and researcher's discourse in the planning/debriefing meetings, including descriptions of the problems of practice that emerged for Heidi, how her framing of these problems evolved over time, and how the teacher's problem solving process played a role in changes to her framing of problems. The fourth chapter also presents findings from analysis of classroom observation data that includes descriptions of changes that were evident in Heidi's instruction and the alignment of these changes with the problems, framings, and solutions

inferred from the discourse during the meetings. Finally, chapter five provides a discussion of the major findings as well as implications for these findings for research and for teacher education.

2.0 REVIEW OF THE LITERATURE

This chapter reviews the literature about teacher change and teacher learning as mediated through reflection. The chapter then operationalizes key constructs and reviews theoretical and empirical research central to the area of focus of teacher change in this study – supporting students’ historical inquiry.

2.1 Teacher Change

As Lampert (2009) noted, one way to conceptualize teaching practice is via the dictionary definition of “practice,” as a “habitual way or mode of acting” or what teachers do “constantly and habitually” (p. 25). The current study draws from that basic conceptualization to define practice as the way teachers routinely teach, or as what teachers do instructionally on a regular basis. Thus, making core changes to one’s teaching practice involves fundamental shifts in pedagogical understandings and instructional approaches. Core changes to one’s practice, such as altering classroom discourse patterns or students’ roles in discussion, requires teachers to “question, unlearn and discard much of their current, deeply rooted understandings of teaching, learning, and subject matter” (Spillane, 1999, p. 154). Changes to teachers’ core practice can be challenging, time consuming, and uncomfortable, and therefore substantial changes are less frequent than change of a smaller magnitude (Spillane, 1999; Waters & Cameron, 2007).

Changing the core of one’s practice demands the ability to “let go” of old routines and alter one’s current assumptions about teaching to adapt to the needs of the specific, and ever-changing teaching environment (Bransford, Brown & Cocking, 2005). Researchers and teacher-educators emphasize that professional growth involves learning to develop adaptive expertise (Hatano & Inagaki, 1986). Adaptive expertise involves developing efficiency through routines,

but understanding when and how routines support learning and when they need to be questioned and altered (Darling-Hammond & Bransford, 2005; Tripp, 1993/2012). Being an adaptive expert requires teachers to be flexible and innovative, being able to move beyond their current routines and alter their practice to address learners' needs and deal with the unique and unpredictable problems that emerge in instruction (Darling-Hammond & Bransford, 2005; Hennessey, 2014). There is no given formula for such know-how (Hammerness, Darling-Hammond, & Bransford, 2005). Professional change involves the increasing ability to both test new instructional approaches and to explain and justify choices in one's practice.

2.2 The Situated Nature of Teacher Learning and Change

The problems that emerge in teaching differ depending on the domain, learning goals, students' developmental level, and the norms and the culture of the school. Thus, teachers learn through regular and systematic attempts to identify and solve authentic, situated problems of practice. That is, most pedagogical understandings emerge through practice (Darling-Hammond & Bransford, 2005; Schön, 1983); teachers develop practical know-how (Schön, 1983) or "craft knowledge" (Putnam & Borko, 2000; Tripp 1993/2012) through their experiential learning, in combination with theoretical learning acquired through modes such as coursework, reading professional materials, professional development. (Tripp 1993/2012).

Situated perspectives emphasize that learning is inextricably tied to the context (Brown, Collins, & Duguid, 1989; Putnam & Borko, 2000). In other words, the nature of knowing cannot be separated from when, where, how, and with whom it was learned. The notion of learning as situated, however, is not meant to imply that situations represent "simple location[s] in space and time (Lave & Wenger, 1991, p. 33). Rather, it is a "much more multifaceted and relational

perspective in which ‘agent, activity, and the world mutually constitute each other’” (Leander et al., 2010 p. 334). Situated paradigms also assume that learning is incremental, such that knowledge is deepened over time with every related experience. Brown et al. (1989) illustrate this notion with the analogy of learning vocabulary words. One may learn the meaning of a new word and understand it as it relates to the particular context in which it was first introduced. But the individual may not fully grasp the many ways the word can carry different (sometimes greatly different, sometimes different in nuanced ways) meanings in various contexts until they have heard and seen it used in many ways, over time, across multiple situations. That is, what we learn is continually recontextualized over time and across contexts.

When enacting instruction, teachers continually shape and reshape their understandings and their practices in light of the particulars of the situation. Over time teachers construct “concrete, detailed knowledge developed and stored in relation to specific learner, classroom and activity contexts, and accessed for use in similar situations” (Hennessey, 2014, p. 6-7) by continually attempting to put theory into practice and using practice to refine the theory. The nature of teaching necessitates teachers constantly make connections between what they learn outside of instruction and what they discover during instruction, bridging theoretical and practical knowledge. That is, changing one’s practice isn’t as simple as hearing about a new instructional approach and inserting it into the classroom. Rather, integrating new approaches into instruction is an evolutionary process that depends on the specifics of the context, such as the teacher’s prior experience, his/her beliefs about the instructional approach, the available resources, etc. For example, one study investigating pre-service teachers’ written reflections in a teacher education course found teachers gradually shifted from relying on their prior classroom experiences as learners and formal knowledge (e.g. theory learned in coursework) to using

classroom experiences as a basis for informing their practice (Eick & Dias, 2005). Acquiring such practical knowledge about teaching occurs in the context of “authentic practice” (Eick & Dias, 2005; Putnam & Borko, 2000).

2.3 Teacher Knowledge

The situated nature of teacher learning means teachers have different knowledge demands across different contexts, such as varying grade levels and content areas. Bransford, Darling-Hammond and LePage (2005) emphasize Dewey’s supposition that teachers mediate students’ needs and the requirements of the curriculum. The authors identified three areas of knowledge fundamental for teachers to mediate student learning across contexts:

- Knowledge of learners and how they learn and develop within social contexts;
- Conceptions of curriculum content and goals: an understanding of the subject matter and skills to be taught in light of the social purposes of education, and;
- And understanding of teaching in light of the content and learners to be taught, as informed by assessment and supported by classroom environments (Bransford, Darling-Hammond, & LePage, 2005, p. 10)

The three areas of knowledge outlined above align to three interrelated types of teacher knowledge Shulman (1986) identified, and that are widely recognized across the literature:

knowledge of learners, content knowledge, and pedagogical content knowledge (PCK).

Knowledge of learners includes understanding what students need to learn and what might be difficult for them to learn, as well as understanding students’ various needs (i.e. physical, social-emotional, linguistic) (Bransford, Darling-Hammond & LePage, 2005; Brown, 2008; Shulman,

1996). Content knowledge, also referred to as subject-matter knowledge and disciplinary knowledge (i.e., Borko, Mayfield, Marion, Flexer, & Cumbo, 1997; Hynd, Holschuh, & Hubbard, 2004; Shulman, 1986), extends beyond merely understanding the facts and information of a discipline and includes understanding the organization of the concepts and principles as well as the “syntax,” or set of rules and practices, that make up a discipline. For example, historical content knowledge entails knowing the details surrounding Rosa Parks’ refusal to give up her bus seat from a legal, social, political, and ideological perspective as well as knowing how to read a document’s subtext, or the author’s intentional and unintentional projected worldviews about the incident (Wineburg, 2001, p. 66). Pedagogical content knowledge (PCK) “goes beyond knowledge of subject matter” and encompasses “subject matter knowledge for teaching” (Shulman, 1986, p. 9). PCK involves unpacking content knowledge into manageable components, representing information and constructing tasks to help students comprehend new content, and recognizing what might be easy or difficult about these processes for students every step of the way.

Each of these types of knowledge is integral to supporting students’ learning across disciplines. Seixas (1993) characterized teachers as the “bridge” between the larger disciplinary community and the classroom community. Thus, integral to content area teachers’ professional growth is deepening one’s knowledge of learners, content knowledge, and PCK vis-à-vis the respective discipline. For example, the recent push for teachers to support students’ disciplinary practices/literacies (Moje, 2008; Goldman, 2012; Carnegie Council on Advancing Adolescent Literacy, 2010) suggests that content area teachers need to have a deep understanding of what these specialized literacies entail and how to engage students in these practices.

2.4 Teacher Reflection

Researchers and teacher-educators generally agree that reflection mediates teacher learning and change (Baird, 1992; Clarke & Hollingsworth, 2002; Rodgers, 2002a). In fact, many view reflection as a “hallmark of professional competence for teachers” (Larrivee, 2008, p. 341). Dewey (1933) is often viewed as the original proponent of reflection as fundamental to improving the practice of teaching. Dewey defined reflection as “active, persistent and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends” (p. 9). Since then, many conceptions of reflection have emerged in the literature to refine and expand on this definition. But most conceptions mirror Dewey’s emphasis on reflection as an active process that serves to unearth assumptions about practice through examination of experience, thus informing subsequent action.

Schön (1987) theorized that experienced practitioners engage in in-the-moment thinking and adjustments to practice on the spot (“reflection-in-action”) as well as thinking about practice and problem solving after the fact (“reflection-on-action”). Reflection-on-action is key to teacher learning because it allows time to ask questions and formulate ideas about practice, often in collaboration with others. Killian and Todnem (1991) elaborated Schön’s model to include “reflection-for-action.” Reflection-for-action guides future practice. For teachers, this can entail the process of identifying and attempting to solve potential problems of practice during the planning phases of instruction. Each of the three forms of reflection are fundamental to teacher professional growth, as teachers need to be adaptive and innovative problem solvers before, during, and after instruction. However, because of the challenges of capturing thinking that goes on in the midst of action, it is a more straightforward process for teacher-educators to support reflection and for researchers to investigate reflection before and after instruction (reflection-for-

action and reflection-on-action). In the current study, the teacher-researcher planning/debriefing meetings served as a space for Heidi's reflection before and after instruction. At times, meetings also provided a space for Heidi to report her reflection during instruction (reflection-in-action).

2.4.1 Problems of Practice

In teaching, reflection entails moving beyond automatic thought, routine action, and impulsive or unthinking behavior (Schön, 1983; Tripp 1993/2012) and toward interpreting and making sense of practice (Freese, 2006). It is a means to intentionally work through “provocative question[s]” or “troublesome situation[s]” (Borko et al., 2008) that teachers encounter on a regular basis. Reflection, then, has the potential to transform practice. However, in order for it to have a “critical function,” reflection needs to uncover and challenge teachers' current assumptions about their practice (Webster-Wright, 2009). Reflection is initiated by a sense of uneasiness and uncertainty about specific aspects of practice, and propelled by a desire to resolve the disequilibrium (Dewey, 1933; Schön, 1983; Rodgers, 2002a). Problems of practice in this study are thus defined as instructional issues that give teachers a sense of disequilibrium and that they attempt to resolve.

Problems of practice are “complex and ill-defined” rather than “well-structured” with straightforward solutions (Teo, 2012), reflecting the situated nature of teaching such that problems are specific to each teaching context. For that reason, problems of practice have been described in various ways across teaching contexts. For example, Lampert (2001) identified several problems of practice she encountered as a mathematics teacher in her fifth grade classroom, a few of them including “planning lessons, working with students while students work independently or in small groups, instructing the whole class at once, [and] linking lessons over time” (p. 423). Ghousseini (2015) examined problems of practice that a pre-service middle

school mathematics teacher faced and found her problems of practice ranged from “attending to students’ spontaneous mathematical contributions” in discussion to “getting students to talk and listen to each other” in discussion (p. 344). Mikeska, Anderson, and Schwartz (2008) synthesized three common problems of practice for elementary science teachers that had been described by teacher-educators across multiple studies: determining how to meaningfully engage students with content, utilizing curriculum materials effectively, and understanding students’ thinking.

Many research studies and professional development programs encourage teachers to investigate problems of practice through examining things that make them uncomfortable, frustrated, confused, surprised, and excited. Approaches include reflecting on critical incidents (Newman 1998; Tripp 1993/2012), conflicts and tensions (Beach & Pearson, 1998), crisis moments (Ma, 2010), and “bumpy moments” (Romano, 2006). What unifies these approaches is a focus on teachers identifying and solving authentic, situated problems that give teachers a sense of disequilibrium. Newman (1998) contends that reflection on problems of practice supports teacher learning, agency, and change because teachers are socialized to rely on outside forces, such as policies, textbook manuals, “expert” researchers and professional development providers, rather than to turn inward and examine their own beliefs and understandings to guide instructional decisions. She asked teachers in her graduate education course to write about and discuss critical incidents, or moments of instruction that made them uneasy, frustrated, or disappointed. She found that reflection served as a way for teachers to identify contradictions between what they felt they were “supposed” to do and what they believed to be more effective practices. Reflection was a means for these teachers to make new meaning of and ultimately transform their practice.

2.4.2 Framing Problems of Practice

The ways teachers talk about, or frame problems of practice reflect their perspectives on the problems. Framing can be described as how practitioners “structure” a problem and determine “parameters” for the situation (Gao & Kvan, 2004; Schön, 1983). Schön (1983) referred to framing as how practitioners: “determine the features to which they will attend, the order they will attempt to impose on the situation, the directions in which they will try to change it. In this process, they identify both the ends to be sought and the means to be employed” (p. 165). Thus, Schön (1983) described framing as how one defines or views a problem that in turn influences the particular aspects of the problem to which practitioners will attend when problem solving. Similarly, Bannister (2015) explains that the way teachers frame problems represents varying perspectives on the issue, and can influence how teachers respond to the problem.

Similarly, Benford and Snow (2000) describe problem solving as involving diagnostic and prognostic framing. Diagnostic framing refers to defining problems and attributing cause(s) to problems, whereas prognostic framing refers to proposing and developing solutions to problems (Bannister, 2015; Benford & Snow 2000; Coburn, 2006). When participants engage in diagnostic and prognostic framing, various aspects of their talk provide insights into what the participants deem important and relevant at that moment in time (Benford & Snow, 2000; Coburn, 2006). For example, the language teachers use (such as specific words and phrases), the specific components of problems on which they focus (or don’t focus), who or what they hold responsible for the problem, and the particular solutions they propose shed light on their perspectives of the problems they identify.

The way practitioners frame problems can change over time. Changes in how teachers frame problems can reflect changes in their knowledge and practice as well as the extent to

which problems have been resolved. Bannister (2015) studied a high school mathematics professional learning community across one school year and found noticeable shifts in the teachers' framing of the problem of struggling readers across one school year. Namely, the group moved from a focus on "fixed attributes" of students and what the *students* needed to do to change and improve at the beginning of the year, to a focus on understanding specific reasons students were struggling and what the *teachers* could do to support students' needs near the end of the year. For example, one teacher's language shifted from talking about one of her struggling students as the "flaky annoying kid" who "refuses to do any work," to talking about the same student as someone who was "failing" but "demonstrated key understandings of challenging mathematical content" (p. 2). This change in language reflects the teacher's perspective shifting from a focus on the student's deficits to a focus on what he was capable of doing. Russell and Munby (1991) found that the language one elementary teacher used to frame a problem about writing instruction changed over time, indicating resolution of the issue as well as marking differences in the teacher's perspectives on teaching writing. Namely, revising her writing instruction to be more directive helped the teacher sort through the issue and to inform her understanding of effective writing. In this example, the teacher revising her writing instruction in an attempt to solve her problem of practice represents a fundamental component of teacher reflection - experimenting or testing hypotheses, which reflects a key step of engaging in the reflection process.

2.4.3 Solving Problems of Practice

Drawing from Dewey's (1938) emphasis on teacher learning through reflection on experience, Rodgers (2002a) describes reflection as "a systematic, rigorous, disciplined way of thinking, with its roots in scientific inquiry" (p. 845). When teachers experience a puzzling

phenomenon, a perplexing issue, a challenging situation, or a “disturbing state of perplexity (or disequilibrium)” (Rodgers, 2002a, p. 850), they are driven by a desire to resolve such problems through a series of steps that mirror the scientific process. Thus, reflection is a form of experimentation. Teachers identify issues that need to be addressed, develop hypotheses about how to fix them, test the hypotheses in instruction, evaluate the outcomes, and repeat the cycle. It is a rigorous process, as “it is an iterative, forward moving spiral from practice to theory to practice” (Rogers, 2002a, p. 863).

A major goal of the current case study is to describe how Heidi’s process of addressing problems of practice relates to theoretical models of practitioners’ problem solving cycles. Figure 1 depicts a model of teachers’ iterative problem solving as synthesized from extant theoretical and empirical literature about practitioner reflection (i.e., Dewey, 1933; Rodgers, 2002a; Rodgers, 2002b Russell & Munby, 1991; Schön, 1983; Sims, 2011). The problem solving cycle as synthesized from the literature involves four phases: defining problems, developing solutions, testing solutions, and then either experiencing resolution or redefining the problem (moving back to the first phase of the cycle). As will be elaborated in chapter three, the current study describes the courses of action Heidi took to address problems of practice she identified and elaborated in the planning/debriefing meetings.

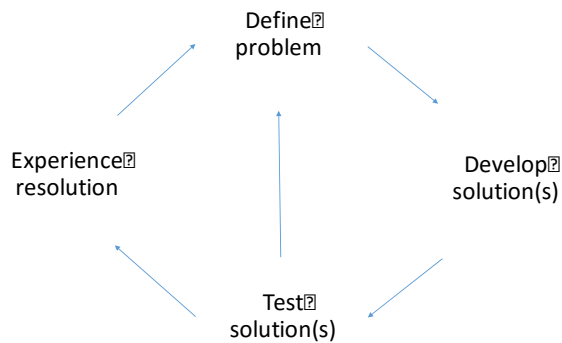


Figure 1. Model of practitioners' iterative problem solving cycle

The first phase of the cycle, defining the problem, involves describing features of the problem. This phase includes identifying uncomfortable feelings, telling stories about and describing experiences, becoming more aware of the problem, explicating details about the issue (Atkins & Murphy, 1993; Boud, 1985; Koole et al., 2001; Korthagen, 2005; Mezirow, 2000; Rodgers, 2002b). This phase of the cycle can also include reasoning about why the problem exists and attributing responsibility for the issue (i.e. diagnostic framing) (Benford & Snow, 2002; Coburn, 2006). Since problems of practice are ill-defined and inextricably linked to the instructional context, defining the problem is an important phase of the problem solving cycle. This phase serves to contextualize and identify the complexity of the problem and to situate the issue “beyond its immediate parameters” (Ferry & Ross-Gordon, 1998, p. 109), which has an impact on the development of solutions. (Ferry & Ross-Gordon, 1998; Rodgers, 2002b; Schön, 1983).

Developing solutions involves proposing and working through various approaches to tackling problems, examining the validity of solutions in relation to how the problem has been defined, and developing alternative approaches (Korthagen, 2005; Koole et al., 2011; Schön,

1983). This phase of the cycle aligns with Benford and Snow's (2002) notion of prognostic framing. As Coburn (2006) explains, diagnostic and prognostic framing, or defining the problem and developing solutions, are intimately related, as diagnostic framing is the process on which prognostic framing is predicated.

The third phase of the cycle, testing solutions, involves experimenting with proposed/developed solutions. Rodgers (2002a) asserts that "reflection must include action" and that "reflection that does not lead to action falls short of being responsible" (p. 855). Such action is "intelligent" action as opposed to "routine" action, as it stems from thorough and systematic thought about the problem (Dewey, 1933; Rodgers, 2002a, Schön, 1983). Schön (1983) describes four possible outcomes of testing solutions. He explains that testing hypotheses can result in surprising outcomes that are either desirable or undesirable or not surprising outcomes that are either desirable or undesirable (p. 153). Testing solutions, then, can either lead to the final phase of the cycle, experiencing resolution, or it can lead back to the beginning of the cycle, redefining the problem. Koole et al. (2011) explain the "outcome" of the reflection cycle as "the identification of a new perspective" (p. 4). Thus, the final phase of experiencing resolution can involve expressing a new perspective or new insight about the problem.

While extant literature extols the value of teachers engaging in this problem solving cycle, there is scant research on teachers' iterative reflection process, especially in the long term. For example, there is little to no research that studies experienced teachers' repeated cycles of identifying problems, working through developing and testing solutions, and redefining problems over time. Rather, most research addresses the issue of helping pre-service and beginning teachers become more reflective about their practice (e.g. Hatton & Smith, 1995; Jay & Johnson, 2002; Larrivee, 2008). While such efforts to explore how teachers learn the importance of and

the process of reflection (learning *to* reflect) are useful, research focuses less on providing in-depth explorations of how experienced teachers engage in the reflective process to improve specific aspects of their practice (learning *from* reflection). A deeper understanding of how teachers make meaning about and experience fundamental change to their practice in relation to their particular content areas, grade levels, and student learning needs and how teachers' reflection processes facilitate such change can help researchers and teacher-educators understand how to support teacher learning. The current study fills some of this void by providing a rich description of an experienced teachers' iterative process of solving multiple, complex, situated, authentic problems of practice over two and half years, providing insight into teacher reflection and professional growth.

2.5 Collaborative Reflection

Reflection is theorized to be “fuller and more complex when generated in community” (Rodgers, 2002a p. 856). Research provides evidence that opportunities to reflect on one's practice in deliberation with others can impact teacher professional growth. For example, in a study of 25 math teachers, Spillane (1999) found that only four teachers enacted changes to instruction that reflected substantial shifts in the core of their practice. The teachers who changed core dimensions of their teaching engaged in “rich deliberations about the reforms and practicing the reform ideas with fellow teachers and other experts” (Spillane, 1999, p. 170). In contrast, teachers who did not make substantial changes to instruction tended to be isolated and individualistic in their reform efforts. Relatedly, Hatton and Smith (1995) found that verbal interactions facilitated teacher education students' reflective process. All 60 of the participants in their study drew on “critical friend dyad” experiences in their written reflections, and students

“overwhelmingly” reported in interviews that opportunities to engage in verbal interaction with peers and supervisors were the two key strategies in the program that moved them forward in their thinking about teaching.

In the context of education, collaborative reflection is ongoing joint inquiry between teachers and/or teachers and researchers (Baird, 1992). Collaborative reflection shares characteristics of certain other practitioner research approaches, such as collaborative inquiry/co-inquiry (e.g. Butler, Lauscher, Jarvis-Selinger, & Beckingham, 2004; Hennessey, 2014), collaborative action research (e.g. Newman, 1998; Wells & Arauz, 2006), and participatory action research (Whyte, 1989). Collaborative reflection is focused dialogue that can improve teachers’ practice by providing opportunities for purposeful, collective, systematic investigations into practical problems (Baird, 1992; Miller & Pine, 1990).

From his work on two long-term studies of teacher collaborative reflection, Baird (1992) derived three guiding principles to support teachers’ systematic inquiry. First, he asserts that collaborations should focus on linking theory and practice, such as fostering teachers’ learning the what, how, and why of new instructional approaches. Second, Baird advises that teacher change requires sufficient time and support in order to facilitate “durable, substantive” teacher change (p. 37). Third, Baird suggests that collaborative inquiry needs to be rooted in reflective practices of examining specific problems of practice teachers encounter in the classroom and deciding approaches to solve the problems and evaluate the results in order to build “metacognitive awareness” of the issues under scrutiny (p. 40). In addition, Grimmet and Crehan (1990) note several key factors that can foster teachers’ reflection in collaborative settings. The authors found that one teacher’s reflection process was supported in a teacher-principal dyad when the teacher identified the problem of practice on which he wanted to discuss and when the

principal accepted and explored the problem without having her own agenda. Grimmet and Crehan (1990) found that the teacher engaged in more “reconstruction” of his pedagogical perspectives when he felt safe to bring up his “shortcomings” and seek help (p. 232).

Collaborative reflection between teachers and researchers draws on each member’s expertise and can be beneficial to both parties (Baird, 1992). Collaborative reflection between teachers and researchers provides opportunities for teachers to systematically address problems of practice specific to their contexts, and provides insight for researchers about how teachers develop practical knowledge in relation to theory. Teacher-researcher collaborative reflection provides teachers with “action-oriented,” systematic examinations of their practice and can result in change to teacher practice because the situated nature of the collaborations allows teachers to make meaningful, context-specific discoveries (Raymond & Leinenbach, 2000). At the same time, these focused, collective reflections provide opportunities for researchers to draw from teachers’ localized, practical knowledge to deepen their understandings of “theory in relation to practice” (Hennessey, 2014, p. xviii). Baird (1992) found a certain type of regular, “one-to-one” reflection between teachers and researchers, what he referred to as “focused professional dialogue” (Baird, 1992, p. 39 citing Ruddock, 1987), to be mutually beneficial for teachers and researchers in his work on two long-term studies of teacher collaborative reflection. For example, in his work with four individual teachers from one school, Baird (1992) found that teachers tended to focus on cognitive aspects of their teaching more so than affective components. Through extended teacher-researcher on-on-one discussion of this issue, most of the teachers came to the realization that they wanted to “increase potentially productive affective interactions” with their students (p. 43).

The teacher-researcher talk in the planning/debriefing meetings in the current case study

can be considered a form of one-to-one focused professional dialogue between Heidi and the researcher. There is a growing body of research exploring teacher reflection as a collaborative process between teachers and their peers and teachers with teacher-educators or researchers. Studies that examine teachers' reflections through interaction with others are often limited, however, in the scope of the interactions, such as the frequency/duration of interactions. For example, many studies investigate teachers' reflections in one education course, explore teachers' reflections on a limited number of lessons, or rely heavily on teachers' written reflections with limited interactional data (e.g., Achinstein & Barrett, 2004; Borko & Livinson, 1989; Danielson, 2008; Eick & Dias, 2005; Lotter, Singer, & Godley, 2009; Morton, 2012; Westerman, 1991). The current study provides a unique approach to studying teacher reflection, as it aims to investigate a teacher's reflection process through her regular, ongoing collaborative interactions with a university researcher over multiple years. This approach affords analysis of how the teacher framed problems and how the pair engaged in iterative problem solving cycles to address these problems.

Importantly, Heidi's reflections occurred in the context of ongoing meetings with the researcher that were characterized as collaborative, but the *collaborative* aspect of the reflections is not the focus of this study. This study does not aim to explore the details of the teacher and researcher's collaborative interactions in depth. Rather, the focus of the study is on the teacher's learning and growth as relates to her process of problem solving. Thus, descriptions of the researcher's contributions in the paper serve to provide context for understanding the teacher's perspectives rather than to make claims about the nature of the teacher's and researcher's collaborative interactions.

2.6 Supporting Historical Inquiry in the Classroom

In the current case study, the focus of the teacher-researcher collaborative reflections in the planning/debriefing meetings was the design, implementation, and evaluation of instructional modules aimed at supporting students' disciplinary argumentation in history. The overarching goal of these meetings (and of Project READI), align with current reform initiatives in history education that call for instruction to support students in learning to engage in historical inquiry (i.e., Herrenkohl & Cornelius, 2013; Monte-Sano, 2008; Wineburg & Reisman, 2015), or learning to “do history” (Lee, 2005). Engaging in historical inquiry involves constructing well-reasoned, evidence-based interpretations of the past based on investigations of multiple sources (Herrenkohl & Cornelius, 2013; Monte-Sano, 2008; Seixas, 1993; VanSledright & Kelly, 1998; Wineburg, 2001). Interpretations can be expressed as arguments that emerge from close scrutiny of primary and secondary sources. Primary sources are documents from the time period of study and therefore often represent perspectives very different from present thinking. Secondary sources are documents written about the past that use primary sources to inform interpretations. Historical inquiry using secondary sources involves deciphering the arguments authors make and how these interpretations compare to what others have argued (Anderson, Day, Michie, & Rollason, 2006; Cleary & Neumann, 2009). Thus, historical inquiry is grounded in the limits of texts (Neumann, 2010; Seixas, 1993) and involves the use of “complex acts of reconstruction to understand the past, examining fragmented and sometimes contradictory facts” (De La Paz, 2005, p. 139).

Historical interpretations, then, are ongoing arguments based on close examination of multiple sources (Anderson et al., 2006; Goldman et al, 2016; Wineburg, 2001; van Drie & van Boxtel, 2008; Voss & Wiley, 2006), reflecting “an epistemological stance that what we ‘know’

about the past is provisional and incomplete” (Goldman et al., 2016, p. 235). Thus, doing history requires engaging in robust, sophisticated reading, writing, and reasoning practices that are unique to the discipline (Monte-Sano, 2008; Shanahan & Shanahan, 2008; Shanahan, Shanahan, & Misischia, 2011; Wineburg, 2001). Based on an empirical investigation of the historical inquiry practices of experts, Wineburg (1991) proposed three key historical inquiry practices: sourcing, corroboration, and contextualization. Sourcing entails considering how source information, such as the author, date, or type of text or origin, shapes what the text is saying and doing (Reisman, 2011; Shanahan et al., 2011; Wineburg, 1991). Wineburg and Reisman (2015) argue that “sourcing undergirds all of historical reading” and that calling it a strategy “belies its radicalism” (p. 636). The authors contend that sourcing “rocks the foundation on which the school textbook rests” (p. 636) such that fostering sourcing as a habitual way of interrogating texts engages students in “a dialectic” with a “human author” rather than as passive consumers of uncontested facts from an unquestioned, authoritative source (such as a textbook).

Corroboration entails comparing and contrasting information within and across sources (Reisman, 2011; Wineburg, 1991). This practice involves critical analysis of historical details across sources, such as cross-checking and noticing agreements and disagreements, to determine the likelihood of events. Contextualization entails constructing details of the historical context (Herrenkohl & Cornelius, 2013; Shanahan et al., 2011) and “interpreting the phenomenon in accordance with that context” (van Drie & van Boxtel, 2008, p. 95). A key component of contextualization is trying to imagine the past from the perspective of historical actors rather than from present day perspectives and values. This has been referred to as using historical empathy, which is contrasted with viewing the past from a presentist lens (Lee, Dickinson, & Ashby, 1997; Shanahan et al., 2011; van Drie & van Boxtel, 2008). Sourcing, corroboration, and

contextualization work in concert with each other and are overlapping and mutually reinforcing. For example, critically reading primary sources entails keeping in mind how the historical details, such as source information or contextual information about the time period, impact our interpretation of the text (Anderson et al., 2006; Lee, 2005; Reisman, 2012). The practices of sourcing, corroboration, and contextualization have also become widely accepted in the history education literature as fundamental to doing history.

In contrast to traditional approaches to teaching history as a set of facts to be understood and remembered, instruction aimed at engaging students in doing history positions students as constructors of knowledge and participating members of the larger disciplinary community. Research indicates, however, that students' understandings of history are naïve (Lee, 2005) and that students tend not to naturally engage in historical inquiry practices (Wineburg, 2001). Research indicates that students tend to approach texts as sources of authority from which to "gather" information, not questioning them or examining the validity of information within and across texts (Paxton, 1997; Stahl, Hynd, Britton, McNish, & Bosquet, 1996; Wineburg, 1991; Vansledright, 2004). Many students, especially young learners, grapple with reconciling their everyday ideas with historical ways of thinking (Ashby, Lee, & Shemilt, 2005; Lee, 2005). For instance, when elementary and middle school students are taught to think critically about sources, they often adopt a general mistrust of sources and even a belief that authors are lying or intentionally withholding information (VanSledright, 2002; Lee 2005). van Drie and van Boxtel (2008) argue it is difficult for novices to use historical empathy and instead tend to judge historical actors based "solely by present standards" (p. 96). For example, Reisman (2011) found high school students tend to impose presentist interpretations on the actions of historical characters. While some research indicates that merely providing students with multiple sources

beyond just a textbook can improve learning of historical content (Nokes, Dole, & Hacker, 2007) and can foster aspects of critical reasoning and historical thinking (Rouet, Britt, Mason & Perfetti, 1996; VanSledright & Kelly, 1998; Wiley & Voss, 1999), many studies indicate that students do not naturally engage in historical inquiry practices such as sourcing, corroboration, and contextualization without interventions designed to teach such strategies (Nokes et al., 2007).

A growing body of research indicates there are noticeable benefits to instruction that promotes students' active engagement in historical inquiry practices. For example, De La Paz and Felton (2010) found that high school students who received explicit strategy instruction about sourcing and contextualization and instruction around argumentative structure in writing across either a semester or yearlong history course had higher quality arguments in their writing and more often drew from sources to support their claims. Similarly, De La Paz (2005) found improvement in eighth grade students' writing after instruction focused on engaging in historical inquiry practices (such as sourcing) and argumentative writing. Specifically, students' papers were longer, more persuasive, included more arguments, and contained more historically accurate information than students who did not receive the intervention. However, despite changes in their argumentative writing, through interviews with a subset of the students, the author found that many of the students retained a naïve view of historical inquiry and of the epistemological status of historical claims (De La Paz, 2005). In other words, even though students showed progress in constructing arguments about the past, progress along the epistemological dimension was slower and less uniform. In a comparative case study, Monte-Sano (2008) found differences among high school students' writing performance in relation to their teachers' instructional approaches over seven months of instruction. One teacher

emphasized close reading of multiple sources from an inquiry stance (e.g. considering the author's perspective, analyzing how evidence supported authors' claims) and 75% (12 of 16) of her students showed marked improvements in their argumentation and historical reasoning. In contrast, the other teacher in the study centered instruction on reading one textbook and promoted memorizing facts; 92% (24 of 26) of his students demonstrated no change or declines in their writing scores. Even studies of younger aged students indicate instruction that supports historical inquiry approaches to learning history have positive effects. For instance, Ferretti, MacArthur, and Okolo (2001) found that fifth grade students grew to be "more aware of bias" after instruction emphasizing historical inquiry.

There is emphasis across the literature on the importance of supporting students' historical inquiry. Nokes et al. (2007) assert that students at all grade levels are able to learn historical inquiry practices, but that "adequate instruction in a scaffolded environment" is necessary (p. 494). Ferretti et al. (2007) argue that history instruction should promote students understanding about the "contingent nature" of history. Furthermore, many researchers suggest that engaging in disciplinary inquiry practices contributes to a better understanding of history as constructed, incomplete, contested interpretations of the past (i.e., Monte-Sano, 2010; Wineburg & Reisman, 2015).

Neumann (2010) posited that teachers' historical epistemologies shape their instructional practices. Indeed, Wilson and Wineburg (1988) reported a comparative multi-case study that provided some evidence to suggest that teachers' knowledge of history as a discipline impacts their instruction. The study found a relation between teachers' expressed knowledge of the discipline and their teaching approaches, suggesting a link between teachers' deeper historical content knowledge and the use of pedagogical frameworks that were more disciplinary-specific.

Wilson and Wineburg's (1988) study provides some evidence to suggest the importance of teachers continually deepening their content and pedagogical content knowledge to meet the complex demands of supporting students' critical analysis and interpretation of primary and secondary sources.

There is very little research to date investigating teachers' process of change in this area. Specifically, little research investigates how experienced teachers learn to shift from more traditional approaches of teaching history to instruction that emphasizes a process of sensemaking that provides students with an opportunity to experience history as reconstruction of the past through engagement in historical inquiry practices. Considering the complexities of engaging in the unique and sophisticated practices of history and students' tendencies to bring naïve understandings about the past to history classrooms, more research is needed to understand the types problems of practice teachers could face and how they work to resolve these problems in attempting to effectively support students' historical inquiry.

2.7 Productive Disciplinary Engagement

Teachers efforts to shift their instruction to disciplinary inquiry often collide with students' conceptions of school learning. That is, just as it is difficult for teachers to change instructional practices, students may find it difficult to change their "learning" practices. Engle and Conant (2002) note the complexity of supporting students' engagement in inquiry across disciplines. In line with extant theory and research, Engle and Conant (2002) outline what comprises student productive disciplinary engagement (PDE) in classrooms and principles for developing learning environments that facilitate PDE. Examples of guiding principles include providing students active roles to foster their agency in the inquiry process and providing

students with the relevant resources to do so. The authors describe PDE as instruction that is 1) *engaging*, meaning instruction involves greater substantive participation by more students “in coordination with each other” (p. 402), 2) *disciplinary*, meaning instruction reflects aspects of the ways of knowing and doing of the discipline, and 3) *productive*, which means instruction shows evidence of students’ intellectual engagement, such as ensuring ideas progress and that students’ thinking “get[s] somewhere” (Engle & Conant, 2002, p. 403). As Engle and Conant note, even though these components are closely linked, it is possible for instruction to reflect only one or two of the components. What follows is an elaboration of each component of PDE - engagement, engagement that is disciplinary, and engagement that is productive – including discussion of relevant literature as relates to the current study.

2.7.1 Engagement

When instruction is interactive and engaging it means more students are participating and that their contributions are directly in response to each other rather than “independent of each other,” off topic, (Engle & Conant, 2002, p. 402) or only in response to the teacher. It means that more responsibility falls on students to construct meaning and to do the “heavy lifting” (Michaels & O’Connor, 2013; Reznitskaya, 2012; Wolf, Crosson, & Resnick, 2006).

In classrooms, discussion is a primary means for students to actively engage in disciplinary inquiry and for teachers to assess and scaffold their engagement. Discussion that is dialogic is talk that is interactive and engaging. It involves talk that is “conversation-like,” represented by back and forth participation among students and between students and teachers (Baker, 2008; Nystrand, 1997). Engle and Conant (2002) advise that attention to factors such as who is speaking (e.g. proportion of teacher to student talk), to whom, how often, and how students and teachers talk can provide insight into the level and nature of engagement/interaction

in classroom discussion. An abundance of research, however, indicates that the predominant mode of classroom discourse is monologic discussion, often involving teachers prompting students with “known-answer” questions and evaluating students’ recall of information (i.e., Cazden, 2001; Nystrand, 1997). Such closed questioning and recitation patterns are usually characterized by the triadic structure of IRE (teacher initiation-student response-teacher evaluation) or IRF (teacher initiation-student response-teacher follow up) sequences (Cazden, 2001; Lemke, 1990; Nystrand, 1997; O’Connor & Michaels, 2007). Researchers argue that these sequences typically do not reflect true dialogue or collective attempts to reach shared understandings. Rather, such discourse structures tend to involve teachers testing students’ knowledge or using questioning as a way to transmit information (Chin, 2006; Nystrand, 1997). On the other hand, dialogic discussions often stem from teachers’ (and students’) open-ended questions that engage participants in collaborative exploration of subject matter.

In a study focused on fostering inquiry in classrooms, Wells (2007) found that the more teachers adopted an “inquiry stance” to instruction (the more they came to view knowledge as co-constructed in activity), the more their classroom discussions became dialogic. In Wells’ (2007) study, discussions in these teachers’ classrooms tended to move from more traditional, monologic, forms of discourse to discourse that reflected more open-ended questions and less teacher evaluation of student ideas. Thus, fostering students’ active engagement in discussion may involve teachers adopting an inquiry stance to their instruction. Adopting an inquiry stance may be related to deepening one’s content knowledge, such as developing a deeper understanding of the epistemologies and inquiry practices of the discipline. For example, developing one’s epistemology that history is continual reconstruction of the past could play a

role in teachers' approaches to eliciting and exploring students' multiple interpretations of the past in history classroom discussions.

2.7.2 Disciplinary Engagement

Exploring and analyzing students' interpretations of the past reflects engagement in inquiry practices unique to the discipline of history, or fostering disciplinary engagement. In history, disciplinary engagement means students are critically reading and discussing multiple sources using practices such as sourcing, corroboration, and contextualization to construct evidence-based interpretations. Of course, students need support in engaging in these sophisticated ways of knowing and doing of the discipline, and teachers serve as the link between the classroom and the larger discipline (Seixas, 1993). Teachers who aim to support students' disciplinary engagement in history are tasked with representing the discipline in ways that are accessible to students. When teachers find ways to make subject matter more student-friendly, they "reduce the complexity of authentic [disciplinary] practices" while also "retaining their key elements" (Edelson & Reiser, 2006, p. 336). Bridging the knowledge and inquiry practices of the discipline and the classroom necessitates that teachers understand what will be/is difficult for learners to understand and be able to do (Bain, 2005; Shulman, 1986) and that they find domain-specific, developmentally appropriate means to help students think in more sophisticated ways and engage in increasingly specialized practices (Wineburg, 2001).

For example, in one study exploring fifth and sixth grade students' historical argumentation (Herrenkohl & Cornelius, 2013), instruction involved various approaches to engage students in sourcing, "cross-checking" (corroboration), and "imagining the setting" (contextualization) with historical and non-historical contexts. These approaches served as building blocks for students to more formally learn such practices. One approach included

investigating “what really happened during a hypothetical playground fight” (p. 443) and another included reviewing conflicting information across texts from a previous historical unit.

Furthermore, instruction included material tools to scaffold students’ building of arguments, such as a SenseMaker board used to organize and analyze evidence. These supports represent what Bain (2005) would characterize as history-specific tools, which include visual and verbal tools and “conceptual strategies” that help students learn historical ways of thinking and doing and to accomplish more than they would be able to do on their own.

For history teachers, representing the discipline and providing appropriate supports to make historical inquiry practices accessible to students comes with many challenges. Two key teacher discourse moves have been identified to help students think more critically about sources and the historical context during classroom discussions. The first move - which has been referred to with various names and is also common in other disciplines - involves teachers prompting students to provide evidence for their claims. Reisman (2011) uses the term *request for textual evidence* to identify moments when teachers (and theoretically fellow students) push students to provide evidence from a source to support their arguments. Of course the habitual use of evidence to substantiate historical interpretations is a fundamental practice of the larger domain of history. A second move identified as key to fostering historical inquiry practices and supporting disciplinary knowledge is prompting students to consider details about the historical time and place. Such a move, called various terms such as *stabilizing the context* (Reisman, 2011) or *imagining the context* (Herrenkohl & Cornelius, 2013), promotes the historical practice of contextualization.

Although some literature provides insight into history-specific discourse moves and instructional tools that might support students’ disciplinary engagement, such as requesting

textual evidence and prompting students to imagine the context, studies that investigate how teachers learn to support students' engagement in historical inquiry practices is still a relatively nascent area of research. Furthermore, as Engle and Conant (2002) point out, what one educator might deem as representing disciplinary engagement might be different from another. Therefore, for teachers, researchers, and teacher-educators, a lot remains to be learned about what disciplinary practices teachers value and the specific ways teachers support students' disciplinary engagement in history.

2.7.3 Productive Disciplinary Engagement

Even if students are actively engaged in classrooms and their engagement reflect practices of the discipline, a further instructional challenge is ensuring students' engagement is productive such that it reflects higher levels of reasoning and deeper understanding of content (Dudley-Marling et al., 2013). Scholars across disciplines emphasize that academically productive engagement involves supporting students in constructing and evaluating ideas via examining evidence and working through reasoning (e.g. Michaels & O'Connor, 2013; Mercer, Wegerif, & Dawes, 1999; Webb et al., 2013). There is no fixed set of rules for determining the productivity of instructional interactions. However, many researchers and teacher-educators agree that the goal of disciplinary inquiry is to push students to new levels of understandings, such as collaboratively developing ideas that become clearer and more coherent, reasoned, and evidence-based (Mortimer & Scott, 2003). Such approaches reflect productive intellectual engagement because the ideas that emerge are stimulating and "new" to students, even if they may not be "new" to the larger respective discipline (Seixas, 1993). In other words, classrooms that foster engagement that is productive support learners in working together to improve ideas

relevant and relative to their current understandings (Hmelo-Silver & Barrows, 2008; Scardamalia & Bereiter, 2006; Zhang, Hong, Scardamalia, Teo, & Morley, 2011).

Boyd and Markarian (2011) argue that inquiry-oriented pedagogy can make instruction more powerful, as it creates the space for students to communicate their ideas, providing opportunities for teachers to hear, understand, and guide students' thinking. For example, when classroom discussion is approached as a forum for improving ideas, students become accustomed to their ideas being collectively examined and incrementally revised based on examination of multiple perspectives and reasoning about related evidence (Engle & Conant, 2002; Scardamalia & Bereiter, 2006). For example, Ghousseini (2015) describes productive disciplinary discussions in mathematics as students jointly developing mathematical ideas through listening to and understanding each other's ideas. A good deal of research across grade levels and content areas highlight pivotal moves teachers can make to promote inquiry-based, productive discussion. One key move highlighted in the literature is called *revoicing* (O'Connor & Michaels, 1993), also referred to as recontextualizing (Sharpe, 2008). Revoicing is when teachers restate students' ideas, often using more technical or domain-specific language, in a way that invites other students to respond to the contribution. Many researchers argue that revoicing can serve to validate students' ideas as worthy of further discussion (Chin, 2006; O'Connor & Michaels 1993, 1996; Reisman, 2011), thus fostering a context for "students to have a part in the problem solving process" (Sharpe, 2008, p. 136). In classrooms where dialogic discussion is standard practice, students, as well as teachers, learn to make these types of moves to build understanding of the group and to move arguments forward (Michaels, O'Connor, Williams Hall, & Resnick, 2010).

Whether and how such discourse moves serve to push students' ideas and disciplinary understandings forward in productive ways, however, depends on the particulars of the situation. The outcomes of these moves need to be considered in light of the larger learning goals and the ongoing sense making of the learning community (Engle & Conant, 2002; Michaels et al., 2010; Mortimer & Scott, 2003; van Drie & van Boxtel, 2008). As Michaels et al. (2010) note, "it is simply not possible to identify 'good' or 'productive'" discussions without an understanding of the broader context. There is "no single 'best' way" to plan for or carry out discussions to effectively support students' productive disciplinary learning and no "particular talk format that works for all students at all times" (Michaels et al., 2010, p. 15). Therefore, even when research and professional development do highlight the affordances of specific discourse moves to employ during discussion, such as revoicing, these types of moves do not represent fixed, universal solutions. What "works" in one situation may not work at all or may work differently in another situation with different content, different students, or different learning goals.

Understanding precisely when and how certain moves can be used to effectively support the productive development of students' disciplinary knowledge and inquiry practices demands consideration of multiple dynamic factors. Thus, it is essential for teachers to have a repertoire of discourse moves and tools to draw from to address the multiple problems of practice they encounter in orchestrating discussions with interrelated purposes in their own contexts. Although research has made huge gains in understanding some of the complexities of supporting productive engagement in disciplinary classrooms, there is still a vast array of unknowns about what teachers can specifically do to support students' learning in relation to the particulars of their situation. Therefore, teachers who aim to guide students in learning the ways of thinking

and doing in history are presented with the ongoing challenge of figuring out what supports are effective, when, how often, for whom, and for what purposes.

3.0 RESEARCH METHODS

Case study provides a way to explore and describe particulars of phenomena as they occur in situ (Stake, 1995; Yin, 2006). The case study methodology used in this study affords the opportunity “to examine, in-depth, a ‘case’ within its ‘real-life’ context (Yin, 2006, p. 111). Close examination of one middle school history teacher attempting to make core changes to her practice over time allows for the identification and description of what specific problems of practice emerged for her and how her process of reflection facilitated particular changes to her practice.

3.1 Research Context

As indicated in the introduction, the general context for this case study was the research and development of Project READI. The focal participant, Heidi, participated in two strands of project activities, the History Design Team and the Teacher Professional Development Network. The focus of the History Design Team was iterative design-based research focused on developing instructional interventions that would provide students with opportunities to learn the "habits of mind" and practices of historical inquiry needed to engage evidence-based argument. In addition to Heidi, a second history teacher; several university-based researchers with expertise in learning, assessment, history education, and literacy; two teachers turned professional development facilitators; a historian; and two graduate students in learning sciences, were members of the team. Heidi joined the team during the second year of the Design Team's work (Spring, 2012) and participated through the culmination of the project in the spring of 2015.

The instructional interventions were designed according to a general architecture to achieve six learning goals (for complete list of learning goals see Goldman et al., 2016). The first

iteration of the design cycle involved the development of two modules intended to be implemented over six to ten days of instruction. Heidi collaborated in the development of the second module. The modules were aimed at supporting student learning as well as teacher learning (Davis & Krajcik, 2005, p. 3). Educative teacher materials are theorized to help teachers deepen their understanding of content as well as build their repertoire of instructional practices that represent reform-based teaching strategies (Davis & Krajcik, 2005; Fishman & Davis, 2006). The READI history modules contained embedded teacher supports, including an essential inquiry question with an accompanying set of texts and detailed lesson plans indicating the sequence and focus of instruction around each text. Subsequent iterations of the design cycle involved the teachers, with support from the Design Team, designing modules to align with the particulars of their own teaching contexts, such as the grade levels and subject matter they taught (i.e., ancient civilizations, U.S. history).

The second strand in which Heidi participated was the Teacher Professional Development Network, a group of history, science, and literature middle school and high school teachers who convened several times a year for professional development around supporting students' argumentation using multiple texts. Heidi began as a participant and moved into a leadership role over the course of the three-year Teacher Professional Development Network meetings.

3.2 Focal Participant

Heidi was in her 11th year of teaching when she began her participation on Project READI. She has a master's degree in Education with a focus on literacy. Heidi taught English in a foreign country for six years and after that taught English Language Arts in

elementary and middle schools in the U.S. for four years. She transitioned to teaching Social Studies/History in 2010. Throughout her participation on the project, Heidi taught 6th-8th grade History at a K-8 school in a large Midwestern urban district that is 96% Hispanic and 89% low income according to the most recent demographics available from the district. Heidi implemented the READI instructional approach in three grade levels (6th, 7th, and 8th) over the course of her involvement with the project, covering Ancient Civilizations (6th) and U.S. History (7th and 8th).

3.2.1 Design Team Participation

Heidi joined the Design Team in March of 2012 and began her first iteration (Iteration I) of design and implementation of READI modules at that time. Heidi worked with the team on developing an educative module, a two-week module about the Little Rock Nine incident in 1957, that she taught during the last few weeks of the 2012 school year. Members from the Design Team observed her instruction and met with her daily throughout the module to reflect on impressions of the taught lessons and to make necessary changes to upcoming designed lessons in the module. During Iteration I, Heidi taught 16 lessons for this module that were observed by researchers.

The following two school years, 2012-2013 and 2013-2014 represent the second and third iterations of Heidi's design and implementation of READI modules (Iteration II and Iteration III). In these iterations, Heidi designed her own modules to reflect the content she was required to cover but that involved students using a variety of document types and discourse forms, consistent with the six learning goals for history (described above). Instructional goals for successive modules over the course of the semester attended to a cycle of introducing and then deepening specific historical inquiry practices and use of overarching

principles and frameworks. The design work was a collaborative activity, sometimes with just the researcher assigned to her classroom and sometimes with the whole Design Team. Collaboration occurred during the biweekly Design Team meetings as well as on-demand depending on Heidi's needs. The university-based members of the Design Team supported the module development work in a variety of ways, including co-planning, identifying and locating resources for various topics, and problem solving dilemmas that Heidi brought to the group. Throughout both school years, Design Team members regularly observed module implementation. Thirty lessons were observed during Iteration II and 25 lessons were observed during Iteration III.

During the twice-monthly Design Team meetings, Heidi and the other Design Team teacher shared with the larger group what they had implemented since the last meeting, the issues that were arising and the successes they were experiencing. They also indicated where they were moving next and sought input from the team regarding next steps. Table 1 summarizes the number and percentage of meetings Heidi attended across the three iterations.

Table 1. Heidi's Attendance at READI History Design Team Meetings

Iteration	Number of meetings	Number (and %) of meetings Heidi attended
Iteration I	6	5 (83%)
Iteration II	16	10 (63%)
Iteration III	21	16 (76%)
Total	43	31 (72%)

Heidi's initial involvement on the Design Team represents what a typical teacher's participation in a research project might look like, as she enacted a "ready-made," co-constructed module. However, Heidi's participation on the team during Iteration II and III – designing, implementing, and reporting progress on her own historical inquiry modules - positioned her as centripetal member of the Design Team (Lave, 1991). Heidi gradually became more and more involved in the decision-making and knowledge construction of the group around teaching and learning historical inquiry. These evolving practices included helping to plan for and co-facilitate discussions in the READI Teacher Professional Development Network meetings in her third year of participation in these meetings.

3.2.2 Teacher Network Participation

The Teacher Network met four to seven times each school year and was conceived of as a means of cultivating a cohort of teachers who would try out and potentially take-up the READI approach. The Teacher Network thus served as a testbed for understanding struggles and challenges teachers might experience in taking-up the READI approach and for exploring the kinds of experiences that would support teachers in developing the knowledge bases they needed to implement the READI approach. A combination of multi-disciplinary and singular discipline activities comprised each meeting. Heidi attended eleven of the 15 meetings across the three iterations. Table 2 summarizes the number and percentage of meetings Heidi attended within each of the three iterations.

Table 2. Heidi's Attendance at READI Teacher Network Meetings

Iteration	Number of meetings	Number (and %) of meetings Heidi attended
Iteration I	4	3 (75%)
Iteration II	7	5 (71%)
Iteration III	4	3 (75%)
Total	15	11 (73%)

3.3 Participant Observer Role

As a member of the Design Team, the author/researcher regularly observed in Heidi's classroom and kept in constant contact throughout the teacher's participation in the study. Communications included written lesson plans, written reflections about lessons, emails, and discussions (in person and by telephone) before and after observed lessons, and about lessons that were not observe. Thus, Heidi's process of enacting changes to her instruction and reflecting on these enactments was well documented across the three iterations of Heidi's lesson design and implementation. Over time, Heidi and the researcher developed a collaborative and reflective working relationship. In terms of collaboration, as Heidi planned her curriculum, the teacher and researcher often discussed ideas together and talked through the pros and cons of specific instructional approaches, materials, and supports. The amount of support the researcher provided ebbed and flowed depending on how much Heidi asked to meet, asked for feedback on her module/lesson designs, or how much the researcher raised questions and issues about things she noticed during classroom observations or in her written module/lesson designs.

Debriefings took place after almost every observed lesson. The majority of lessons were observed by the participant observer/author, either alone or in combination with one

other researcher. Similarly, the majority of debriefings were between Heidi and the participant observer/author, at times involving other researchers. Therefore, references to the researcher in this study mean the participant observer/author. In addition to debriefing about lessons, meetings also involved discussion about upcoming lessons, and therefore involved some collaborative decision-making about her instruction. The researcher was open with Heidi about the focus of her research. The teacher and researcher both often shared with each other their questions and insights about Heidi's practice, her learning/progress in the area of supporting students' historical inquiry, and issues surrounding history instruction in general.

3.4 Data Sources

Collaborative reflection occurred in the context of planning lessons/modules and debriefings following enacted lessons and the module as a whole. Transcripts and audio recordings of these planning/debriefing meetings were the primary data sources used for analysis purposes, augmented by artifacts the teacher had used during the lesson enactment. Video recordings and field notes documented the classroom enactments. What follows is a description of data collection procedures for each of these contexts.

3.4.1 The Classroom

Classroom observations were conducted regularly over the two plus years of this study. Lessons are defined as one instructional class period, typically lasting 90 minutes. There were a total of 71 classroom observations. Table 3 outlines the subject area, grade level, and number of lessons observed across each iteration of the study. Appendix A details the data sources collected for each grade for each iteration.

Table 3. Observed Lessons

	Grade level/content	Number of observed lessons
Iteration I	7 th Grade U.S. History	9
	8 th Grade U.S. History	7
Iteration II	6 th Grade Ancient Civilizations	30
Iteration III	6 th Grade Ancient Civilizations	18
	8 TH Grade U.S. History	7
	Total	71

Observational data include audio and video recordings, field notes, and artifacts (e.g. texts, student work) of taught lessons. Except when there were technical difficulties, every observed lesson was video recorded. For each observed lesson, one to three audio recorders were placed at student table groups in order to capture a range of small group discussions and to pick up portions of whole group discussion that were difficult to hear from the video alone. One to two Design Team researchers were present for each observation as participant observers. The participant observers manned the video camera, took field notes, and walked around to observe and interact with students when they worked individually or in small groups. Interaction with students often included participating in small group talk, such as asking students questions to facilitate discussion. Field notes captured as much as possible of what was said during whole group discussion, described snippets of what was heard from small group talk, included explanations of interactions with students as close in time as possible, and described the noise level of the classroom (such as “loud murmur” during small group talk or “room totally quiet” during individual reading). Field notes also included details such as what the teacher wrote on

the board or added to charts on the wall, how many students were looking at the teacher at given moments, what charts and posters the teacher or students referred to, the number of students' hands raised, etc. For each observed lesson, various artifacts were also collected, including texts; student work; teacher created materials such as graphic organizers and notetakers; photos of artifacts in the room, including notes written on the board, teacher created scaffolds/posters (i.e. "Questions to Ask of Sources"), or ongoing teacher and student-constructed lists (e.g. "Sources Historians Use"). Artifacts such as student work were also collected for many lessons the teacher taught that were not observed by researchers.

3.4.2 Planning and Debriefing Meetings

The planning and debriefing meetings served as the primary context for teacher and researcher collaborative reflections. These meetings included verbal discussions as well as written communication.

After most observed lessons, Heidi debriefed with the researcher(s) who observed in her classroom. The meetings were often a combination of debriefing about the observed lesson and planning for upcoming lessons. Other pre-observational meetings solely focused on planning for upcoming lessons. Planning and debriefing meetings were open-ended with no formal structure or set of questions. Topics in post-observational debriefing meetings included Heidi and the participant observers' impressions of the lesson - what went well, what was surprising, what might have been done differently, assessments of students' historical thinking, etc. The researchers also asked Heidi questions to better understand her thinking or to probe reasons for decisions she made. Data sources for these meetings include audio recordings, summary field notes, and ex post facto notes about spontaneous, unrecorded conversations. There were a total of 65 planning/debriefing meetings. Table 4 outlines the number of meetings and the average

number of minutes per meeting for each iteration of the study. Appendix B details the number of data sources collected across each iteration for planning/debriefing meetings.

Table 4. Planning/Debriefing Meetings

Iteration	Number of meetings	Average number of minutes
Iteration I	11	25
Iteration II	28	36
Iteration III	26	38
Total	65	33

Written communication data sources include Heidi's lesson plans, Heidi's written reflections on taught lessons, and email exchanges. Lesson plans were sometimes in the form of a brief overview/outline of plans for the week via email and sometimes a more formal, structured lesson plan format via an online shared platform. Within the structured written lesson format, Heidi also often wrote brief reflections about taught lessons.

3.5 Interrelationships Among Data Streams

Throughout the study, memos were written that included observations, questions, insights, etc. about Heidi's practice and her thinking vis-à-vis the extant literature about supporting students' historical inquiry. Memo notes took multiple data sources into account and focused on cross-connections across the data streams. The memos included notes about how collaborative reflections during planning and debriefing meetings seemed to impact Heidi's instructional decisions. These notes also helped shaped the focus of field notes and interactions

with Heidi, and informed the ongoing analyses of the data. For example, patterns and themes that emerged from analysis often guided the focal questions or topics of subsequent interactions with Heidi.

3.6 Data Analysis Strategies

There were two major phases of analysis. The first phase of analysis addressed the first two research questions. It focused on identifying problems of practice that emerged for the teacher and what her process of problem solving entailed, as evidenced by discourse occurring within the context of planning/debriefing meetings. The second phase of analysis addressed the third research question; analysis addressed the alignment of Heidi's classroom instructional practices with the problems, framings, and solutions inferred from the discourse during the meetings.

3.6.1 Phase One of Analysis: Determining Problems of Practice and the Teacher's Problem Solving Process

This section first describes the methods of analysis for determining the problems of practice that emerged for Heidi in the planning/debriefing meetings and how she framed these problems differently over time. This section then describes the methods of analysis for determining the teacher's problem solving process in meetings.

Determining Problems of Practice

Each planning/debriefing meeting was transcribed and the transcripts were segmented into episodes marked by shifts in the topic of conversation (Hmelo-Silver & Barrows, 2008; Zhang, Lundeborg, & Eberhardt, 2011). A subset of these episodes involved talk centered on identifying, defining, and elaborating on topics that were problematic for the teacher. Such

episodes of problem identification and elaboration, labeled problem episodes, were determined through linguistic and paralinguistic cues that indicated a sense of disequilibrium, such as frustration, perplexity, uncertainty, intrigue, disappointment, or discontent (Horn & Little, 2010). Example linguistic cues include words and phrases such as: frustrated, hard, problem, struggling, wasn't feeling good about, wasn't sure, didn't know, not confident, could have been better if, wish that, etc. Audio recordings were consulted when necessary to differentiate tone and to identify paralinguistic cues that corroborated the sense of frustration, disappointment, uncertainty inferred from the transcripts.

Conversations in problem episodes included talk about the nature of the problem as well as talk about ways to resolve it. As described in the review of literature in chapter two, talk that centers on defining problems and proposing solutions coincides with what Benford and Snow (2002) describe as diagnostic and prognostic framing of problems. Analytic memos (Saldana, 2009) were written about each problem episode, summarizing how the problem was framed and by whom and noting similarities and differences to framing in other problem episodes.

Identifying Problems

A primary purpose of this initial phase of analysis was to determine which problem episodes were candidates for further analysis, based on which kinds of problems most frequently emerged across meetings. Across the three iterations, there were 96 problem episodes. Out of the 96 problem episodes, 32 were not considered for further analysis because they either occurred as “stand-alone” problems or they were not taken up by the teacher. For example, 14 problem episodes were about issues that only occurred once or twice across the three iterations and thus did not relate to other problem episodes. Examples include student misbehavior, inappropriate texts for the grade level, and school/district pressures. The other 18 problem episodes involved

problems not taken up by the teacher. Some problems not taken up by the teacher were initiated by researchers and not elaborated on by Heidi, such as student participation in small group discussion. Other problems not taken up by Heidi were initiated by the teacher and/or the researchers, but she dismissed the issue as insignificant in the context of the overall progress the students were making. Examples of problems she dismissed as insignificant include the level of student participation in whole group discussion and distinguishing between claims and evidence in texts. The 64 remaining episodes constitute the corpus that was analyzed for this study. Appendix C outlines the number of problem episodes within and across each meeting over the three iterations of the study for the remaining 64 episodes.

The 64 problem episodes represented an array of topics and foci. These 64 problem episodes were analyzed using grounded theory approach (Corbin & Strauss, 2007; Saldana, 2009) to shape and refine them to a set of 13 categories. Category codes captured the dominant topic(s) of discussion within episodes. The categories include various aspects of subject matter, instruction, students, and assessment. The set of 13 categories and descriptions and examples of each are provided in Table 5.

Table 5. Categories of Problems

Category	Description
Annotations	Supporting students' process/ routine of marking thinking when reading
Assessment	What, how, when, and why to design and use specific formative or summative tools to support and evaluate student learning, such as quick writes, culminating tasks (i.e. essays), rubrics
Claims-Evidence	Supporting students' construction of evidence-based arguments from historical sources and/or supporting students' understandings about the relation between claims and evidence in sources

Classroom Discussion	The nature and/or quality of discourse among students and teacher, including levels of student participation, discussion formats (i.e. Socratic Seminar), and discourse moves (i.e. teacher revoicing)
Close Reading	Supporting students' process/ routine of reading thoroughly, taking time to read with an inquiry approach, attending to details of the text, etc.
Content	Supporting students' understandings of key concepts and details/information about the topic of study (historical and non-historical)
Design Process	The process of designing for lessons using the READI approach and/or the process of collaboratively planning and debriefing
Historical Inquiry Practices	Supporting students' foundational reading, speaking, writing, and thinking skills/strategies needed to engage in historical interpretation (such as sourcing, corroboration, contextualization)
Logic-Reasoning	Supporting students in forming reasonable, sensible judgments
Material Resources	What, how, when, and why to find, select, use materials for instructional purposes (i.e. texts, notetakers, posters)
Motivation-Engagement	The level of attention, interest, and investment students demonstrate with instructional tasks
Who's Doing the Work	Supporting students' independent engagement in intellectual tasks, including ensuring students assume more of the effort in accomplishing tasks than the teacher
Writing	Supporting the process and/or quality of students' writing, including steps of the writing process

Identifying Problem Frames

Repeated readings of the 64 problem episodes indicated that the teacher expressed different perspectives on the categories across the 2.5 years of the study. In other words, there were different concerns at stake about the categories at different stages of the project. The 64 problem episodes were thus charted on a sequential timeline for purposes of examining how Heidi's perspective on the categories changed over time. The timeline charting suggested that certain categories occurred across a span of successive episodes and then appeared to drop out at

the same time that a different category appeared and continued over a successive string of episodes. For example, during iteration II, the category Classroom Discussion was problematized over nine of the first ten problem episodes across the first 14 meetings. Following that, Historical Inquiry Practices was problematized over the next six problem episodes across seven consecutive meetings.

Analysis of Heidi's perspectives on the categories included identifying similarities and differences in the words and phrases she used to frame the problems of the same and different categories. This involved a focus on the type of language the teacher used to define problems and to discuss solutions within and across episodes (Bannister, 2015; Benford & Snow, 2000; Coburn 2006; Russell & Munby, 1991). From analysis of the teacher's discourse in the spans of successive episodes, it became evident that Heidi used similar language across spans of episodes to address various aspects of instruction that she was grappling with at different times across meetings. These semantically similar ways of talking about episodes are referred to in this study as problem frames. Problem frames represent Heidi's perspective on a problem of practice that encompassed multiple episodes about aspects of instruction talked about in similar ways. Frames include one or more problem episodes talked about in semantically similar ways. Frames are bounded by an initial and final problem episode representing a certain perspective on an aspect of instruction, meaning when talk about the overarching problem began and ended.

What follows is a description of the methods of analysis used to explore Heidi's process of problem solving in the planning/debriefing meetings and how that process contributed to changes in her framing of problems.

Exploring Heidi's Problem Solving Processes

Analysis of the teacher's problem solving involved first inductively coding specific

activities and processes that occurred in the planning/debriefing meetings that were related to issues talked about in the 64 problem episodes. Analysis then involved adding all activity and process codes relevant to the 64 problem episodes to the sequential timeline charting of the problem episodes (mentioned above). The chart served as a way to see the activities and processes that occurred within problem episodes as well as those that preceded and followed each episode, allowing a sequential view of the steps Heidi took to address each specific problem, as well as a view of the progression of steps she took across problems in each frame and across frames over time.

Analysis then involved determining which coded activities and processes aligned to phases of the problem-solving cycle theorized in the literature. As described in the review of literature in chapter two, a number of models of practitioners' (including teachers') process of solving problems mirror the steps of the scientific inquiry process. As synthesized from extant literature, these steps include iterative phases of: defining problems, developing solutions, testing solutions, and experiencing resolution or redefining the problem (Dewey, 1933; Rodgers, 2002; Schön, 1983). This cycle is represented in Figure 1 in chapter two. Table 6 outlines the coded activities and processes vis-à-vis phases of the problem-solving cycle. Note that some of the activity and processing codes align to more than one phase of the cycle.

Table 6. Teacher and Teacher-Researcher Activities and Processes Codes Aligned to Phases of Problem-Solving Cycle

Phases of problem-solving cycle	Definition	Teacher-researcher activities and processes
(Re)Define the problem	Describe features of the problem, including what it involves, how one feels about it, and reasoning through why it might be happening	<ul style="list-style-type: none"> • Identify and describe a problem • Reason about problem/attribute responsibility for problem • Engage with materials (including looking at student work, reading field notes) • Draw from external resources/contexts • Relate to own experiences/understandings
Develop a solution	Work through possible new or existing instructional approaches to address a problem, including proposing, elaborating on, and planning specifics of instructional approaches	<ul style="list-style-type: none"> • Propose new instructional approach • Elaborate new instructional approach • Plan specifics of new instructional approach • Propose existing instructional approach • Elaborate existing instructional approach • Plan specifics of existing instructional approach • Engage with materials (including reading texts, reviewing notetakers, etc.) • Draw from external resources/contexts • Relate to own experiences/understandings

Test solution ^a	Enact new or existing instructional approach in instruction	<ul style="list-style-type: none"> • Talk about enacted new or existing instructional approach proposed/planned in meeting(s)
Experience resolution (full or partial)	Talk about resolution through describing changes to perspectives on the problem or changes in understandings/practices, including how one feels about the problem and reasoning about why those changes might have occurred	<ul style="list-style-type: none"> • Interpret new or existing instructional approach a success • Express insight • Explain change in understanding/practice • Report successful new or existing instructional approach developed and tested on own

^aTest solution was not an activity that occurred in the meetings. Evidence of testing solutions was derived from observational data (i.e., field notes) and from teacher-researcher talk about instructional approaches in the meetings

The data were examined to determine what courses of action Heidi took in addressing the 64 problems she identified. For each of the 64 problems, the relevant coded activities and processes were diagrammed on the corresponding points of the cycle to visually display the courses of actions the teacher took in addressing each individual problem that made up the problem frame. The visual display served as a multidimensional means of organizing the data to illuminate the courses of action Heidi took to resolve each specific problem at the level of the episode and to visualize how those courses of action contributed to her overall resolution of the problem frame (Miles & Huberman, 1994; Verdinelli & Scagnoli, 2013). Courses of action ranged from just defining the problem and taking no further actions, to defining the problem and developing solutions only (not testing the proposed solutions), to defining the problem and developing and testing solutions.

Resolution could occur at two different levels. Full resolution of problems occurred at the level of the problem frame. Full resolution of the problem frame was evidenced by talk shifting to a different perspective on the same element of instruction (a shift to a different problem frame) and/or by the teacher making statements that indicated changes to her understandings about the problem or changes to her practice. For example, activities coded as “express insight” or “explain changes in understanding/practice” provided evidence of resolution of a problem frame. Full resolution of the problem frame at times was evidenced in talk during the last problem episode and at other times in later meetings. In addition to resolution at the level of the frame, Heidi also at times experienced partial resolution at the level of specific problems that made up a frame. Partial resolution meant that some solutions were successful or that Heidi had gained some insight into specific element of the problem, but that her overarching perspective on the larger problem of practice had not been fully resolved. Partial resolution was evidenced by the

same activity and process codes as full resolution, such as Heidi expressing insight or explaining changes in her understanding or practice. However, partial resolution differed from full resolution in that related problem episodes reemerged even after she had expressed some form of resolution about certain elements of the overarching problem frame.

The timeline chart and visual displays were used to determine patterns in the teacher's courses of actions for addressing problems and experiencing resolution within and across frames.

3.6.2 Phase Two of Analysis: Exploring the Alignment Between Heidi's Talk and Her Instruction

The second phase of analysis addressed the alignment of Heidi's classroom instructional practices with the problems, framings, and solutions inferred from the discourse during the meetings. This first involved identifying sample lessons for analysis from classroom observational data. Each classroom observation across the three iterations was catalogued to chart key components of lessons, such as texts, tasks, and artifacts (i.e. notetakers, student work collected). Cataloging was based on field notes from each observed lesson, augmented by video/audio files if necessary to complete the catalogue. Candidate lessons for further analyses met two criteria: 1) included mostly whole group instruction, and 2) included the use of at least one text (including print, image, video, etc.). Whole group instruction meant class time involved the teacher interacting with all of the students at the same time and included classroom discussions, teacher modeling, and teacher guided practice. Lessons were not considered for further analysis if the majority of class time was spent on individual or small group tasks. Use of at least one text meant that class time was spent either reading part or all of a text and/or discussing part or all of a text students had already read (i.e. in a past lesson or for homework). Note that most observed lessons involved repeated cycles of individual reading and writing tasks,

small group discussion, and whole group discussion.

From the 58 lessons that met these joint criteria, five lessons were selected with the goal of sampling lessons that had occurred across the 2.5 years, starting with the initial implementation. Table 7 lists the dates and grades for each analyzed lesson selected for phase two analyses. From the first iteration, one lesson was selected and then an early in the year and late in the year lesson from the second and third iterations. The variation in grade level resulted from the specific grades the teacher taught each year combined with which lessons met the two criteria for analysis. Appendix D provides further information about each analyzed lessons, such as the instructional topics, texts, and related instructional tasks for each lesson.

Table 7. Sample Lessons Analyzed

Sample lesson (Iteration and semester ¹)	Date	Observed lesson # (out of 71)	Grade level
ITI	5/10/12	obs #4	8th
ITIIF	10/4/12	obs #20	6th
ITIIS	5/31/12	obs #44	6th
ITIIIF	10/21/13	obs #47	8th
ITIIS	4/2/14	obs #65	8th

¹Semester referenced as F for Fall and S for Spring

Transcriptions for each sampled lesson were parsed into talking turns, defined as “everything a speaker says until she stops talking” (Baker, 2008, p. 44). Notes were also made about student and teacher actions beyond talk (i.e. pointing at posters, looking at texts, laughing) when it could be viewed or heard in the video and/or when noted in the field notes. Transcripts were coded using qualitative analysis software (MAX QDA) to allow for the simultaneous reading of transcripts and viewing of/listening to the video.

For each lesson, transcripts were segmented into participation groupings (whole group, small group, individual). Based on the teacher's framing of problems of practice in the planning/debriefing meetings derived from phase one of analysis, a set of indicators that reflected aspects of Heidi's concerns were developed and iteratively revised to guide the focus of analysis of lessons. Based on these indicators, discourse analysis was used to determine quantitative and qualitative indices of the structure and the nature of whole group segments, such as who was talking, how often, and in what ways. Content analysis was used to determine instructional foci and teacher instructional tools/scaffolds for all instructional segments (not just whole group segments). Codes for discourse and content analysis emerged from the data, but were informed by the plethora of empirical and theoretical literature about classroom discussion that is dialogic and that centers on idea improvement, as well as literature about instruction aimed at supporting students' disciplinary practices across grade levels and content areas, especially in the domain of history (e.g. Applebee, Langer, Nystrand, & Gamoran, 2003; Ashby et al., 2005; Bain, 2005; Baker, 2008; Bielaczyc, Kapur, & Collins, 2013; Boyd, 2012; Boyd & Markarian, 2011; Cazden, 2001; Chin, 2007; Christoph & Nystrand, 2001; Engle & Conant, 2002; Greenleaf & Freedman, 1993; Herrenkohl & Cornelius, 2013; Hynd et al., 2004; Lee, 2005; Lemke, 1990; Mercer, 2002; Monte-Sano, 2008; Mortimer & Scott, 2003; Nystrand, 1997; O'Connor & Michaels, 1993; O'Connor & Michaels, 2007; Reisman, 2011; Scardamalia & Bereiter, 2006; Seixas, 1993; Scott, Mortimer, & Aguiar, 2006; Sharpe, 2008; Wells & Arauz, 2006; Wineburg, 1991, 2001).

Discourse analysis involved line by line coding of teacher and student discourse moves at the level of talking turns and/or communication units, which are utterances or statements within talking turns (Marshall, Smagorinsky, & Smith, 1995). Within each segment, talk attributed to

non-consented students was not analyzed. Example coded teacher discourse moves include: *rephrase/revoice, elaborate idea, evaluate idea, ask for reasoning, ask for textual evidence, ask for agreement/disagreement, ask for summary/conclusion*. Example coded student discourse moves include: *propose idea, elaborate own idea, elaborate other's idea, explain reasoning, use textual evidence, agree/disagree*. Appendix E outlines coded discourse moves, including a definition and example of each. The coded discourse was summarized using quantitative indices (e.g. frequencies of discourse moves, proportion of students talking, student words per turn) and qualitative analyses of patterns and sequences of speakers and types of discourse moves and the development of ideas.

Content analyses of segments captured two dimensions: instructional foci and teacher instructional tools. Codes for instructional foci and instructional tools spanned anywhere from a short series of talking turns within segments to whole segments and could involve multiple overlapping codes. Example codes for instructional foci include: *literacy strategies, addressing the essential question, sourcing, corroboration, contextualization, identifying author's claim*. Codes for teacher instructional tools were applied to instances where the teacher utilized material, verbal, and/or interactional supports (Bain, 2005; Hammerness et al., 2005; Puntambekar & Hubscher, 2005). Material supports included artifacts that structured information and represented relationships (e.g. graphic organizers, semantic maps), cued students about what to remember or notice (e.g. word wall; sourcing questions), or provided prompts or suggestions for engaging in tasks (e.g. discussion sentence stems). Example verbal and interactional support codes include: *refer to or use tool, identify use of literacy strategy, identify use of historical inquiry practice, define/explain historical inquiry practice, use story/analogy, think aloud, elicit students' ideas about teacher think aloud*.

For each lesson, analysis involved identifying qualitative and quantitative (i.e. frequency) patterns based on coded discourse moves, instructional foci, and instructional tools in relation to the set of indicators reflecting Heidi's concerns across problem frames. Determining patterns involved iteratively "grouping and conceptualizing" elements with similar characteristics (i.e. discourse reflecting IRE/IRF sequences; explicit talk about specific historical inquiry practices) (Miles & Huberman, 1994, p. 249) and repeatedly reading transcripts and watching video as necessary to validate patterns. From these patterns, summaries of lessons were written for each lesson. Summaries were aimed at characterizing lessons in relation to the indicators, or "subsuming particulars into more general classes" (Miles & Huberman, 1994, p. 256). For example, recurrent discussion of key source information (i.e. author, date) by students was characterized as students routinely engaging in sourcing. Summaries of each of the five lessons were reviewed to determine similarities and differences in the patterns in relation to the indicators. These similarities and differences were used to infer gradual changes (or no evident change) across lessons and more global changes to the teacher's instruction (and related student engagement) from the first to the last analyzed lesson vis-à-vis the problem frames.

3.7 Researcher Positionality

In qualitative research, the researcher is the "primary instrument" and all "observations and analyses are filtered through that human being's worldview, values, and perspectives" (Merriam, 1998). Thus, it is important for researchers to be forthcoming about their own experiences and how they may have influenced the study. The researcher's position in the study was influenced by the close professional and personal relationship she developed with the focal participant, Heidi. In terms of the teacher-researcher professional relationship, over the course of

the study, Heidi and Jackie (the researcher) developed what the researcher would consider a comfortable, collaborative, and critical working relationship. From Jackie's perspective, they easily developed rapport early on in the project and were able to be honest with each other about their goals, achievements, concerns, and frustrations about the work with which they were engaged. This facilitated being able to investigate problems of practice the teacher faced, as they developed a routine of being open and honest about the design work and about her teaching. In terms of their personal relationship, over time Heidi and Jackie have grown to be close friends.

From the moment Heidi first joined the project, the researcher held her in high esteem, valuing her input in Teacher Network and Design Team meeting contexts, as well as being impressed with her teaching when she first started observing in her classroom. The researcher is aware that her perspective of Heidi as a "highly skilled" teacher has not only increased because of the close relationship they developed, but that it also could have influenced how she interpreted the data.

At the same time, because of their roles as researcher and teacher, there remained an element of a sense of authority, albeit somewhat subtle, in the teacher-researcher collaborative reflections. The researcher is aware that when she proposed problems and solutions, they may have had more weight to their conversations than had she been a fellow teacher, whom the teacher may have perceived as more of an "equal." However, careful attention was taken to focus analysis on the problems of practice of importance to Heidi, those that she identified and elaborated. Thus, some of the topics or problems that Jackie "pushed" as important in the meetings that Heidi did not take up were not included as the focus of analysis of this study.

Although Jackie was a former elementary teacher and taught social studies as a general subject, she was not a history teacher. Thus, even though the discipline of history was relatively

“new territory” for Heidi, it also was for Jackie. Jackie was, therefore, not positioned as an “expert” in the domain of history any more than Heidi, putting them on more “equal ground” in that area. Teacher-researcher collaborative reflections are theorized to be mutually beneficial to both researchers and teachers, as both participants bring different expertise to the table (Baird, 1992). From the researcher’s perspective, what she learned over time from Heidi about how to translate theory about historical inquiry into practice in middle school classrooms was invaluable.

To address the researcher’s biases/positionality, throughout the study, she continually took measures to address her positionality, such as memoing/keeping a reflexive journal about her potential biases and interrogating the data by continually looking for contrary findings to address rival explanations. Further steps the researcher took to ensure trustworthiness of the study are detailed below. These steps should be considered in light of the researcher’s positionality.

3.8 Ensuring Trustworthiness of the Study

The quality of case study research relies on rigorous methods of data collection, data analysis, and reporting to ensure trustworthiness of the study (Lincoln & Guba, 1985; Yin, 2006). As one way of establishing validity, this paper has thoroughly described many aspects of the case study, from careful description of the research context to detailed explanation of the analytic plan. Also, throughout the study, in order to maintain a transparent audit trail, the researcher kept a running log documenting study decisions and reflective commentary to trace the development of her conclusions throughout data collection, analysis, and reporting (Miles & Huberman, 1994; Shenton, 2004)

To strengthen internal validity, multiple sources of data and layered analytic approaches were used to triangulate findings (Miles & Huberman, 1994; Stake 1995; Yin 2006). Analysis of primary data sources – audio and transcripts of the planning/debriefing meetings and audio/video and field notes of the classroom observations - have been thoroughly described above. Other data sources, such as classroom artifacts, teacher written lesson plans and reflections, and field notes and audio/video recordings from Design Team and Teacher Network meetings, were also used to augment the analytic process. Information from other sources can confirm or disconfirm findings and can add to the construction of a “holistic understanding” of the situation (Merriam, 1998). To further ensure quality of conclusions in this study, measures were taken to move beyond assumptions that were merely “plausible” to those grounded in the data by engaging in thorough and systematic investigations of emerging hypotheses. Tactics involved considering rival explanations and revising initial assumptions based on confirming and disconfirming evidence (Miles & Huberman, 1994).

Prolonged engagement in the field and with the focal participant further ensured trustworthiness of the study (Lincoln & Guba, 1985; Anney, 2014; Shenton, 2004). The large data corpus of this study - 65 planning/debriefing meetings and 71 classroom observations that occurred over two and half school years - reflects the researcher’s prolonged engagement in the field. This extended engagement with the focal participant served to build rapport and trust with the teacher, to gain an understanding of her “insider’s” view of the context and the phenomenon under study, and to understand possible “core issues” that might influence the quality of the data (Anney, 2014; Shenton, 2004). Additionally, data collection and analysis involved ongoing communication with the focal participant to avoid misconceptions (Barone, 2011) and to determine the teacher’s perspective about the plausibility of tentative interpretations (Merriam,

1998). This involved both informal conversations to elicit the teacher's insights about tentative findings and more formal "member checks" asking for the teacher's specific feedback about written reports.

Finally, thick descriptions and multiple examples from the data were intentionally used in this paper to promote the credibility of the findings, allowing the reader to determine the extent to which the researcher's interpretations "ring true" (Shenton, 2004, p. 69). The combination of these steps serves as a means for establishing trustworthiness of the study.

4.0 FINDINGS

This chapter first presents findings from analysis of the teacher and researcher's discourse in the planning/debriefing meetings. These findings include descriptions of a) the problems of practice that emerged for Heidi and how her framing of these problems evolved over time, and b) the teacher's problem solving process and how her process played a role in changes to her framing of problems. The third section of findings reports analyses of classroom observation data that seek to determine whether there was alignment between changes in problems, framings, and solutions that Heidi discussed and instructional practices enacted in the classroom.

4.1 What Problems of Practice Emerged for Heidi

Across the 64 problem episodes, 106 instances of the 13 categories were identified, indicating that some episodes reflected mention of multiple categories. Table 8 shows the frequencies with which the categories occurred, organized from highest to lowest frequency of occurrence in problem episodes. Important to note in this table is the last column that indicates if the category occurred as the sole focus of a problem episodes. This column shows that only the three most frequently mentioned categories occurred as sole foci of problem episodes. The other ten categories always occurred in conjunction with one or more of the three most frequent. As well, the three most frequent co-occurred, as discussed below.

Table 8. Frequency of Categories

Category	Freq	% ^a of problem episodes	Single occurrence
Classroom Discussion	40	63%	Yes
Historical Inquiry Practices	14	22%	Yes
Motivation-Engagement	14	22%	Yes
Who's Doing the Work	8	13%	No
Close Reading	7	11%	No
Logic-Reasoning	6	9%	No
Material Resources	4	6%	No
Annotations	3	5%	No
Assessment	2	3%	No
Claims-Evidence	2	3%	No
Content	2	3%	No
Design Process	2	3%	No
Writing	2	3%	No
106			

^a Total % of categories exceeds 100%, as % calculated out of 64 problem episodes and problem episodes could be tagged with more than one category code.

The three most frequently occurring categories – Classroom Discussion, Historical Inquiry Practices, and Motivation-Engagement – recurred singly and as co-occurrences across the iterations, indicating these categories were persistently problematic. This study focuses on Heidi's framing of these three most frequently occurring categories. Across the 2.5 years of her reflections, Heidi expressed nine different problem frames about these three major categories. As stated in the description of data analysis in chapter three, problem frames represent Heidi's perspective on an aspect of instruction that encompassed multiple episodes talked about in similar ways. Thus, in this study, the nine frames that emerged for Heidi are considered the nine problems of practice that the teacher identified and addressed in meetings. Table 9 outlines the nine problem frames expressed by Heidi.

Table 9. Problem Frames

Frame #	Frame
1	Getting students to engage in inquiry-based historical discussions
2	Dealing with the messiness of inquiry-based historical discussions
3	Determining how much to let students grapple and go on in discussion
4	Planning lessons to engage students in sourcing
5	Pushing students in their sourcing
6	Presenting corroboration
7	Getting students to stick to and track reasonable arguments in discussion
8	Getting eighth graders to buy in to close reading, annotations, and discussion
9	Being explicit about contextualization

The episodes that made up problem frames included talk about one or more of the three major categories (Classroom Discussion, Historical Inquiry Practices, and Motivation-Engagement), occurring singly, co-occurring with each other, or co-occurring with the other ten categories. Figure 2 represents when each frame occurred. For each frame, the figure includes the number of problem episodes and the relevant category or categories for each meeting that an episode occurred. Note that frames overlapped in time. Note also that only the categories of Classroom Discussion, Historical Inquiry Practices, and Motivation-Engagement are represented in this figure. For example, Frame 3 involved nine problem episodes about Classroom Discussion at the beginning of Iteration I. Two of the nine episodes were about Classroom Discussion as a single topic and the other seven of the nine episodes co-occurred with other categories, such as Who's Doing the Work, Close Reading, and Assessment. A more in depth

examination of these frames in the next section reveals the texture and multidimensional nature of the teacher's learning.

Frames	F1			F3								F5				F8																					
	1H	1M	1M &D	1D	1D	1D	2D	2D	1D	1D	2H	1H	5M	1M	1M	2M	1M	1M &D																			
	F2			F4								F6				F9																					
	2D; 1D &H	2D	1D; 1M	1H &D								2H	2H	1H	1H								1H														
												F7																									
											3D			1D			4D	3D	2D	1D	4D	1D	1D	1D				1D									
Meeting #	3	5	7	8	9	14	15	19	20	22	23	24	25	26	27	32	33	35	38	40	41	47	48	49	50	51	52	53	54	55	56	57	58	60	61	62	63
Date	5/16/12	5/18/12	5/24/12	5/25/12	5/30/12	10/3/12	10/4/12	10/17/12	11/2/12	11/7/12	11/14/12	11/19/12	11/21/12	12/3/12	1/14/13	4/8/13	4/11/13	4/23/13	5/31/13	10/21/13	10/22/13	12/13/13	12/13/13A	12/13/13B	12/17/13	2/10/14	2/17/14	2/18/14	2/26/14	3/10/14	3/20/14	3/24/14	4/9/14/A	5/2/14	5/13/14	5/27/14	5/29/14A
Iteration	Iteration I (2012)					Iteration II (2012-2013)										Iteration III (2013-2014)																					

H = Historical Inquiry Practices, D = Classroom Discussion, M = Motivation-Engagement

Figure 2. Problem frames and relevant categories over time

Note only meetings with problem episodes represented in figure. Numbers represent the number of episodes about each specified category

4.2 How Heidi's Framing of Problems Evolved

The sequence of frames represents overarching changes in the teacher's perspectives on aspects of her instruction. Across frames over time, Heidi generally progressed from a focus on facilitating inquiry-based historical discussions, to a focus on engaging students' in discipline-specific inquiry practices, to a focus on getting students to take a more active role in the historical inquiry process. Therefore, this paper organizes the findings according to this general progression. As will be described in further detail below, the first three frames involved concerns about facilitating inquiry-based historical discussions, but the way Heidi talked about these concerns differed in each of the three frames. In this study, learning is conceptualized as changes to the teacher's knowledge and practice. Changes in Heidi's talk from Frame 1 to Frame 3 reflected changes in her knowledge and practice, thus reflecting learning about this aspect of her instruction. In Frames 4 through 6 as well as frame 9, Heidi expressed concerns about engaging students in discipline-specific inquiry practices. Again, each of these four frames centered on supporting students' historical inquiry practices, but differed in how Heidi talked about problems about this aspect of instruction. The way the teacher talked about historical inquiry practices differently from Frames 4 through 6 and then again in Frame 9 shows evidence of changes to her knowledge and practice about this aspect of her instruction. Furthermore, Heidi's talk in Frame 4 compared to Frame 1 shows evidence of her learning about supporting her students' discipline-specific inquiry practices. In Frames 7 and 8, Heidi expressed concerns about how to get students to take a more active role in the historical inquiry process. Heidi's talk in these two frames show evidence of changes to her knowledge and practice from each of the previous frames. Further details of these changes across frames are described below.

4.2.1 Facilitating Inquiry-Based Historical Discussions

Early on in meetings, during all of Iteration I and the first part of Iteration II through November, Heidi expressed concerns about facilitating inquiry-based historical discussions. For example, Frame 1 involved Heidi's concerns about wanting to get students engaged in more historically specific ways of reading and reasoning in discussion. However, at this time, Heidi's language represented a somewhat vague and general way of talking about historical inquiry practices. For example, Heidi used phrases such as wanting to have students ask "deeper questions" (5/15/12, mtg #2; 5/16/12, mtg #3), the "kinds of questions historians ask," and going "a little deeper in questioning" (5/15/12, mtg #2), without defining specifically what she meant by deep questions. Similarly, Heidi referred to teaching the three practices of sourcing, contextualization, and corroboration combined together as comprising historical inquiry broadly rather than differentiating these practices. For instance, she explained, "I've never used the words contextualization and corroboration with [students], even sourcing with them. Maybe if I taught them that and then we looked at photos and they had those lenses, that would have been a more advanced study" (5/16/12, mtg #3). Jackie contributed to the teacher's framing, using similar language about going "deeper" with the content and similarly not differentiating sourcing, corroboration, and contextualization. For example, she stated "I like the idea of taking it a little deeper, thinking about [contextualization, corroboration, and sourcing]. So [students have] already kind of practiced and are familiar with reading photographs. So let's take it a step deeper and really tie it in with contextualization and corroboration and sourcing" (5/16/12, mtg #3).

Frame 1 also involved Heidi's concerns about wanting to get her eighth graders more engaged in classroom discussion. Her language indicated she thought the eighth graders lacked an interest and willingness to share in discussion, making statements such as "[eighth graders]

don't care. They are just not that interested now. It wouldn't matter what we're doing, they don't really care. Everything is a chore to them" (5/18/12, mtg #5). At this time, Heidi positioned the eighth graders as less engaged than her seventh graders, making statements such as the eighth graders were "just so different from 7th. It's like a completely different experience" (5/18/12, mtg #5).

Frame 2 was also focused on facilitating inquiry-based historical discussions. However, during Frame 2, Heidi expressed concerns about her discomfort with inquiry discussions feeling "disorderly" and "messy" (5/24/12, mtg #7). This concern shows a progression from her previous concern about getting students *to engage* in such discussions, and indicates a change in her practice. At this time, Heidi's language indicated that she was indeed engaging students in inquiry-based discussions, but that she felt a lack of "control," "management," and "flow" with these discussions (5/24/12, mtg #7). She also expressed discomfort with letting students have "misconceptions" and "living with the ambiguity of just letting them think wrong things and then letting them sort them out eventually" (5/25/12, mtg #8). The teacher talked about it being a "paradigm shift" for her to not "fill in the gaps" of content for students (5/25/12, mtg #8). At this time, Jackie framed the issue differently, expressing excitement about the level of students' engagement in inquiry-based discussions. For example, after Heidi's first attempt at asking students to discuss her own "deep" questions, Jackie commented, "I feel like I was so excited because [you asked] an open-ended question. Those eighth graders, I saw more hands up than I ever have with them" (5/24/12, mtg #7). Heidi expressed that she understood the value of such a discussion, but that she was grappling with the ambiguity of an exploratory discussion, stating, "I thought it was really great, but I thought it could have been better if I had like mapped it out a little better in my head. But then maybe that, maybe not, maybe it just needed to be messy, you

know” (5/24/12, mtg #7). Heidi attributed the issue of her discomfort with messiness to the discipline of history being “fairly new” to her and thus not feeling “confident” that she knew historical content “well enough to just kind of pick up on it when it happens and just capitalize on it [in discussion]” (5/24/12, mtg #7). Heidi’s expressed lack of confidence about her history domain knowledge suggests that at this time the teacher felt her knowledge of history lacked the kind of depth she knew was fundamental to effectively facilitate discussions of history from an inquiry stance.

In Frame 3, Heidi’s concerns focused on the extent to which she should let students grapple and let inquiry discussions go on and on in multiple directions. At this time, the language Heidi used indicated she was no longer uncomfortable with messiness or with students having misconceptions during discussion, but instead that she wrestled with the extent to which she should allow students to sit in the realm of uncertainty and to deliberate with each other about historical topics. Her language indicated she understood the value of students doing the thinking, making statements such as “This was a good place to start, to let them grapple” (11/7/12, mtg #22), but that she wasn’t sure how much to do so. For instance, she made statements such as, “I mean it’s always hard to know how much, to let it go in all these directions versus in a specific direction and how much to tell them versus let them struggle” (11/2/12, mtg #20). At this time, Heidi explained that “in-depth inquiry will take most of the class so I don’t want to rush writing at the end” (11/2/12, mtg #20) and that she now tries to “err on the side of not telling [students] as much, even if it takes longer” (11/21/12, mtg #25). Heidi’s talk about issues in Frame 3 indicate noticeable changes in her practice from Frame 1, progressing from concerns about how to get students engaged in inquiry-based discussions to regularly facilitating inquiry-based discussion such that she privileged such discussions over other instructional tasks.

4.2.2 Engaging Students in Discipline-Specific Inquiry Practices

Heidi's concerns evolved from a focus on facilitating inquiry-based historical discussions to a focus on supporting students' engagement in discipline-specific inquiry practices during most of Iteration II from November through May. Although a shift in focus from inquiry-based discussions to specific historical inquiry practices does not necessarily indicate progression in her learning, Heidi's language use across frames provides evidence of overall changes to her practice vis-à-vis this aspect of instruction. Specifically, Heidi moved from a focus on getting students generally engaged in asking historical questions (Frame 1) to differentiated foci - how to help students hone specific historical inquiry practices (Frames 4, 6 and 9). As mentioned above, in Frame 1 Heidi talked about historical inquiry practices in a somewhat vague and general way (i.e. wanting students to ask "deep questions") and referred to the three practices of sourcing, contextualization, and corroboration together, almost as if they were synonymous. Heidi's framing evolved to concerns about ways to support the specific historical inquiry practices of sourcing (Frames 4 and 5), corroboration (Frame 6), and contextualization (Frame 9). Furthermore, the way Heidi talked about these practices over time from Frame 1 to Frame 9 showed marked changes in her knowledge of what these practices entailed as well as her knowledge of how to support students' engagement in the practices.

For each of the three specific historical inquiry practices, Heidi's concerns varied in focus, from frustrations with planning lessons, to concerns about how to deepen students' engagement in specific practices, to concerns about how to be more explicit with students about the specific practices in which they were already engaging. For example, in Frame 4, Heidi expressed frustration with planning lessons to engage students in sourcing. She used language indicating difficulties in finding the "right" texts to use in lessons, making statement such as: "I

never find the right text” (12/3/12, mtg #26), “I’m baffled ... finding texts, that’s the hardest part for me” (12/3/12, mtg #26), and “I spend so much time looking and looking and I never can quite land on the perfect combination of [texts]” (1/14/13, mtg #27). In addition to difficulties finding the right texts, at this time Heidi also used language indicating she herself was grappling with understanding exactly what sourcing entailed. She made comments such as, “I’m just like blind, I’m blindly trying things” and “there’s something about sourcing in particular that is a little elusive to me, how to get it to click” (1/14/13, mtg #27). These statements indicate that not only did Heidi feel she didn’t have a deep knowledge of what sourcing involved, but also that she didn’t have a clear vision of what it looked like to teach sourcing. The concerns Heidi expressed in Frame 5 indicate a noticeable change in her practice, as she shifted from uncertainty about how to plan lessons to engage students in sourcing to concerns about how to push students’ thinking in their sourcing. This shift indicates the teacher learned how to design and facilitate ways to engage students in sourcing. However, during Frame 5, even though Heidi didn’t express concerns about understanding sourcing as a practice, the teacher’s talk indicated she was still trying to fully understanding what sourcing entailed. For instance, she asked if she could look at examples of annotations from “really proficient” high school advanced placement students that reflected sourcing, because “I don’t know what that looks like exactly” (4/8/13, mtg #32).

In both Frames 6 and 9, Heidi’s concerns focused on how to be more explicit with specific historical inquiry practices. In Frame 6, Heidi expressed concerns about “presenting” corroboration in a way that encouraged students to annotate and share their thoughts about corroborating details across sources (5/11/13, mtg #38). At this time, Heidi’s concerns about making corroboration more of an explicitly talked about practice indicates that she had

knowledge of what corroboration entailed and knowledge about how to engage students in corroboration. Her concerns in Frame 6 indicate a change in knowledge about historical inquiry practices as compared to Frame 1, where Heidi talked in vague terms about getting students to ask deep historical questions.

Similarly, Heidi's concerns in Frame 9 focused on wanting to more explicitly explain and highlight to students when they were engaging in contextualization. This indicates it was part of the teacher's practice to engage students in contextualization and that she had knowledge of what contextualization entailed and how to engage students in the practice. She used language indicating that she was "already doing contextualization in the way I question," but that she "just want[ed] to be more explicit about it" (3/24/14, mtg #57). She talked about wanting to make contextualization a "spotlighted goal" and that she didn't want to "miss opportunities to be explicit about contextualization" with students (5/2/14, mtg #60). At this time, Heidi did express some concerns about wanting to gain a deeper understanding of contextualization, making statements such as: "that's a part that I'm still foggy on myself. Like what does that actually look like to be developing that skill?" (03/20/14, mtg #56) and "I'm just not exactly sure what that looks like to make [contextualization] my spotlighted skill for the unit" (3/24/14, mtg #57). At this time, Jackie contributed to Heidi's framing of contextualization as somewhat foggy, making statements such as: "contextualization ... it's a hard one" (3/20/14, mtg #56), "I don't think we talk about contextualization enough so it would be good to figure out" (3/20/14, mtg #56), and "I'm right with you, though, I would miss opportunities [to be explicit about contextualization] too" (5/2/14, mtg #60).

However, unlike in Frame 4 where Heidi felt she was "blindly trying things" with sourcing, the teacher expressed more confidence and competence about supporting the practice

of contextualization in Frame 9. For instance, after Jackie mentioned that part of contextualization was helping students learn not to judge historical actors based on their current values, Heidi stated, “See I must be doing that better anyway this year because that kind of thing just doesn’t happen as much” (3/24/14, mtg #57). Heidi also made explicit statements about how she felt better about supporting students’ historical inquiry practices and thus was confident about deepening her understanding of contextualization. She stated, “the difference between this year and last year is that I’ve come so much further skill-wise so I’m ready to move on to something, I’m ready to deepen [contextualization]” (3/20/14, mtg #56). This statement that she has “come far” in her teaching suggests she had learned effective ways to support students’ historical thinking. The statement that she wanted to “deepen” contextualization indicates she wanted to expand on a certain level of understanding about what the practice involved rather than feeling like it was “elusive” to her (as she did with sourcing).

Furthermore, Heidi’s language in Frame 9 indicates a noticeable change in her knowledge about historical inquiry practices as compared to Frames 1, 4, 5, and 6. During Frame 9, the language Heidi used to talk about contextualization represented a deep understanding of the complex interrelation between contextualization, sourcing, and corroboration. She made numerous statements about the interrelation, such as, “making contextualization kind of a spotlighted goal is a way of deepening sourcing more because its helping students to understand that’s kind of why we source, because it helps us contextualize better. Like that this document or this source becomes part of a context and we understand it within that context” (3/24/14, mtg #57). She also explained, “It’s like they have these interconnected kind of, you source to better contextualize and then contextualizing helps you go deeper in sourcing” (3/24/14, mtg #57). Over time across frames, the language Heidi used to talk about historical inquiry practices

generally moved from a vague notion of asking “deep questions” and an undifferentiated association of sourcing, corroboration, and contextualization to talking about the practices as differentiated from each other, but in nuanced and interrelated ways. Her reflections suggest that these statements were related to her own deepened understanding of these historical inquiry practices.

4.2.3 Getting Students to Take a More Active Role in the Historical Inquiry Process

Heidi’s concerns evolved to a focus on getting students to take a more active role in the historical inquiry process during the end of Iteration II and throughout the duration of Iteration III. For example, in Frame 7 the teacher expressed concerns about getting students to stick to and track arguments in discussion. This concern shows progression from Heidi’s earlier concerns in Frame 3, when she was uncertain about how much to let students grapple and go on in discussion. In Frame 7, the teacher was no longer concerned about how long to let discussion go on, but was focused on making sure students were more agentic in ensuring their talk was productive. Heidi talked about wanting students to take more of the responsibility for listening to and understanding each other. For instance, in rehearsing what she could say to students, she commented “it’s your job to make sure that you understand [each other] and if it wasn’t clear, you ask, ‘did you mean this?’ or you ask ‘can you repeat it louder?’” (12/17/13, mtg #50). Heidi also talked about wanting students to track their arguments, making statements such as that she wanted to “make sure they nail down an answer” (4/11/13, mtg #33) and “at some point, I’d like them to keep mental tallies [of the argument], like when something comes up it gets responded to or addressed (12/13/13A, mtg #48.). Furthermore, she wanted students to be more accountable for ensuring their own and each other’s arguments were based on evidence. She stated, “they should hold each other to always use evidence for everything they say. Or they could say ‘right

now, I'm saying something right now I can't prove with evidence. It's just my idea.' Like call it out what it is." (4/11/13, mtg #33). Such statements show a change from concerns in Frame 3, as the teacher's concerns progressed from a focus on determining how long to let discussions go on to concerns about ensuring students' talk was focused and purposeful.

Related to the teacher's concerns about students taking more responsibility for tracking arguments, Heidi's concerns in Frame 7 were also focused on ensuring students were developing arguments that were logical and reasonable. This concern centered on problems with her sixth grade students not realizing when their arguments didn't quite make sense. For example, she talked about how her sixth grade students were attempting to use textual evidence but that their evidence wasn't always relevant. She stated, "someone asked [a student] to use text evidence to support [her claim] and she said something that was remotely from the text. Then [that student's claim] was on the table as a relevant option when it really shouldn't have been (12/13/13A, mtg #48). Heidi also talked about the difficulty of having sixth graders take more responsibility in tracking their co-constructed arguments because their arguments weren't always reasonable. She explained:

Excerpt #1

Heidi: It is hard for them. But sometimes when somebody says something that's lacking logic, I know that there are people in the room who notice. And that's why I guess I'm always trying to, since I'm teaching them to respond to each other, I'm hoping and I'm trying to leave those opportunities for them to say that doesn't make sense. But they're not doing it and then [the argument] just gets foggier and foggier.
(2/18/14, mtg #48)

These statements provide evidence that Heidi's practice involved students' doing more of the work of building arguments together, but that the teacher was grappling with how to handle her sixth graders' underdeveloped reasoning skills.

Since at this time Heidi had made it a part of her regular practice to have students

actively engage in inquiry-based historical discussions, it is reasonable to assume that doing so made it easier for her to see her students' thinking and notice their reasoning. It is also possible that the more and more the teacher made it a regular part of her practice to engage students in specific historical inquiry practices, students' reasoning about the historical content became more evident, leading Heidi to notice where their historical reasoning was lacking.

Similar to her concerns about students taking on more of the responsibility in discussion during Frame 7, Heidi's talk in Frame 8 centered on concerns about getting students to take a more active role in the historical inquiry process. Specifically, in Frame 8 Heidi expressed concerns about getting eighth graders to buy in to close reading, annotations, and discussion. At this time, Heidi talked about her eighth graders not "buying in" (10/21/13, mtg #40; 10/22/13, mtg #41) and not being "on board" with such tasks (2/17/14, mtg #52), making comments such as: "they don't want to buy in to the idea of annotations" (10/21/13, mtg #40), "they're not buying into it so they're still trying to read as not closely as they can get away with it" (10/21/13, mtg #40), and that it's "harder to get eighth grade to buy in to talking loudly because they're more self-conscious" (05/13/14, mtg #61). Jackie contributed to this framing, relating the issue of eighth graders not buying in to annotations to not seeing the value of annotations, stating, "I don't know what to say about that. It's just agency maybe, like they're just going 'I don't have to do it so I'm not going to do it.' Or that's just not valuable for them. It's not doing something for them" (2/17/14, mtg #52). Similar to how Heidi positioned her eighth graders differently than seventh graders in Frame 1, during Frame 8 she also positioned eighth graders as more difficult to motivate than her sixth graders. For example, she stated, "I'm not used to having to [get buy in] because sixth graders will just buy in to whatever you tell them to buy in to" (10/21/13, mtg #40), and "that just would never ever happen with sixth grade, ever" (02/17/14, mtg #52). Jackie

contributed to positioning eighth graders differently than sixth graders, making statements such as that eighth graders were “too cool for school” (2/10/14, mtg #51), or “with sixth grade I feel like they're gonna want to do anything you want them to do because they're just used to that. But with eighth grade you maybe have to make, have a little, a few more twists or something” (10/22/13, mtg #41).

Heidi's concerns in Frames 1 and 8 both centered on getting eighth graders more engaged. However, the teacher's talk in Frame 1 suggested she had a somewhat simplified view of students' motivation, framing her eighth graders as lacking an interest or willingness to participate. However, Heidi's talk in Frame 8 suggests she had a more nuanced understanding of the relation between her students' motivation and engagement, as well as her role in motivating students. During Frame 8 Heidi talked about eighth graders needing a reason to be invested and her role in figuring out how to convince them of finding value in inquiry processes such as close reading and annotations. For example, she explained, “I want them ultimately to value [close reading]. I'm treading lightly and trying to figure out what to do” (10/21/13, mtg #40) and “I need to think about how I can convince them that [close reading] is actually valuable for them” (10/21/13, mtg #40). In terms of students' engagement in classroom discussion, Heidi's concerns changed from a focus on getting students to share in Frame 1 to a focus on getting students to take more ownership of discussion in Frame 8. This shift suggests a change in the teacher's practice such that she was able to get students to participate and share, but that she wanted them to do so in more productive ways (such as talking louder so others could hear).

4.3 Heidi's Problem Solving Process and How It Played a Role in Framing Problems

This section first describes Heidi's overall problem solving process and then describes

specific ways the teacher's problem solving process played a role in the evolution of problem frames, or how Heidi framed problems differently over time in meetings.

4.3.1 Heidi's Overall Problem Solving Process

Heidi's problem solving did not always involve moving through every phase of the cycle to address each of the 64 problems she identified. Rather, over the duration of the study, there were three courses of action Heidi took in planning/debriefing meetings to address these problems, reflecting variation in engagement in phases of the cycle. The three courses of action included: 1) defining the problem and taking no further action, 2) defining the problem and developing solutions, and 3) defining the problem, developing solutions, and talking about the outcomes of solutions she tested in her instruction.

When addressing the 64 problem she identified, there were only five instances of Heidi just defining the problem and taking no further action. This meant that for five of the problems Heidi identified, no solutions were proposed by the teacher or researcher. Instead, Heidi and Jackie's talk involved just describing the problem and talking about possible reasons for the problem. Figure 3 depicts this course of action in relation to the problem solving cycle.

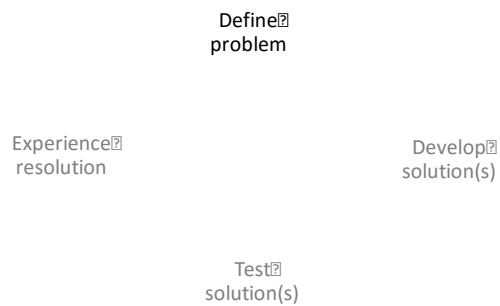


Figure 3. Defining the problem and taking no further action

Except for the five instances mentioned above, reflection about problems always involved some talk about developing solutions, even if that talk involved proposing a solution that was not elaborated or taken up. At times, talk about proposed solutions evolved into detailed lesson planning, which involved making decisions about specific aspects of upcoming lessons. Most of the time, however, talk about developing solutions tended to go in and out of elaborating on the problem and briefly elaborating ways to address the problem. Therefore, a big part of Heidi's problem solving process was this back and forth between defining problems and proposing solutions. For example, during one episode in Frame 7, the teacher and researcher discussed Heidi's concern that students were sticking with illogical arguments (12/13/13B, mtg #49). Excerpt #2 below illustrates how Heidi and Jackie vacillated back and forth between developing a solution to the problem (writing down students' ideas to provide them with a visual to track the argument) and further defining the problem (students didn't hear each other very clearly). The classroom discussion on which the teacher and researcher reflected in this excerpt involved sixth grade students discussing the source information for a primary source from ancient Egypt called *Hymn to the Nile*. During their discussion, in trying to determine what type

of text they were reading, students were confused about whether a hymn was a gift or a song. Jackie proposed writing down students' ideas on the board so that they could both hear and see the argument, helping them notice when ideas didn't make sense (line 1). Heidi further elaborated on the problem, describing how students could not hear each other very well (most of line2), and then elaborated on Jackie's proposed solution (end of line 2). The pair continued to elaborate this solution (lines 3-4).

Excerpt #2

- 1 Jackie: So if someone says something that doesn't make any sense and no one picks up on it, it again goes back to if you're tracking [the argument], aka writing it down. So if you wrote down "hymn means gift," someone will see it and they might be like "Hey, hymn doesn't mean gift" if you looked it up in the dictionary.*
 - 2 Heidi: Right because if they're not hearing. Like, that was what was hard, was that, [student name] read it out of the dictionary. It said a song. It said it in the dictionary [laughing]. But I'm not sure everyone heard that as clearly as they could've. And that should've ended that conversation and it didn't, you know? So I think hearing, everybody hearing everything is a factor. And you're right, having like a visual tracker of it is gonna help too.*
 - 3 Jackie: Yeah, so I think it's a matter of hearing and seeing it, twice. Like ok if we think hymn means gift here and then we look it up [in the dictionary] and it means song, then someone's going to go, "hymn does not mean gift" and you can cross it off.*
 - 4 Heidi: Should I try to make some type of simple tracker like I put up today? I think it's a lot. The way it was on the board it was just kind of natural.*
- (12/13/13B, mtg #49)*

Since classroom observations and planning/debriefing meetings did not take place every day, it wasn't always evident which proposed solutions Heidi tested. Most solutions developed in meetings, whether they were only briefly proposed or more fully elaborated, were not discussed as being tested in Heidi's instruction in subsequent meetings. Thus, the course of action that Heidi most often took in addressing problems in meetings was defining problems and developing solutions, without follow up conversations about testing specific proposed solutions. This course of action occurred 42 times for the 64 problems (66%) Heidi identified over the course of study.

However, importantly, the absence of talk about tested solutions in meetings does not

necessarily mean that Heidi did not test solutions in her instruction that were developed in meetings. In fact, it is evident from the teacher and researcher's talk that often the solutions they discussed in the past had become part of the teacher's regular practice. For example, the teacher and researcher often proposed specific discourse moves Heidi could incorporate as solutions to problems, such as asking students for textual evidence to back up their claims. Although they did not subsequently discuss whether and how Heidi implemented such moves, often the teacher and researcher's talk in later meetings showed evidence that Heidi had appropriated some of these moves as part of her regular practice. In one meeting she reflected on this change to her practice, stating, "Like I recognize when [students are] expressing an idea that has no basis really quickly and then I kind of call it out by asking that question [where do you see that in the text?] until I get them to either see that themselves or give me evidence" (10/22/13, mtg #41). Such instances of talking about proposed solutions Heidi had adopted as part of her practice provided evidence of the teacher experiencing partial or full resolution to the problem. Furthermore, Heidi at times experienced resolution to the problem simply through engaging in the course of action of defining problems and developing solutions, as evidenced by the teacher expressing insight about the problem while talking about developing solutions and thereby deepening her knowledge about elements of the overarching issue. This suggests that the process of developing solutions without follow up discussion about testing the solutions in meetings played a role in changing the teacher's knowledge and practice. As will be discussed below, this was especially apparent in Frames 4, 5, 6, and 9, when reflection on problems centered on developing solutions for concerns about engaging students in specific historical inquiry practices (but did not center on talking about the outcomes of tested solutions).

Figure 4 depicts the most frequent course of action - defining the problem and developing

solutions, which at times led to resolution (indicated with a dashed arrow).

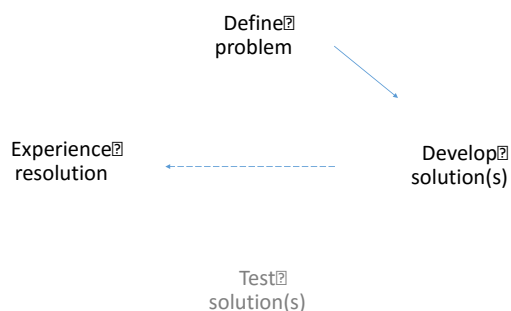


Figure 4. Defining the problem and developing solutions

The third course of action - defining the problem, developing solutions, and subsequently talking about specific solutions the teacher tested in her instruction – was evidenced 17 times in meetings. When Heidi tested solutions that were developed collaboratively in meetings and subsequently reflected on the outcomes of these tested solutions, it tended to result in her either redefining the problem (9 times) or identifying a new problem that she framed differently (2 times). Thus testing solutions and reflecting on the solutions seemed to trigger the identification of more problems. The other six instances of reflecting on tested solutions resulted in talk that indicated either partial or full resolution, such as Heidi interpreting a new instructional approach as successful or explaining changes in her understandings and/or practices.

Talk about tested solutions was most frequent in Frames 1-3, which focused on concerns about facilitating inquiry-based historical discussions, and in Frame 7, which focused concerns about getting students to stick to and track reasonable arguments in discussion. Thirteen of the 17

courses of action involving testing solutions occurred within these frames. This will be discussed in more detail in the following sections.

Figure 5 depicts the course of action involving defining the problem, developing solutions, and talking about the outcomes of tested solutions, which either led to redefinition of the problem, identifying a new problem (full resolution of the frame and shifting to a new frame), or talk that showed evidence of partial or full resolution.

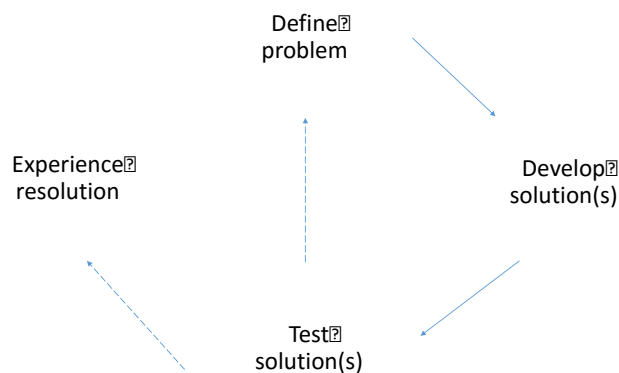


Figure 5. Defining the problem, developing solutions, and reflecting on the outcomes of the tested solutions.

4.3.2 How the Teacher's Process of Problem Solving Played a Role in Framing Problems

This section describes Heidi's problem solving process vis-à-vis the nine problem frames and how the teacher's problem solving played a role in her evolving talk about the frames. As described above, the sequence of the nine frames represents overarching changes in the teacher's perspectives on the three major categories. Across frames over time, Heidi generally progressed from a focus on facilitating inquiry-based historical discussions, to a focus on engaging students in discipline-specific inquiry practices, to a focus on getting students to take a more active role in

the historical inquiry process. This section is organized according to this progression of frames. Some descriptions of Heidi's problem-solving process include data from classroom observations that relate to specific issues on which the teacher focused in her reflections. Importantly, data from the classroom observations were selected based on the specific instances and phenomena on which the teacher reflected about taught lessons and were not coded by the researcher. Thus, summaries and excerpts from field notes or audio/video transcripts serve to illustrate the nature of the issues on which Heidi focused and how her framing of problems related to what steps she took instructionally.

Problem Solving About Facilitating Inquiry-Based Historical Discussions

As mentioned above, testing solutions that were developed in meetings and subsequently evaluating the outcomes of those tested solutions in meetings was central to how Heidi addressed and resolved problems in Frames 1-3 centered on facilitating inquiry-based historical discussions. This course of action, which occurred seven times across these first three frames, played a role in changing the teacher's practice such that she continually implemented refined versions of the solutions she tested in her instruction. This course of action also played a role in changing Heidi's perspectives about inquiry-based discussions, reflecting shifts to new problem frames. As previously described, Heidi's initial framing of problems evolved from a focus on getting students engaged in inquiry-based historical discussions (Frame 1), to concerns about such discussions feeling messy and disorderly (Frame 2), to concerns about the extent to which she should let students grapple and let discussions go on (Frame 3). Thus, resolution of the first and second frame involved a shift in how Heidi talked about problems about facilitating inquiry-based discussion. The course of action of testing solutions was related to these shifts in framing. Resolution of Frame 3 also involved a shift in how Heidi talked about problems related to

facilitating inquiry-based discussions, progressing to a focus on getting students to take more responsibility in sticking to and tracking reasonable arguments in Frame 7. The course of action of testing solutions was also related to this shift in framing. What follows are descriptions of ways Heidi tested solutions throughout Frames 1-3 and how this course of action played a role in shifts to her perspective on problems about facilitating inquiry-based discussions.

An example of changes to Heidi's perspectives and her practice through testing solutions occurred at the end of Frame 1, leading to resolution of the frame and a shift to Frame 2. At the end of Frame 1, in response to Heidi's concerns about getting students engaged in asking deep historical questions, the teacher tested a variation of a solution she and the researcher had developed. Heidi facilitated a discussion with her eighth graders focused on her own deep epistemological question - "how can we ever really know [about history]?" (5/24/12, mtg #7). When she reflected on this tested solution, Heidi's concerns shifted from getting students engaged in inquiry (Frame 1) to concerns about discussion feeling "messy" and "taking a lot of tangents" (5/24/12, mtg #7) (Frame 2). In her debriefing about the students' discussion of this question, the teacher's statements indicated she felt that she "wasn't quite as in control" as she wanted to be and that she "didn't quite know how to get the reins" (5/24/12, mtg #7).

The portion of the lesson where students discussed Heidi's "how can we ever really know?" question involved two four-minute segments of whole group discussion where six students contributed seven different ideas about the topic (5/24/12, obs #11). Data from field notes indicate that during those eight minutes of the lesson, Heidi asked the inquiry question at least five times, each instance a paraphrase of her original question (5/24/12, obs #11). For example, she asked "how can we know that what we know is exactly the way it really was?" and "how can we really know anything about history?" (5/24/12, obs #11). Throughout the two four-

minute discussions, seven student ideas were proposed, each idea directly related to Heidi's overarching question, and several directly expanding on previous students' proposals (5/24/12, obs #11). Therefore, Heidi's interpretation of the "how can we know?" deep question discussion as being tangential and messy does not necessarily align with the actual sequence of ideas in the classroom discussion. Heidi feeling that she "wasn't quite as in control" and that she wasn't "keeping the flow as nicely" may have been related to the number of times she rephrased her question, which yielded multiple student ideas about the same topic rather than yielding an elaborated discussion about one or two student ideas in more detail. However, even though this discussion didn't involve elaboration of one idea after another in succession, each idea proposed by students was on task and therefore doesn't necessarily align with the interpretation of discussion as tangential.

Heidi's testing and reflecting on the deep question solution led to a shift in her concerns about facilitating inquiry-based discussions, progressing from a focus on getting students to engage (Frame 1) to dealing with the messiness of such discussions (Frame 2). Within Frame 2, the course of action Heidi took to address each of the problems she identified involved testing solutions she and the researcher had developed and reflecting on the outcomes of those tested solutions in the meetings. During Frame 2, developing solutions centered on selecting parts of texts on which to focus inquiry discussions and on refining the specific way she framed inquiry questions for students to discuss. At the beginning of the frame, developing solutions also involved Heidi determining that she needed to "loosen [her] grip" and "trust [herself] more" (5/24/12, mtg #7) during discussions. After testing and refining several solutions, Heidi tested a new instructional approach - implementing a "mini" Socratic Seminar discussion with her seventh grade students (6/6/12, obs #16) - that led to resolution of her concerns about the

messiness of inquiry-based discussions in Frame 2. In her debriefing of this lesson, Heidi interpreted the discussion as successful because students were “look[ing] at each other and talk[ing] to each other,” and were consistently using argumentation language “automatically,” such as “I disagree with you” (6/10/12, mtg #11). This indicated resolution of Frame 2, as Heidi was no longer concerned with issues of messiness and control of inquiry-based discussions.

In her reflection on the mini Socratic Seminar discussion, Heidi expressed the realization that she didn’t encourage back and forth talk on a daily basis, stating, “the way that I do whole class discussions actually does not encourage them to have that back and forth because I facilitate it” and “the way I was doing it before [the mini Socratic Seminar], I wasn’t facilitating [discussion] in a way that was encouraging them to respond to each other. Or if they responded to each other they had to raise their hand and be called on by me” (6/10/12, mtg #11). The teacher and researcher talked about plans to include Socratic Seminar throughout future units because, as Jackie commented, “that discussion right there was perfectly what we’re looking for” (6/10/12, mtg #11). Thus, testing a solution at the end of Frame 2 played a role in Heidi’s shifting perspective on inquiry-based discussions, moving from wanting to be in control and keeping the reins to wanting discussion to involve more student-to-student talk and less of her control.

What is interesting to note is that the researcher interpreted both tested solutions - the “how can we ever really know?” deep question at the end of Frame 1 and the mini Socratic Seminar discussion at the end of Frame 2 - as successful. This suggests the two discussions reflected similar characteristics for supporting students’ historical inquiry. If the nature of discussion didn’t drastically differ between the “how can we ever really know?” discussion and the mini

Socratic Seminar discussion, it is possible that Heidi's differing interpretations of the two tested solutions were more a matter of her growing comfort with the "messiness" of discussion and letting go of "control" than necessarily the quality of students' talk. The mini Socratic Seminar involved two whole group segments totaling 17 minutes where students talked about the biggest obstacles and most effective tactics for desegregating Little Rock Central High School in 1957 (6/6/12, obs #16). The first segment about obstacles was eleven minutes long and included three different ideas proposed by several students, followed by each of those ideas being elaborated on by several students. The second segment about tactics was six minutes long and included four different ideas proposed by students and the teacher, three ideas of which were elaborated on by others. Throughout both of these segments, students indicated whether they agreed or disagreed with each other and explained why numerous times, making statements such as:

- *I disagree because ...*
- *I get what you're saying ... but ...*
- *I disagree. I think the most effective tactic was ...*
- *Actually I kind of, now that I think about it, I kind of agree with [student name] because ...*
- *I understand what she means, but ...*

(6/6/12, obs #16)

Furthermore, throughout these two segments, the teacher continually encouraged students to agree or disagree with proposed ideas through her prompts, asking questions such as "Do you agree? Any other thoughts on that?" She also encouraged students to deliberate, making statements such as "You guys can push back if you disagree" and "So which is the biggest

obstacle then? Again there's no right answer. I just want you to explore the question more" (6/6/12, obs #16). Heidi's interpretation of the mini Socratic Seminar discussion as a successful display of student argumentation might relate to the fact that almost all of the proposed ideas were elaborated by multiple students. Her interpretation of the mini Socratic Seminar discussion as successful presumably also relates to her continual prompting for students to agree and disagree and the students' ensuing direct statements of agreement and disagreement with each other's ideas.

Thus, the mini Socratic Seminar did not drastically differ from the earlier "how can we ever really know?" discussion with which Heidi interpreted as problematic. In fact, the mini Socratic Seminar discussion seemed to involve a little more student-to-student talk, but wasn't necessarily less tangential or messy. It is possible that after several rounds of developing and testing solutions to address the issue of inquiry-based discussion feeling messy, Heidi began to interpret discussions with certain characteristics (such as a lot of back and forth student talk) as successful that she would have previously interpreted as messy. It is likely that the teacher's repeated courses of action of (re)defining the problem, developing and testing solutions, and talking through the outcomes of the tested solutions played a role in Heidi's growing comfort with the open-endedness of inquiry-based discussions across the first three frames.

Problem Solving About Engaging Students in Discipline-Specific Inquiry Practices
Across Frames 4, 5, 6, and 9, Heidi's concerns centered on supporting students'

engagement in specific historical inquiry practices. Addressing concerns across these four frames involved much less teacher-researcher talk in meetings about testing solutions than the first three problem frames. Rather, the course of action Heidi most commonly took to address problems across these four frames about engaging students in discipline-specific inquiry practices was to define problems and develop solutions in meetings, without follow-up talk about testing

particular solutions. This course of action seemed to play a role in Heidi deepening her knowledge about historical inquiry practices. This course of action also played a role in changing Heidi's perspectives about this aspect of instruction, leading to framing problems differently. Resolution of problems in these four frames involved one instance of a shift in how Heidi talked about the problem, evolving from talk about difficulties in planning lessons for sourcing in Frame 4 to talk about how to push students' thinking about sourcing in Frame 5. Resolution of problems in Frames 5, 6, and 9 involved Heidi talking about ways her perspective on the problem changed and/or talking about changes to her practice.

As part of the course of action of defining problems and developing solutions, the process of developing solutions in Frames 4-6 and 9 centered on the teacher and researcher engaging with material resources that served to deepen Heidi's (as well as the researcher's) knowledge of what specific historical inquiry practices entailed in conjunction with how to teach such practices. For example, to address concerns about how to push students' thinking about sourcing in Frame 5, Heidi and Jackie's process of developing solutions involved weaving in and out of engaging with various primary and secondary texts while working through their own understandings of the source information in relation to the historical context. It also involved identifying the affordances and limits of specific texts that Heidi had used and could use in her lessons to support students' sourcing. In doing so, Heidi deepened her knowledge of what it meant to think critically about source information, including the limits to thinking critically about the source information of textbooks. When engaging with material resources, the teacher and researcher tended to develop general principles about supporting students' sourcing rather than necessarily developing specific solutions for Heidi to explicitly test in a subsequent lesson.

For example, one particular episodes during Frame 5 centered on how to get students to

show their thinking about sourcing in their annotations beyond just “look[ing] at the source information” and “underlin[ing] everything” (4/8/13, mtg #32). As part of the process of developing solutions to this problem, the teacher and researcher read through a set of advanced placement high school students’ annotations that reflected sourcing a primary text from a lesson Jackie had observed in another design teacher’s classroom. Reading through the primary source side-by-side with student-annotated examples helped Heidi deepen her knowledge of sourcing in multiple ways. Excerpt #3 below illustrates talk that reflected some of these insights.

Excerpt #3

1 Heidi: so [students are] basically tracking their prior knowledge about that person [the author] before they read to just refresh their memory [of the historical context]

2 Jackie: because in these instances [with primary sources] the authors are very important. Whereas a textbook, who the hell is the author and why is that person ...

3 Heidi: so it's just not as

4 Jackie: it's really hard with textbooks

5 Heidi: ok so [students are] doing all that they can

6 Jackie: they're doing what they can

7 Heidi: and then we're developing that skill so that when I do have an opportunity to give them [a primary source] like this ... but I want to try to make sure that I can you know

8 Jackie: yeah it would be so, if you can find any primary source that's, that you know the sourcing information and where they can read it at a level where they kind of understand it ...

(4/8/13, mtg #32)

The above excerpt begins with Heidi’s realization that advanced placement students’ prior knowledge about the historical content helped them source documents more purposefully (line 1). In other words, the less one knows about the historical context, the more difficult it would be to understand the relevance of who wrote the text, when, and for what purpose. Second, Heidi and Jackie concluded that there was only so much critical thinking you could do about the source information of a textbook because the authors were not integral to the historical context, and therefore, given the texts with which the students in her room were engaging, students were “doing all they can” (lines 2-6). Since Heidi was teaching ancient civilizations for her sixth grade

curriculum, it had been difficult to find primary sources, and thus her students were mostly reading secondary sources like textbook excerpts (which some refer to as tertiary sources). By the end of the excerpt, Heidi concluded that there might be some skill-building value in having students source textbook excerpts (line 7-8). This could mean Heidi saw value in students developing the habit of noticing and asking questions about the source information for every type of historical text they encounter, even tertiary sources.

Resolution of Frame 5 was evidenced by Heidi noting in a later meeting that students were “sourcing in a more purposeful way” (5/31/13, mtg #38) with a set of primary sources from a short inquiry unit the teacher designed and implemented on her own. Heidi also noted ways she had deepened her own understanding of designing lessons for sourcing. She explained that she was “getting better at planning these units” and that even though “it’s not an efficient process yet,” when she’s trying to design a set of texts to use for a unit, “at some point it all comes together and I’m like ‘all right’” (5/31/13, mtg #38). Evidence suggests the course of action of defining problems and developing solutions played a role in building Heidi’s knowledge about planning for and supporting students’ engagement in sourcing.

Developing solutions to problems in Frame 9 also centered on the teacher and researcher engaging with material resources that served to deepen Heidi’s (and again the researcher’s) knowledge of contextualization. Heidi expressed concerns in Frame 9 about wanting to be more explicit with students about contextualization and about wanting to gain a deeper understanding of contextualization (3/20/14, mtg #56; 3/24/14, mtg #56; 5/2/14, mtg #60). In addressing these concerns, the teacher and researcher’s process of developing solutions involved recalling information from historical texts they had previously read and talking through how they interpreted these texts based on what they knew of the historical context. Engagement with these

hypothetical sources allowed Heidi and Jackie to practice contextualizing at their own level, which served as a way to make their tacit historical processes more evident. Much like Heidi's process of developing solutions for issues related to sourcing led to the development of general principles about teaching sourcing rather than specific solutions to explicitly test in subsequent lessons, talking through their own process of contextualization with specific historical texts also served as a way for Heidi and Jackie to define contextualization and to develop general principles about supporting students' contextualization.

Excerpt #4 below illustrates how the teacher and researcher engaged with (hypothetical) resources in their process of developing solutions for how to be more explicit with contextualization. In this excerpt, Jackie brought up some primary sources Heidi had used previously in her instruction with eighth graders, a series of letters between John and Abigail Adams during the time that John Adams had served in the Continental Congress (1774-1777). In these letters, Abigail urged John to consider the rights of women while drafting the American constitution. Jackie and Heidi talked through their interpretations of the letters based on the historical context.

Excerpt #4

1 Jackie: And so I'm thinking about the letters between Abigail and John Adams, and when you're reading those, you're not just taking them at straight value like if someone today wrote those. You would interpret them very differently [if you thought they were written today] than when you know the time period that they're written in. Okay, I know that women didn't have rights at the time, so [Abigail and John Adams are] kind of joking about things that, today if someone joked about it, it wouldn't be funny.

2 Heidi: And even the fact that they were talking about [women's rights] shows that they were progressive in a way that other people weren't kind of [at that time]. Because [John] said [Abigail] was being "saucy." It was "saucy" to be talking about women's rights in their context, even talking about it [was saucy].

3 Jackie: So if you asked today if Abigail Adams was a feminist, you'd probably say "no," but back then, "yes." Because she was pushing for things that weren't ... for historical empathy, I think contextualization and empathy are very overlapping too, where you're trying to think about all you know about the context to validate your interpretations.

4 Heidi: So now I think it's actually a matter of going back to my texts and seeing if they

even afford making [contextualization] a spotlighted skill or if I need to look for other sources to make that happen.
(3/20/14, mtg #56)

In this excerpt, Jackie and Heidi both gave examples of how they interpreted the content of the letters as progressive and as representing a feminist perspective based on what they knew about the time period in which the letters were written. Jackie then defined contextualization in a way that was somewhat new to her: “trying to think about all you know about the context to validate your interpretations” (line 3), leading Heidi to conclude that she needed to reexamine some of the sources she was planning on using in instruction to determine if they “even afford making [contextualization] a spotlighted skill or if I need to look for other sources to make that happen” (line 4). Thus, Heidi and Jackie practicing and illuminating their own contextualization process with historical texts informed the development of an initial solution for Heidi - to relook at her texts to determine the extent to which they afforded students being able to engage in similar interpretations based on what they knew about the historical content under study.

Excerpts #3 and #4 above exemplify the most common course of action Heidi took for addressing problems about historical inquiry practices in Frames 4, 5, 6, and 9 - defining problems and developing solutions without subsequently talking about testing specific solutions in meetings. However, as explained earlier, a lack of talk about testing solutions did not necessarily mean that Heidi was not developing, testing, and evaluating the outcomes of solutions on her own outside of the meetings. Indeed, during meetings Heidi regularly reported details of her independent engagement in various phases of the problem solving cycle to address concerns about historical inquiry practices. Her reports included describing the way she planned for and enacted particular approaches in her instruction and what informed her decisions to enact those approaches, as well as providing her interpretation of the outcomes of the enacted

approaches.

At times when Heidi reported details about how she developed and tested solutions outside of the context of collaborative reflections in meetings, such descriptions stemmed from the researcher having noted something in Heidi's instruction during a classroom observation and subsequently bringing it to the meeting. For example, during one meeting (4/8/13) Jackie commented, "so that brings me to corroboration. What have you done? Cuz it seemed like when you were talking about corroboration today they totally got it. What have you done to lead up to that point?" Heidi reported that she had learned more about supporting students' corroboration from a "teaching moment" that occurred in her sixth grade class when they were deciding together what events to put on a timeline. The teacher explained how having students put dates and events on a timeline turned out to be an important way to encourage students to read closely to compare and contrast historical details across texts because "they got really into wanting to write things for the timeline." She explained:

Excerpt #5

Heidi: Then what was happening is we would find something slightly different than something we already put on the timeline and I would say "let's put it up there and look at how they're different"

(4/8/13, mtg #32)

Heidi gave an example of students noticing one source using the word "villages" and one source using the word "cities" to describe ancient Egyptian civilizations in 3500 BCE and how she prompted students to think about why that might be. She explained how she discovered through these teaching moments that those "concrete examples" in "real contexts" helped students hone their corroboration skills.

Excerpt #6

Heidi: It was through that, having those concrete examples. I kept saying things like "Does this corroborate this?" Then they would say "yes" or "no." Then I would say "Ok you

found something new. Does that corroborate what we already know? Look at the timeline and tell me.” So because I was using the term so often in a lot of real context ... yeah I think that was what really helped them to get it. And now they really like to say “that does not corroborate that.”
(4/8/13, mtg #32)

Therefore, Heidi’s talk in meetings indicates she was engaging in developing and testing solutions about supporting students’ corroboration while she taught. This reflection-in-action (Schön, 1983) seemed to help Heidi build her practical knowledge of teaching sixth graders to corroborate such that she realized they needed continual prompting to compare “concrete examples” of events/dates.

Related to Heidi reporting ways she developed and tested solutions while she taught, in meetings the teacher also reflected on her process of more fully understanding historical inquiry practices through teaching them. Excerpts #7-9 below exemplify such statements:

Excerpts #7-9

Excerpt #7. Heidi: If I'm talking to [students] about sourcing but I'm not exactly sure what it looks like when sixth graders source and I'm not exactly sure myself because that's a historical practice that I didn't learn about in any class ... to try to get kids to a place that I myself don't know how to get to and don't know what it looks like when we do get there is a kind of like a messy process. But then once I've actually [gotten students to source], I kind of dug through that with one group of kids, I kind of know what it looks like to be moving in that direction and it's like I can move us there. Don't you think? And I had to do that with several different things. Sourcing is just one example.
(12/3/13, mtg #46)

Excerpt #8. Heidi: If I don't have a sense of what it looks like to [source] then there's no way that I can build that in [to instruction]. I had to learn [sourcing] by teaching it that first year. (02/10/14, mtg #51)

Excerpt #9. Heidi: I'm learning a lot about contextualization by trying to focus on it this year because it's making me more aware of it and it's kind of refining my definition in my mind. And I'm reading with an eye for it a lot more than I was before. So I think probably I'll do it better next [year] because of just kind of stumbling through it this time” (5/2/14, mtg #60).

Problem Solving About Getting Students to Take a More Active Role in the Historical Inquiry Process

Although both Frames 7 and 8 involved similar concerns about getting students to take a more active role in the historical inquiry process, problems in each of these frames were addressed very differently. As will be further elaborated below, Heidi's courses of action in Frame 7 centered on defining the problem, developing solutions, and subsequently testing and reflecting on tested solutions that had been developed in meetings. On the other hand, Heidi only developed, tested, and reflected on a tested solution one time at the beginning of Frame 8. Rather, in Frame 8, Heidi's most frequent course of action was to define and develop solutions to problems, but talk about developing solutions was minimal and actually decreased over time. This will be described in further detail below.

Neither Frame 7 nor Frame 8 showed clear resolution of the problem. However, talk in the final episode of Frame 7 showed evidence of partial resolution of the problem, expressing insight about a particular element of the overarching problem of getting students to stick to and track reasonable arguments. Furthermore, Heidi's talk throughout Frame 7 showed evidence of changes to her knowledge and practice. Testing solutions and reflecting on the outcomes of the tested solutions seemed to play a role in these changes. Heidi's talk at the end of Frame 8 did not indicate any type of resolution of the overarching problem of getting eighth graders to buy in to close reading, annotations, and discussion. Furthermore, there was little evidence of changes to Heidi's knowledge about this aspect of instruction from the beginning to the end of the frame, suggesting a relation between her limited problem solving and limited growth in this area.

Since the last episode for Frames 7 and 8 occurred at the end of the study (5/27/14, mtg #62 for Frame 7; 5/13/14, mtg #61 for Frame 8), there is no way to tell if more problems would have reemerged for either frame had there been more meetings. However, data suggests that

problems in each of these frames would have persisted, given the number of episodes that occurred in each frame, the duration of each frame, and the lack of clear resolution of each frame. Frame 7 involved 22 episodes starting near the end of Iteration II and persisting throughout all of Iteration III, and only partial resolution of the problem was evident at the end of the frame. Frame 8 involved eleven episodes starting at the beginning of Iteration III and persisting throughout the entire iteration, and there was no evidence of resolution at the end of the frame.

During frame 7 the course of action of developing solutions and subsequently testing and reflecting on the tested solutions was pivotal to Heidi's problem solving, similar to how Heidi addressed problems centered on facilitating inquiry-based discussions in Frames 1-3. During Frames 1-3, the solutions Heidi developed and tested centered on design decisions about discussions, such as parts of texts to use and how to frame inquiry questions for students to discuss. Heidi did not seem to need this same type of support when addressing problems about getting students to stick to and track reasonable arguments in Frame 7. Rather, the solutions Heidi developed and tested in Frame 7 centered on refining when and how to use specific discourse moves and tools (and when not to use them) to support her goals related to students taking a more active role in ensuring discussion was more productive. The change in the types of solutions Heidi developed in Frame 7 shows progression from Frames 1-3, as the teacher moved from trying to figure out how to effectively design and promote inquiry-based discussion to trying to ensure discussions went somewhere. Throughout Frame 7, Heidi experimented with various ways of being more or less involved in/integral to facilitating discussion to support students being more agentive in developing reasonable arguments. Heidi's process of testing solutions played an integral role in changes to her practice, such as revising her use of various

discourse moves and tools. At the same time, the teacher deepened her knowledge about these discourse moves and tools, gaining a better sense of when, why, and how to use or not use them to support students in sticking to and tracking reasonable arguments. What follows are descriptions of several examples of Heidi testing solutions over time across Frame 7 and how this course of action related to such changes in the teacher's knowledge and practice.

At the beginning of Frame 7, Heidi tested a solution that led her to question the extent to which she should be “invisible” in classroom discussion. The teacher's concern stemmed from her reflection on the implementation of a formal version of Socratic Seminar at the beginning of Frame 7. The formal Socratic Seminar, much like the mini Socratic Seminar she tested in Frame 2 (6/6/12, obs#16), was intended to involve very little teacher facilitation of discussion in order to allow students to engage in more direct back and forth talk with each other (4/11/13, obs #39). In her evaluation of the tested formal Socratic Seminar, Heidi expressed concerns about how productive the discussion was when she was less involved. The teacher made comments about students not hearing or understanding each other, such as: “like clearly people were not understanding what someone said and they were just letting that pass” or “[student name] said something that I thought was pretty great but he didn't express it clearly or loud and none of them really got it” (4/11/13, mtg #33). Heidi also interpreted parts of the discussion as “a hot mess” and as “crazy talk,” explaining that students were “just all over the place, but you can see the threads [of the conversation]” (4/11/13, mtg #33).

The Socratic Seminar on which the teacher reflected was a 45-minute discussion where students sat in a circle and discussed their own questions about Mesopotamia. The teacher stood outside of the circle, contributing only intermittingly (4/11/13, obs #39). The discussion included the group addressing three main questions students asked that represented high-level thinking

and thorough knowledge of the historical context (i.e. why did [Mesopotamian] villages grow into city states?). For each of these main questions, students responded with various ideas that were on topic and related to each other's ideas. However, students' responses tended to bring up other related but somewhat tangential questions and topics (i.e. Did Mesopotamians fight over city states?) and tended to be based on conjectures (i.e. the wealthy class had weapons but the poor people only had sticks to fight). When the teacher periodically stepped in to the discussion, she usually did so to remind students to use textual evidence to back up their claims. For example, she asked, "Do you think there are more reasons cities grew? Can you give anything from our texts?" She also read a portion of a text and asked, "Do you think this evidence has anything to do with why villages grew into larger city states?" (4/11/13, obs #39).

Thus, it seems Heidi's interpretation of the formal Socratic Seminar discussion as "all over the place" and easy to "lose track of" (4/11/13, mtg #33) was based on students' tendency to talk about and around the initial question posed and on their tendency to speculate about what might have happened in the past rather than to consistently base their claims on evidence from the texts. During the debriefing of the lesson, Heidi expressed some insight about how much she should be involved in leading discussion versus letting students take the lead, stating, "I was always under the assumption that I need to be invisible, but then I can't really be" (4/11/13, mtg #33). She also explained, "I think I'm not as impressed with doing [Socratic Seminar] as I used to be. I think probably when I was more impressed it was because I was impressed that they were talking to each other, doing all that on their own without me. Like I was more interested in the discussion skills themselves, not necessarily what they were saying" (4/11/13, mtg #33). These statements indicate Heidi's growing knowledge about what comprises productive inquiry-based historical discussions, moving from interpreting discussions with a lot of "back and forth" talk as

exciting in Frame 2, to interpreting a discussion with an extensive amount of student-to-student talk in Frame 7 as “a hot mess,” presumably based on the discussion lacking logical, evidence-based conclusions. Testing the formal Socratic Seminar solution seemed to play a role in deepening Heidi’s knowledge in this area.

Throughout the rest of Frame 7, Heidi grappled with the extent to which she should guide where discussion goes and how to (and how much to) shift some of that responsibility to her students. Heidi continually addressed these concerns through the course of action of defining problems and developing and testing solutions. For example, in response to concerns Heidi raised in a later meeting (12/12/13, mtg #47) about her revoicing students’ ideas too much during discussion, Heidi and Jackie developed a solution for her to test. The solution, which the teacher referred to as new “discussion norms,” involved Heidi significantly removing herself from discussion through “not always be[ing] the one responding to everyone who speaks” and by providing students with a set of sentence stems aimed at getting students to respond directly to each other and to rephrase each other’s ideas (12/12/13, mtg #47). Example sentence stems included: “I would like to respond to what _____ said,” “Did you mean ____?” and “Can you repeat that?” (12/12/13, mtg #47). Part of the discussion norms solution also included helping students “track” the argument “visually” by Heidi writing students’ ideas on the whiteboard (12/12/13, mtg #47). When Heidi tested her new discussion norms and reflected on this tested solution the following day, she expressed concerns that, although students used the stems, they continued to stick to illogical arguments and did not “recognize when the right thing had been said” (12/13/13B, mtg #49).

Heidi’s concerns about her tested solution centered on a classroom discussion that took place after she spent time explaining and practicing her new discussion norms with the students.

The teacher then asked students to preview a primary source from ancient Egypt called Hymn to the Nile and to talk about what characteristics were important to notice about the document, such as the author or the author's purpose (12/13/13, obs #56). A 16-minute discussion ensued, centered on students deliberating the type of text it was, arguing why they thought it was a poem, a song, a prayer, a gift, or a name. Throughout the discussion, students consistently used the sentence stems to identify to whom they were responding and about what specific point they were responding (i.e., "I would like to respond to what [student name] said that it's a bible ...") and at times to even challenge each other to back up their claims with textual evidence (i.e., "What evidence supports your statement?"). However, students often asked each other for evidence when it didn't quite make sense to do so or after evidence had already been provided. This was especially poignant when one student challenged another's claim that "hymn" meant "song" after they had looked up the word "hymn" in the dictionary (which stated, "a song that praises God"). Excerpt #10 illustrates part of this exchange. Note that student names are pseudonyms.

Excerpt #10:

1 Natalia: The best definition for hymn is song because it said it in the dictionary

2 Sofia: I would like to respond to Natalia. Um, do you have any textual evidence to back up your statement?

(12/13/13B, obs #56)

Heidi's interpretation of this discussion as students sticking to illogical arguments and not "recognizing when the right thing has been said" (12/13/13B, mtg #49) clearly stemmed from incidents such as the one in excerpt #10 above. Although the discussion did involve students actively listening to each other and responding to each other's ideas directly, their responses didn't always make sense. Thus, the tested solution yielded the teacher's desired result of her doing less revoicing for students and putting more of the onus on students for hearing and

responding to each other. However, it is possible that when students began to listen to and respond to each other's ideas more precisely and when Heidi did less paraphrasing of students' ideas, it surfaced more of the sixth graders' reasoning, which was underdeveloped. In reflecting on the discussion, Heidi expressed insight about negotiating her role in facilitating inquiry-based discussion. She decided that maybe it's ok to "preload" some information that isn't in the text and that students aren't capable of figuring out on their own (12/13/13B, mtg #49). Similarly, she stated, "the lesson to be learned from this experience if there is one is that even though I'm trying to have them do more of the work, if there are words that they're just not going to get I should just give them to them" (12/13/13/B, mtg #49). This shows Heidi experienced partial resolution of the overarching problem of getting students to stick to and track reasonable arguments in discussion for Frame 7 in that she realized that there are some things students just won't be able to do without her guidance. This shows evidence of Heidi gaining a deeper understanding of the challenge of balancing frontloading of concepts and pre-teaching with engaging kids in exploratory inquiry. In other words, she was developing her practical know-how about what and when to help students construct knowledge on their own versus telling them information, which represents another dimension of determining how invisible to be in facilitating discussion.

Two of the tools Heidi tested as part of her new discussion norms – the sentence stems and writing students' ideas on the board - became part of the teacher's regular teaching practice, as evidenced by the teacher and researcher's continual reference to them in later meetings. However, Heidi still grappled with the extent to which she should intervene in discussion (such as how much to revoice), as evidenced by the continual reemergence of problems and her continual testing of related solutions. At the end of Frame 7, Heidi tested another solution related to this issue and interpreted the tested solution a success, indicating partial resolution of the

frame. The specific solution Heidi tested was a suggestion Jackie gave in the previous meeting to get students to take more responsibility for tracking the argument: asking students if they heard and understood each other and asking students to repeat or explain their own and each other's ideas to clarify (5/29/14A, mtg #63). In Heidi's reflection on this tested solution that she deemed a success, the teacher explained that students were indicating more when they didn't understand each other, explaining, "I think another thing I just noticed today was them doing more like 'what?' Like they'll just say, 'what?' if they didn't hear or they'll say, or they'll look at me and go 'I couldn't hear'" (5/29/14B, mtg #64).

The lesson on which Heidi reflected about this tested solution involved a 25-minute discussion about three documents from a short inquiry unit focused on whether or not slaves built the Egyptian pyramids of Giza (5/29/14, obs #70). Throughout the discussion, students' ideas consistently were in response to other students' ideas, and at times they even used the sentence stems she had introduced much earlier in the year (i.e., "I would like to respond to what ____ said about ____.") (5/29/14, obs #70). Throughout the lesson, Heidi also repeatedly asked students to indicate whether they heard and understood each other's ideas via thumbs up/down and then asked students to repeat their ideas when the group consensus was "no." Heidi also asked students multiple times to rephrase their own and each other's ideas when there was confusion about what it meant. For example, she asked, "Does anybody think they know what [student name] is trying to say? Or [student name] do you have a better way to say what you're trying to say now?" and "Does anybody think they have a better way to say it?"

Therefore, Heidi's interpretation of the discussion as successful because students expressed when they couldn't understand each other was likely related to the interconnected tools and discourse moves she employed throughout the lesson. These tools and moves - such as asking

students to indicate on thumbs whether they heard and understood and asking students to paraphrase ideas themselves and for each other - show changes to the teacher's practice. Such moves indicate that although Heidi was at the center of directing the discussion and far from "invisible," she did less revoicing herself and instead used another means to support students in doing more of the work of listening to and understanding each other. Heidi's interpretation of the discussion as a success indicates partial resolution to the problem of getting students to stick to and track reasonable arguments in discussion in that she was satisfied with one of her solutions working "really well" for getting students to listen to and understand each other better (5/29/14B, mtg #64).

Although there was no evidence of full resolution to the overarching problem in Frame 7, the course of action of defining problems, developing solutions, testing solutions, and reflecting on the outcomes of the developed solutions played a role in changing Heidi's practice such that she continually honed her use of specific discourse moves and tools. Throughout that process, as evidenced by her talk in meetings, Heidi deepened her knowledge of the advantages and disadvantages of certain discourse moves (such as revoicing) and tools (such as sentence stems) and deepened her understanding of when, how, and why such moves and tools were more or less effective for getting students to take more of the responsibility for developing reasonable arguments.

As mentioned above, although Heidi had similar concerns about getting students to take a more active role in the historical inquiry process in Frames 7 and 8, she approached problems in Frame 8 very differently than she approached problems in Frame 7. Rather than focusing on testing solutions as she did in Frame 7, Heidi's most frequent course of action to address concerns focused on getting eighth graders to buy in to close reading, annotations, and discussion

in Frame 8 was to define problems and develop solutions to problems. However, talk about developing solutions was minimal and actually decreased over time from the beginning to the end of the frame. For example, at the beginning of Frame 8, Heidi engaged at length in the process of developing solutions in meetings. When talk about developing solutions occurred in the middle and the end of the frame, the amount of time spent talking about these solutions steadily decreased. These conversations often involved the researcher periodically suggesting a few ideas and the teacher not elaborating on the suggestions but instead continuing to define the problem. Furthermore, Heidi's course of action for two of the last four problems in Frame 8 involved only defining the problem and not discussing any solutions at all. At the beginning of Frame 8, there was evidence of changes to the teacher's knowledge about eighth graders' motivation to engage in historical inquiry. There was little evidence of changes to Heidi's knowledge (or to her practice) as the frame went on. This suggests a relation between Heidi's courses of action, which decreased over time, and related changes to her knowledge, which was less evident over time. What follows is a description of Heidi's decreasing problem solving process throughout Frame 8 and the related limited evidence of changes to the teacher's practice as the frame went on.

At the beginning of Frame 8, Heidi's courses of action involved more thoroughly defining problems and developing solutions than in the middle and end of the frame. These courses of action led to Heidi expressing insights about the problem of getting eighth graders to buy in to aspects of the historical inquiry process. Defining problems and developing solutions at the beginning of Frame 8 also led Heidi to test one solution. This more thorough process of problem solving at the beginning of Frame 8 occurred across two meetings. One meeting involved defining problems and developing solutions to Heidi's concerns about her eighth graders not

buying in to close reading and annotations (10/21/13, mtg #40). The subsequent meeting involved reflecting on a tested solution that was developed in the previous meeting, and redefining the problem and developing solutions (10/22/13, mtg #41).

During the first meeting of Frame 8, the teacher and researcher spent the duration of the 50-minute meeting reflecting on Heidi's concerns that students "just don't read closely enough" (10/21/13, mtg #40) and that "there are quite a few who aren't buying in to annotations" (10/21/13, mtg #40). As part of the teacher and researcher's process of developing solutions, Heidi articulated her goals for the taught lesson on which she was reflecting. The taught lesson involved Heidi asking students to identify authors' claims and what evidence the authors used to support their claims from a set of primary sources about the Chicago Haymarket Riot of 1886. Examining her learning goals helped the teacher gain insight into the issue of eighth graders' buy-in to close reading. For example, Heidi came to the realization that, in addition to thinking about what kind of historical thinking certain texts afford (such as identifying claims and evidence), she also needed to think about her students' needs and their motivation. The teacher stated, "I think part of what I'm doing here that's, like, I'm designing things as I should, based on what the texts afford and thinking about the learning objectives. But what I probably didn't think about as much as I needed to for this particular lesson was where my students are." She also noted, "So maybe, given what I know about my students, even though these texts afford this lesson, this just isn't the right time to have this lesson" (10/21/13, mtg #40).

Therefore, in the process of developing solutions in the first meeting at the beginning of Frame 8, Heidi expressed insights about her students' motivation in relation to the level of rigor of the tasks with which she was asking them to engage. These insights represent a change in the teacher's talk about eighth graders' motivation and engagement from Frame 1. Heidi's talk about

eighth graders' engagement in inquiry-based discussions in Frame 1 reflected a more simplified understanding of her students, positioning them as being unwilling and not wanting to share in discussion (5/18/12, mtg #5). Heidi's talk in this first meeting at the beginning of Frame 8 represented a more nuanced understanding about her students' motivation in relation to the difficulty of the task, as well as an understanding of her role in engaging students. The teacher's deepening knowledge seems to be related to the teacher's course of action of defining problems and developing solutions during this first meeting.

In the subsequent meeting at the beginning of Frame 8 (10/22/13, mtg #41), Heidi reflected on her testing of a solution she had developed in the previous meeting (10/21/13, mtg #40) – having a conversation with her eighth grade students about the importance of close reading and annotating. In Heidi's reflection of her tested solution, the teacher's course of action again involved thoroughly (re)defining the problem and developing solutions. Developing solutions again involved talk focused on the accessibility of content for students. For example, Heidi proposed using “shorter chunks [of texts]” and being more “intentional” about “keeping it interesting” for students (10/22/13, mtg #41). However, at this time, the teacher also made it clear that she was not going to stop facilitating historical inquiry, indicating she understood the value of doing so, even if it was challenging. She explained that she told students “now that I know how to teach you this way I have a moral obligation to do it” and she reported that students “even said, ‘we know it's actually better’” (10/22/13, mtg #41). Thus, at this time it seems Heidi was deepening her understandings of issues around how to balance challenging and motivating students. Heidi's course of action of defining problems and developing solutions played a role in deepening her knowledge.

The two above described meetings involved Heidi thoroughly defining the problem and

developing solutions. From that point on, however, the amount of time spent on developing solutions for problems Heidi identified in Frame 8 was minimal. Evidence of changes to Heidi's knowledge was also minimal. For example, excerpt #11 below from a much later meeting shows how the teacher tended to focus on defining the problem about students not buying in to thinking hard in discussion and not on developing solutions. At two different points, the researcher asked Heidi what she might do (lines 4 and 6), and the teacher briefly mentioned solutions (underlined text) but then continued to define the problem (lines 5 and 7).

Excerpt #11

1 Heidi: with eighth grade I find myself, I find this tendency that I do more of the cognitive work because, although it's unspoken, there's this secret negotiation between us where they're like "we'll behave if you don't make this too hard on us. And if you bore us or keep us, if you make it too tedious then we're gonna make you pay." So I find myself like going further than I would ...

2 Jackie: interesting

3 Heidi: I know that's what's happening

4 Jackie: so what can you do about that?

5 Heidi: I think you have to like be explicit about it probably, but it's an issue of like how to actually motivate them because ... they, um, they just aren't, my eighth grade students are not motivated [by me wanting] them to do this. And my sixth grade students are. [The sixth graders] are like "she wants us to do this kind of thinking so we're going to try really hard to do this kind of thinking for her." And eighth grade, they have to have, like agency, like they have to have a reason why it matters for them

6 Jackie: so how do you make that reason?

7 Heidi: it's keeping it interesting. I think the only like card I have up my sleeve is keeping things ... and as soon as it becomes less interesting for them, it's hard to develop a stamina with them cuz they only persevere through something hard as long as it stays interesting for them

(5/2/14, mtg #60)

This excerpts exemplifies the extent to which the teacher and researcher engaged in developing solutions for each problem Heidi identified after the first two meetings throughout the rest of Frame 8. Most often, their talk involved very brief mention of a solution without elaboration. In the above excerpt, Heidi acknowledged that she only had “one card up her sleeve” (or one solution), which was to keep things interesting for students. Therefore, it is

possible that the teacher truly believed there wasn't much else she could do to solve the problem. In the meeting from which the above excerpt was taken, as well as across other meetings, the researcher didn't seem to challenge this belief.

There was little evidence of changes to Heidi's knowledge or practice in relation to issues about getting eighth graders to buy in to close reading, annotations, or discussion from her initial insights at the beginning of Frame 8 to the end. In the first two meetings at the beginning of Frame 8, Heidi expressed insight about the problem that indicated nuanced changes to her knowledge from Frame 1. However, even though there was no clear change in Heidi's knowledge or practice directly related to the problem of getting eighth graders to buy in to the historical inquiry process, changes to her knowledge and practice about engaging students in historical inquiry in general were evident in her talk about problems across the other frames. In other words, evidence in Heidi's talk across other frames indicate she moved from a vague notion of wanting to get students to engage in asking deep historical questions in Frame 1 to differentiated, more clearly articulated goals for specific historical inquiry practices (i.e. in Frames 4, 5, 6, and 9). Even though Heidi's perspective about eighth graders' motivation only changed a little from Frame 1 to Frame 8, as evidenced in her talk about problems in other frames the teacher's practices changed notably in that she was designing ways for students to engage in more sophisticated historical inquiry tasks. Therefore, the teacher's problem solving about other areas of her instruction may have impacted her perspectives about problems in Frame 8, such as noting the need for "keeping [the inquiry] interesting" (10/22/13, mtg #41) and feeling as though she had a "moral obligation" (10/22/13, mtg #44) to engage eighth graders in historical inquiry even if they didn't want her to.

4.4 Alignment of Heidi's Talk and Her Instruction

The third section of the results presents the findings from analyses of classroom observation data to address the alignment of Heidi's classroom instructional practices with the problems, framings, and solutions inferred from the discourse during the meetings. The analyses examine the five sampled lessons intentionally selected to afford characterizing instruction at the beginning of the process, and then early and late in the subsequent two years. The results focus on the extent to which changes inferred from Heidi's talk in the meetings were visible in her classroom instruction. The overarching conclusion from these analyses is that Heidi's instructional practices changed and these changes generally aligned with the evolution of Heidi's framing of problems and solution efforts. That is, the analyses indicate that over the course of the five lessons students' engagement in discussions increased, who was "doing the work" of inquiry shifted from teacher to students, and the nature and depth of inquiry reflected more and deeper levels of historical inquiry practices. Concomitant with these changes in students, there was also evidence of changes in how Heidi was conducting classroom activities. Figure 6 shows where each sample analyzed lesson occurred over the course of the time frame of the study and in relation to the problem frames. Appendix D provides information on the main topics, texts, and tasks of each of the five sampled lessons. The remainder of this section details the evidence that supports these overall conclusions.

Frames	F1			F3						F5		F8																		
	1H	1M	1M &D	1D	1D	1D	2D	2D	1D	1D	2H	1H	5M	1M	1M	2M	1M	1M &D												
	F2			F4						F6		F9																		
	2D; 1D &H	2D	1D; 1M	1H &D						2H	2H	1H	1H						1H	1H	1H									
Analyzed Lesson	F7																													
	3D																													
	1D 4D 3D 2D 1D 4D 1D 1D																													
Meeting #	ID																													
	ID																													
	ID																													
Date	ID																													
	ID																													
	ID																													
Iteration	ID																													
	ID																													
	ID																													

H = Historical Inquiry Practices, D = Classroom Discussion, M = Motivation-Engagement, L = Analyzed Lesson

Sample lessons analyzed: ITI = Iteration I; ITIIF = Iteration II Fall; ITIIS = Iteration II Spring; ITIIF = Iteration III Fall; ITIIS = Iteration III Spring

Figure 6. Sample analyzed lesson in relation to problem frames

4.4.1 Getting Started: Heidi's Instruction in the First Sampled Lesson

The first sampled lesson was an eighth grade lesson that occurred at the beginning of Iteration I (Lesson ITI, 5/10/12, obs #4). This lesson (ITI) centered on reading two sources about the Little Rock Nine incident of 1957 and discussing reading strategies used to unpack the meaning of those texts. This lesson essentially demonstrates a baseline of the teacher's instruction at the very early stages of the study.

Lesson ITI occurred before the discussion of the first problem episode in Frame 1. Frame 1 involved Heidi's concerns about wanting to engage students in inquiry-based discussion. The teacher expressed concerns about wanting her eighth grade students to share more in discussion (5/18/12, mtg #5) and wanting to engage students in more historically specific ways of reading and reasoning, such as asking "deep" historical questions (5/15/12, mtg #2; 5/16/12, mtg #3). Overall, the analysis of this lesson showed limited student engagement and little evidence of historical ways of reading and reasoning. The observation data generally corroborate with Heidi's concerns in Frame 1 regarding wanting to engage students in more discussion, specifically having them engage in deep historical questioning.

More specifically, the eighth graders' limited engagement in discussion in Lesson ITI was evidenced by a lack of distributed participation and by multiple instances of students not responding to the teacher's prompts. Throughout the entire lesson, only about 1/3 of the students (36%) spoke during whole group discussion, and many of these turns were brief, one or two-word responses by a single student who then did not speak again. Student talk was also dominated by one student, who accounted for 77% of the total student talking turns. During this lesson, there were eight instances of "no response" incidents, which included three or more seconds of silence following the teacher's prompt for participation. Four of these no-response

incidents involved silence for 10 or more seconds, one lasting as long as 24 seconds. The two representative excerpts below illustrate how Heidi handled these moments of silence. In the first example (excerpt #12) she moved on to another topic; in the second (excerpt #13) she answered the question herself.

Excerpt #12

Heidi: One more person who would like to share with us.

[24 second silence. Heidi looking around the room smiling at students]

Heidi: Ok let's move on.

(Lesson ITI, 5/10/12, obs #4)

Excerpt #13

Heidi: Lets kind of talk about the strategies we're using here.

[5.5 second silence]

Heidi: One thing I'm doing here is I'm picturing Melba Pattillo Beals because I saw a picture of her. ...

(Lesson ITI, 5/10/12, obs #4)

Students' lack of engagement in Lesson ITI reflects Heidi's concerns about eighth graders not sharing in discussion. It is unclear why students shared minimally in this lesson, but is possible that the way Heidi addressed these "no response" moments reinforced students' non-responsiveness. In other words, it is possible that students felt they did not need to respond because they knew the teacher would move on to another topic or answer for them.

In addition to limited student participation, there was a limited range of discourse moves in Lesson ITI. Indeed, discourse during Lesson IT1 fit a basic Initiation-Response-Follow up (IRF) pattern of the teacher asking a question, a single student responding, and then the teacher providing brief evaluations and her own elaborations of student responses, with no expansion or further exploration of the idea (Cazden, 2001; Nystrand, 1997). There was thus a limited range of student and teacher discourse moves, suggesting that the teacher was the one doing most of the "work" of asking and answering questions and limiting students' engagement in inquiry-based

discussion. Noticeably absent were moves indicating that students were engaging with each other's ideas (e.g., students agreeing, disagreeing, or elaborating other's ideas). Likewise, there was an absence of moves that represented the teacher encouraging students to scrutinize or build on their own or each other's ideas, (e.g., asking for agreement (0), elaboration (1), textual evidence (1), or reasoning (0)). Excerpt #14 below is representative of this IRF pattern. In this excerpt, Heidi had asked students to share the literacy strategies they used when reading a text about the Little Rock Nine, one of those strategies being asking questions of the text. This excerpt shows Heidi repeating and evaluating one students' idea/question (line 3), eliciting another student response (line 3), and then evaluating and elaborating that student's idea/question herself (line 5). Note that all student names are pseudonyms.

Excerpt #14

1 Heidi: What strategies are we using?

2 Ricardo: Why was [the school] all white?

3 Heidi: Good question. Why was it all white? That's an excellent question. What else?

4 Adriana: If it was all white, how ... [inaudible]?

5 Heidi: Good question. If it was all white, [the author] says "the eight African American students plus her." Why are they going to this school? Why are African American students going to an all-white school? It almost seems like a contradiction in that sentence doesn't it?

(Lesson IT1, 5/10/12, obs #4)

As shown in this excerpt (#14) and throughout Lesson IT1 there was also an explicit focus on identifying literacy strategies divorced from historical reading strategies. The explicit focus on literacy strategies in this lesson was evidenced by the teacher's instructions to pay attention to the strategies while reading, by her eleven-minute explanation/model of literacy strategies, and by her continual prompts to report the strategies students used when reading the texts. For example, in excerpts #15-16 below, in providing instructions for reading and

discussing their reading, Heidi focused on reading with no mention of history-specific inquiry practices.

Excerpt #15-16

Excerpt #15. Heidi: We want to be paying attention as we're reading to see that we're using these strategies, these are strategies that help us to be better readers. (Lesson ITI, 5/10/12, obs #4)

Excerpt #16. Heidi: Note the words that you don't understand. What's some of your connections, some of your, use some of these strategies from the Think Aloud Bookmark². And you can keep [the Think Aloud Bookmark] right beside you as you work to see if there's any other strategies that you conclude ... (Lesson ITI, 5/10/12, obs #4)

A second example of the lesson's focus on identifying literacy strategies occurred during the teacher's modeling of her own thinking while reading. For example, Heidi read the words "Little Rock," and described visualizing a "little rock" in her mind rather than explaining her thinking about the historical context, such as Little Rock (Arkansas) being a city in the south at a time of high racial tension. In addition to the distinct separation of reading and history reading in Heidi's modeling of her thinking for the students, there was evidence of missed opportunities to connect reading strategies with historical inquiry practices. For example, Heidi emphasized the strategy "questioning" the text, and asked students to share their questions multiple times throughout the lesson. However, when students shared questions, instead of engaging the class in a conversation about the related historical context, the teacher added their questions to a Questions Chart and elicited more questions from students. Excerpt #17 below illustrates Heidi's response to one student's series of questions about the historical context he had written down while independently reading and annotating the text. Instead of addressing his inquiries, the teacher commented on him asking a lot of questions as a useful literacy strategy.

² The "Think Aloud Bookmark" lists literacy strategies such as questioning, predicting, and picturing (visualizing) (Schoenbach, Greenleaf, & Murphy, 2012).

Excerpt #17

1 Ricardo: The NAACP, The National Association for Advance of Colored People. I put “who are they and what do they do?” Um, then the next part is “these groups started the movement in the 1950's and 1960's.” Then I put “why so late?” And the last part is “integrate public schools” and I put “why” because they're having so much violence. That's what I meant by like “why?”

2 Heidi: Yeah. What I love about this one is that you are asking some excellent questions and you're asking a lot of questions of the text. The text as you're reading is bringing a lot of questions to your mind and you're just keeping track of the questions that you have. This is great. And is there one other person who wants to show their annotations? (Lesson ITI, 5/10/12, obs #4)

These missed opportunities relate to Heidi's concern about moving students toward asking “deeper questions,” the “kinds of questions historians ask” (5/15/12, mtg #2; 5/16/12, mtg #3). It seems Heidi's focus on identifying literacy strategies was related to her missing opportunities to recognize and elaborate students' emerging “deep” questions. Above excerpt #17 illustrates that students were indeed asking some questions that reflected emergent historical thinking, such as Ricardo's desire to know more about the historical event (contextualizing), but that the teacher didn't acknowledge them as such. It is possible, as evidenced by concerns Heidi expressed much later in Frame 9, that at the time Heidi taught Lesson ITI, she did not have a deep enough knowledge of what the practice of contextualization entailed and thus didn't recognize “opportunities to be explicit about contextualization” (5/2/14, mtg #60). Statements she made during Frame 2 corroborate this assumption, such as Heidi stating she didn't feel “confident” that she knew historical content “well enough to just kind of pick up on it when it happens and just capitalize on it [in discussion]” (5/24/12, mtg #7).

In summary, in Lesson ITI, teacher-student talk reflected fairly typical IRF exchanges, with the teacher's follow up statements limiting opportunities for students to elaborate their own and each other's ideas. As well, the teacher's questions and instructions were not a means of

delving into students' thinking about the historical context or about how they were reading history, but instead they served to identify the general reading strategies (e.g., questioning, predicting, and visualizing) they were using to read and understand the text. It is interesting, however, that Heidi was aware of the absence of history in her instruction at this time, as shown by her stating in the planning/debriefing meeting that this was a problem that she wanted to address. Thus, the ITI observation corroborates her verbal report.

4.4.2 But What If They Don't "Get It?" Heidi's Instruction in the Second Sampled Lesson

The second sampled lesson was a sixth grade lesson that occurred in the fall of Iteration II (Lesson ITIIF, 10/4/12, obs #20). This lesson (Lesson ITIIF) centered on making inferences about artifacts using multiple sources.

Lesson ITIIF occurred at the beginning of Frame 3, where the problem of practice was determining how much to let students grapple and go on in discussion. Evidence from Lesson ITIIF aligns with Heidi's concerns in Frame 3. Lesson ITIIF also suggests resolution of Frames 1 (getting students to engage in inquiry-based historical discussions) and 2 (the messiness of inquiry-based historical discussions). In Lesson ITIIF, about half of the students were participating in discussion (57%), as compared to 36% in Lesson ITI. In addition to more distributed participation, Lesson ITIIF provided evidence of more student emotional displays (e.g., students shouting "ah" and waiving their hands to be called on), an indicator of engagement (Engle & Conant, 2002), and more varied discourse moves than Lesson ITI. The increased variation in discourse moves suggests that students were doing more of the work of engaging in inquiry and Heidi's discourse moves served to elicit more elaboration on multiple ideas.

Excerpt #18 below represents the increased variation in moves in Lesson ITIIF from Lesson ITI, thus enabling students to explore multiple ideas. The excerpt is from a discussion following the teacher asking students to preview a page from a catalog advertising a rug beater from 1918 and to determine “what type of paper is this and how do you know?” (Lesson ITIIF, 10/04/12, obs #20). In this excerpt, Heidi asked students whether they agreed or disagreed with each other’s ideas (line 3), revoiced students’ ideas (line 3, 7), and asked students to explain their reasoning about why they agreed or disagreed (lines 1, 5, 7). The students responded by agreeing and disagreeing with each other’s ideas (line 4) and providing their reasoning about why (lines 2, 6, 8).

Excerpt #18

1 Heidi: Can somebody share why they disagree? Tomas?

2 Tomas: Because it's just showing you uh like, by generations how the carpet beaters change.

3 Heidi: Oh, so Tomas says that this is showing us the history of carpet beaters. He is saying the first carpet beaters looked like this, and then they changed later and looked like this, and then they got like this and like this. Do you agree or disagree with him?

4 [Mixed responses from students, some say agree, some say disagree]

5 Heidi: Some people agree. Some people disagree. Um, who, someone who disagrees. What do you think? Maria?

6 Maria: um I think it's like it's different than that, [inaudible]

7 Heidi: She says its' just different designs of carpet beaters. Maria what makes you think that?

8 Maria: Because they're just saying like they're all carpet beaters but maybe one's stronger or ...

(Lesson ITIIF, 10/4/12, obs #20)

The above excerpt illustrates that discourse still adhered to the general IRF sequence, but that the teacher’s follow up moves were more varied than in Lesson ITI. The above excerpt is representative of the discourse in Lesson ITIIF and indicates resolution of the first two problem frames. Throughout Lesson ITIIF, Heidi did not have problems with getting students to share and explore ideas and the ideas the class discussed reflected students’ beginning attempts at making

historical interpretations (emergent historical thinking) (indicating resolution of Frame 1). The teacher's continual prompting for students to agree and disagree and to share their reasoning why suggests Heidi was not uncomfortable with the "messiness" of discussions that involved scrutiny of multiple ideas without one clear conclusion (indicating resolution of Frame 2). During the discussion of the rug beater advertisement, Heidi continued to prompt students for more possibilities for "the type of paper" they were reading, even after students had provided accurate responses. These data suggest that Heidi was no longer uncomfortable with students having "misconceptions," with "living with the ambiguity of just letting them think wrong things," and with not "filling in the gaps" of content for students (5/25/12, mtg #8), providing further evidence of resolution of Frame 2.

Heidi's apparent comfort with the ambiguity of inquiry-based discussions not only indicates resolution of Frame 2, but aligns with her concerns in Frame 3. When discussing problems about Frame 3 in meetings around this time period, Heidi's language indicated that she understood the value of students doing the thinking, but that she wasn't sure how much to let them wrestle with ideas while doing so. She also made it clear that she now tried to "err on the side of not telling [students] as much, even if it takes longer" (11/21/12, mtg #25). It seems that determining how much to let students sit in the realm of uncertainty was inextricably linked to helping students develop well-reasoned, evidence-based arguments (which Heidi focused her concerns on later in Frame 7). For example, excerpt #18 above illustrated how Heidi did not ask students what in the text informed their ideas, which ended up reinforcing students making guesses rather than building evidence-based arguments. Students' ideas and explanations were clearly based on inferences they were making from details in the text, but without support from the teacher to work through those details, the sixth graders' ideas stayed at the level of

conjecture. Thus, by not pressing for textual evidence, the inquiry was less constrained, which actually served to invite more ambiguity about “the type of paper” the class was reading.

Lesson ITIIF also contains some indicators that Heidi had figured out some ways to address her concerns in Frame 1 about getting students to address the “kinds of questions historians ask” and to go “a little deeper in questioning” with historical sources (5/15/12, mtg #2). For example, although Heidi did not explicitly label the “what is this paper?” task as a sourcing task, asking students to identify the type of text exemplified by the rug beater advertisement can be considered a stepping stone (Boyd, Sullivan, Popp, & Hughes, 2012) for sourcing. The task of identifying the type of text can inform understanding of the intended purpose of the document; purpose can influence how information is presented in the text, how language is used to persuade, etc. Lesson ITIIF also involved tasks that can be considered stepping stones for corroboration in that students made inferences about artifacts using multiple sources. Heidi asked students to think about how historians might “move a little closer to figuring out what this [artifact] actually is or how it was used,” which was aimed at getting students to think about the need for multiple sources to corroborate claims about the past (Lesson ITIIF, 10/4/12, obs #20). There are multiple possibilities for why Heidi did not explicitly label sourcing and corroboration in Lesson ITIIF. She may not have felt that her sixth graders were ready yet to learn those terms, but first needed to get comfortable with the concepts. Another possibility is that Heidi herself did not yet feel she had deep enough knowledge of the practices to feel comfortable explicitly labeling them. Her concerns about sourcing being “elusive” to her and that she was “blindly trying things” much later in Frame 4 (1/14/13, mtg #27) provide some support for the latter conjecture.

4.4. 3 Going Deeper with Sourcing as an Inquiry Practice: Heidi's Instruction in the Third Sampled Lesson

The third sampled lesson occurred in the spring of Iteration II (Lesson ITIIS, 5/31/13, obs #44). This lesson (Lesson ITIIS) centered on reading primary sources to address the question about whether the conspirators named in the Chicago Haymarket Riot of 1886 were guilty. This lesson involved the same sixth grade students Heidi taught in Lesson ITIIF.

Lesson ITIIS occurred after Frames 4 and 5, where Heidi problematized issues about planning for sourcing instruction (Frame 4) as well as getting students to go deeper with sourcing (Frame 5). In Heidi's reflection on Lesson ITIIS, she indicated resolution of both frames. For example, the teacher stated that students were "sourcing in a more purposeful way" (resolution of Frame 5) and that she felt she was "getting better at planning these units" and designing text sets to support inquiry (resolution of Frames 4 and 5) (5/31/13, mtg #38). Lesson ITIIS provides evidence to corroborate Heidi's talk about resolution of both of these frames.

Analyses of Lesson ITIIS suggest that students were accustomed to sourcing documents as a routine part of reading: Heidi asked students to "source" documents at two different points in the lesson with very little explanation, yet students engaged in on-point discussions and purposeful sourcing. For example, before reviewing one source students had read for homework, Heidi simply said, "Let's go back and source this document again. You don't need to show a lot more in your annotations. Just review your annotations about sourcing and think about the source again" (Lesson ITIIS, 5/31/13, obs #44). In the discussion that followed, students' contributions reflected important and relevant sourcing issues, such as noticing the date of publication in relation to other key historical events (i.e. the date of the Haymarket riot; the date the eight men were sentenced) and such as questioning the audience and purpose of the document (i.e. noting it was published in an anarchist newspaper so it only represented "one side of the story").

In addition to planning lessons that engaged students in sourcing in explicit, routine ways, Heidi also explicitly talked about and engaged students in corroboration in Lesson ITIIS. Heidi's reflection on this lesson marked the first (and only) episode for Frame 6, concerns about not "presenting" corroboration in a way that encouraged students to annotate and share their thoughts about corroborating details across sources (5/31/13, mtg #38). Heidi's "presentation" of corroboration in Lesson ITIIS included an 11-minute segment during which she explained what corroboration was, asked students to define the term, and then modeled her thinking about corroboration with an article about dynamite published in an anarchist newspaper the year before the Haymarket Riot. Several times in her think-aloud, Heidi modeled how she made sense of information in the text and how that information compared to details in other sources. The following excerpts (#19 and #20) are representative of this. In excerpt #19 below, Heidi first shared her thinking about what the author/text was doing:

Excerpt #19

*Heidi: I was thinking it almost seems to me like he's [the presumed author, August Spies] almost encouraging people to use dynamite but in a really, like carefully worded, hinting kind of way.
(Lesson ITIIS, 5/31/13, obs #44).*

The teacher then talked about how this information related to previous texts the class had read for this unit:

Excerpt #20

*Heidi: The first text we read, I don't remember anything of it saying August Spies encouraged Dynamite use or encouraged violence. The second, the video, I actually remember that even Mayor Harrison said, while he was there, he said [the rioters] weren't talking about anything violent in their speeches. Remember? So, that, I haven't read any other pieces of evidence so far that said that [August Spies] was encouraging violence. So am I finding the same information everywhere? Not yet. Right now I have one source that kind of shows me that maybe he's encouraging violence. And I have a couple other sources that didn't mention that at all.
(Lesson ITIIS, 5/31/13, obs #44)*

As evidenced in these excerpts, Heidi's presentation of corroboration was clear and exemplified what the practice of corroboration entails. However, when Heidi asked students to discuss their "thinking about the corroboration questions" in discussion, student talk did not center on corroboration. Discussion did reflect multiple aspects of students' historical thinking, especially students' critical thinking about sourcing, but thinking about how details corroborated across sources was only minimally addressed. This aligns to the concerns the teacher raised after the lesson about students not sharing their thoughts about corroboration. Rather than the issue stemming from how Heidi presented corroboration, though, it is likely that students' lack of talk about corroboration was related to Heidi's limited focus on the practice after the 11-minute explanation and modeling segment. For example, across three rounds of reading and discussing parts of a text, the teacher only once instructed students to think about corroboration while they read and only once prompted them to share their thoughts about corroboration. In the meeting following Lesson ITIIS, Heidi decided that in her next lesson she would "explicitly ask more, like 'ok I want to hear from people who can talk about some of the corroboration questions'" (5/11/13, mtg #38). Thus, in her reflection on Lesson ITIIS, Heidi indicated that she had a clear understanding of why the problem occurred and what she needed to do to resolve it.

Lesson ITIIS also occurred after the emergence of concerns about getting students to stick to and track reasonable arguments in discussion in Frame 7. Specifically, before Lesson ITIIS Heidi expressed concerns about students being "all over the place" and not coming to logical conclusions (4/11/13, mtg #33). Lesson ITIIS provides evidence to suggest such concerns talked about in Frame 7 had indeed not been resolved. For example, similar to Lesson ITIIF, Lesson ITIIS involved students making conjectures without prompting from Heidi to support their claims with evidence from the texts. For example, students repeatedly made claims that a

mayor who attended the Haymarket rally but left early was probably guilty of planting a bomb (which was very unlikely). Heidi did at times advise students that they were “jumping to conclusions” and making “guesses,” but the lesson only involved one instance of the teacher pressing students to provide textual evidence for their claims. This suggests the teacher had not yet resolved the issue of ensuring students developed reasonable, evidence-based arguments.

Also, Lesson ITIIS involved Heidi tending to revoice students’ ideas thoroughly and providing several of her own interpretations of the texts, indicating she was doing the ultimate concluding *for* students. This relates to concerns Heidi expressed at the beginning of Frame 7 (before Lesson ITIIS) about the extent to which she should be “invisible” in discussion (4/11/13, mtg #33). This also relates to issues Heidi talked about later in Frame 7 (after Lesson ITIIS), where the teacher questioned the amount she should revoice students’ ideas herself versus find ways to have students take more of the responsibility of rephrasing and responding directly to each other to collectively develop arguments (12/12/13, mtg #47). Excerpt #21 below is one example of Heidi revoicing a student’s idea and drawing a conclusion for students rather than guiding them in responding to the idea and drawing a conclusion together. In this excerpt, Heidi elaborated one student’s idea about why there might have been a German speaker invited to speak at the Haymarket rally.

Excerpt #21

Hugo: Like so the workers can know what he's saying

Heidi: Yeah they wanted to make sure that the workers could understand. But then what he's saying is “it turned out nobody there really needed me to speak in German so I went ahead and spoke in English anyway.” I'm guessing, but that's the only thing that makes sense to me. Because otherwise what he said didn't make sense. So that's my guess about it.

(Lesson ITIIS, 5/31/13, obs #44)

At the time of Lesson ITIIS, Heidi had not yet brought up issues about how much she should revoice students ideas in any meetings. Therefore, it is unclear the extent to which the teacher was aware of the role her revoicing played in supporting or not supporting students in developing their own arguments.

4.4.4 Making Clear and Logical Arguments: Heidi's Instruction in the Fourth Sampled Lesson

The fourth sampled lesson occurred in the fall of Iteration III (Lesson ITIIIF, 10/21/13, obs #47). This lesson (Lesson ITIIIF) was also about the Chicago Haymarket Riot of 1886, but with a different set of students (eighth graders) the following year. Lesson ITIIIF centered on determining authors' claims and what evidence the authors used to support their claims in a set of primary sources.

Lesson ITIIIF occurred after Frame 6, focused on corroboration, and after the emergence of concerns about getting students to stick to and track reasonable arguments in discussion (Frame 7). ITIIIF provides further evidence of resolution of Frames 1-6, as well as further evidence that Frame 7 had not yet been resolved. In Lesson ITIIIF, Heidi talked about and set up tasks for students that reflected engagement in sourcing and corroboration in relation to identifying and reasoning about claims and evidence in historical texts, evidence that Heidi was regularly planning for and pushing students' thinking in sourcing (resolution of Frames 4 and 5). Furthermore, she was intentionally and explicitly reminding students to share their thinking about corroboration (indicating resolution of Frame 6). For example, Heidi modeled multiple historical inquiry practices during one think-aloud. Her model included talking about elements of sourcing and corroboration as integrated with her talk about identifying the author's claim and making interpretations of the text. The teacher also set up tasks with multiple disciplinary foci in

ITIIIIF. For instance, at one point during the lesson, Heidi instructed students to think about identifying the author's claims as well as thinking about how information in the text corroborated with other texts they've read. Excerpt #22 below illustrates how she talked about these multiple purposes, encouraging students to do "a little bit of everything":

Excerpt #22

- 1 Heidi: So now we're going to get a new text today and we're going to use those [Claims] questions to think about that text too. Um, this is where it gets a little crazy guys, cuz you're going to use these questions, but that doesn't mean I want you to stop using the corroboration questions too, cuz you're still going to keep thinking [reading from a poster] "What do I already know? What do other pieces of evidence say? Is this different or the same as what I'm hearing before?" Ok? Think you can handle that? You totally can. Yeah, um, so think about the claims, but keep thinking about corroboration and how we're noticing that things are matching up with what we already know. Laura?*
- 2 Laura: So pretty much a little of everything?*
- 3 Heidi: Yeah we're doing a little bit of everything.*
- (Lesson ITIIIIF, 10/21/13, obs #47)*

In addition to instructing students to pay attention to authors' claims and corroborating details, in ITIIIIF Heidi also had students engage twice in a basic sourcing task. Heidi asked her eighth graders to preview a text and determine the type of document and "what is important to notice" about it before they read. Evidence suggests this previewing practice was routine for students, as the teacher introduced the two tasks with little explanation and the subsequent discussions involved students' ideas about key elements of sourcing, such as claims about the purpose of the document and questions about who excerpted and edited the document and why. Engaging students in these multiple historical inquiry practices and doing so in interrelated ways provides evidence of Heidi's changing knowledge and practice as relates to earlier concerns she had raised about sourcing and corroboration in Frames 4, 5, and 6.

Lesson ITIIIIF also provides further evidence of resolution of Frames 1-3 centered on facilitating inquiry-based discussion. This was evidenced by students relatively distributed

participation (53% of students) and even more variation in discourse moves than the earlier three lessons. For example, unlike in earlier lessons, during Lesson ITIIF, Heidi regularly asked students for textual evidence. In fact, the explicit focus of ITIIF was on identifying claims authors were making in texts and the evidence the authors used to support the claims. Thus, the lesson included multiple prompts from the teacher for students to provide evidence (i.e. “Ok, what evidence do they use to support their claim?”) (5 instances) and students subsequently provided such requested evidence (4 instances) (10/21/13, obs #47). Excerpt #23 below represents how Heidi prompted students to examine the relation between claims and evidence in the text they were reading.

Excerpt #23

1 Heidi: What other evidence does [the author] use?

[5 second silence]

2 Heidi: Would you say he has a lot of evidence to support that claim or a little evidence to support that claim?

3 Santiago: um ...

4 Heidi: Just based on what he says, let's ...

5 Santiago: Like what people say in the crowd, like um [reading from text] "anarchists [inaudible] very bad and they join the force [inaudible] enemies, crucify, crucify" (Lesson ITIIF, 10/21/13, obs #47)

Excerpt #23 above exemplifies how Heidi pushed students for textual evidence. This excerpt also shows how the teacher handled “no response” moments with her eighth grade students differently than she did in Lesson ITI. Lesson ITIIF did involve several “no response” incidents, but the longest moment of non-response was five seconds as compared to 24 seconds in Lesson ITIS. Furthermore, in Lesson ITIIF, Heidi used strategies such as rephrasing her prompt, as she did in excerpt #23 above, to elicit ideas from her students. This served to put the responsibility on students to answer the question rather than moving on to a different topic or answering the question herself.

In addition to more focus on textual evidence, the wider range of discourse moves utilized in Lesson ITIIF also involved students in more regularly elaborating each other's ideas than in earlier lessons. This combination of identifying evidence and elaborating on each other's ideas resulted in more collaborative knowledge development than in earlier lessons. In other words, rather than students briefly determining whether or not they agreed or disagreed with an idea and then moving on to another idea as they did during Lessons ITIIF and ITIS, in this lesson the group tended to stick to one idea for longer periods of time and talk through the validity of those ideas. This not only indicates resolution of Frames 1-3, but it also shows some progression around issues about getting students to stick to and track reasonable arguments in Frame 7. However, at this point in time, Heidi's concerns in Frame 7 had only been expressed in one meeting the previous spring and therefore had not yet become a central focus of the teacher's reflections. Evidence in Lesson ITIIF suggests that issues about shifting more of the responsibility to students in Frame 7 were still prevalent. Specifically, there were no instances of the teacher asking students to summarize or draw conclusions about the multiple ideas on the floor. But there were a number of instances where Heidi provided conclusions for students, not unlike in Lesson ITIS. For example, after a lengthy discussion analyzing an author's rhetorical strategy of asking questions and answering them himself, the teacher summarized for students the reason the author used this strategy (to make a claim about what his enemies might say).

Excerpt #24

Heidi: I think it's helpful to understand that [the author is] using this way of communicating like I did with the silly school lunch example. He's using this way of communicating where he asks questions and then he says what other people would say as answers to that question. And as Cassandra pointed out, the other people are like his enemies right? So every time he does that, he's making a claim about what his enemies say.

(Lesson ITIIF, 10/21/13, obs #47)

Heidi doing some of the concluding for students may be related to issues she raised about students not reading closely in her reflection on Lesson ITIIF. These concerns marked the emergence of Frame 8 focused on issues of eighth graders not buying in to close reading, annotations, and discussion. In her reflection of this lesson, Heidi noted her frustrations with students' lack of understandings of the authors' claims in texts and attributed this to the students not having read closely enough. She made statements such as "I can tell they are missing important parts" and "they hadn't read closely enough to pick up on what I was asking" (10/21/13, mtg #40). There is a likely link between Heidi's frustrations with students' apparent lack of understanding and the teacher's tendency to fill in some of the information for students rather than using moves to elicit and refine students' summaries and conclusions.

It is also possible that what the teacher was asking students to do in Lesson ITIIF might have been too difficult for them. Excerpt #25 below from Lesson ITIIF provides evidence that the teacher was expecting quite a lot from her students. In this excerpt, Heidi again gave instructions to students that included multiple disciplinary foci, perhaps too many to attend to at once:

Excerpt #25

Heidi: Ok so I want you just like you did with the August Spies text, just like we did with the little video, think about what claim is Albert Parsons making here. What evidence does he use to, does he present to support his claim? And what techniques does he use to persuade his audience ok? So that's what we will be thinking about as we read. But ... we also can keep thinking about corroboration. Is Albert Parsons saying anything that is similar to what others have said in other sources? Or is it different somehow? Ok so keep that in the back of your mind. Also, cuz I know you guys can totally handle this with these amazing brains that you have, you can also think about our essential questions. Cuz remember Albert Parsons is an important one. Um, were [the men accused of conspiring the Chicago Haymarket Riot] guilty? You could think about that as you read. And was he a dangerous man? You could think about that as you read too. Ok we've got a lot going on here.
(Lesson ITIIF, 10/21/13, obs #47)

During her reflection of Lesson ITIIF, Heidi expressed some insight that she might have designed the lesson based on the affordances of the texts more than necessarily “where [her] students [were]” (10/21/13, mtg #40) and that, “given what I know about my students, even though these texts afford this lesson, this just isn’t the right time to have this lesson” (10/21/13, mtg #40). Heidi’s instructions to students in the above excerpt reflect the teacher’s sentiment in the meeting that she was highly focused on the affordances of the texts. It is unclear the extent to which her students were capable or wanted to engage in the multiple tasks she was advising. Lesson ITIIF was at the beginning of the school year, so it is possible that the teacher had not had a lot of time to guide students in developing their skills in identifying authors’ claims and authors’ techniques for backing up their claims, or to guide students in developing the disposition to persevere through closely reading difficult texts.

4.4.5 Drawing Collective Conclusions and Reasoning Historically: Heidi’s Instruction in the Fifth Sampled Lesson

The fifth sampled lesson occurred at the end of Iteration III (Lesson ITIIS, 5/2/14, obs #65) and involved the same eighth grade students Heidi taught in Lesson ITIIF. This lesson (Lesson ITIIS) had two main components: 1) reviewing texts students had previously read and determining the authors’ claims about why the U.S. entered World War I, and 2) introducing contextualization (defining and modeling) followed by students reading, discussing, and reflecting on contextualization during reading.

Lesson ITIIS was markedly different than Lesson ITI in that the eighth graders were highly engaged in discussion and their engagement represented students doing the “work” of asking and answering historical questions. Lesson ITIIS also showed small but noticeable differences as compared to each of the earlier lessons (sampled lessons two through four). What

follows is a description of these differences as relates to Heidi's framing of problems in the meetings over time.

Lesson ITIIS occurred near the end of Frames 7 and 8, and Heidi's reflection on this lesson marked the final episode of Frame 9. Evidence from Lesson ITIIS indicates resolution of some of the issues Heidi addressed in each of these frames. Lesson ITIIS also provides further evidence of resolution of Frames 1-6. For example, in Lesson ITIIS, 73% of the students spoke during whole group discussion, which was more than in any of the earlier lessons. Furthermore, Lesson ITIIS included numerous instances of overlapping speech (10), such as students responding simultaneously or interrupting each other, and multiple instances of emotional displays (12), such as students raising their voices, laughing, expressing surprise (i.e. "oh"), and erupted responses. These indicators provide further evidence of resolution of issues with getting eighth grade students to share in discussion in Frame 1 and marked contrast to the eighth graders' engagement in Lesson ITI.

Excerpt #26 below illustrates students' high level of engagement during one discussion in Lesson ITIIS, evidenced by the number of students participating in this short snippet (five students' audible responses and multiple students' mumbled responses) as well as students' overlapping speech (multiple students mumbling in line 8) and emotional displays (erupted responses of disagreement line 2; raised voice in line 9).

Excerpt #26

1 Victor: ... that Franz Ferdinand got assassinated. They attempted to throw a bomb at him and then they failed and then, um they shot him

2 Heidi: So the U.S. was motivated to enter World War I because Franz Ferdinand was assassinated. I'm gonna put "FF" [on the board]

3 [light eruption of students, noises/sounds like disagreeing]

4 Heidi: wait I hear a lot of people grumbling. Would anyone like to respond to [student name's] claim?

5 Santiago: well that was, Mexico wanted, they said Mexico [inaudible], but they wanted to join the war ...

6 *Unknown Student 1: nah*
7 *Unknown Student 2: no*
8 *[Teacher laughing]*
9 *Mumbling from a couple students*
10 *Unknown Student 3: no Germany (raised voice)*
11 *Heidi: All right, thanks for trying real hard to work it out to make sure we got it right.*
What precisely was that exchange between Germany and Mexico?
(Lesson ITIIS, 5/2/14, obs #65)

Above excerpt #26 not only represents students' engagement in discussion, but also represents a wider range of student and teacher discourse moves than each of the earlier lessons. These moves functioned to support students in exploring and scrutinizing ideas to collectively develop evidence-based historical arguments. The above excerpt shows a series of varied teacher and student moves representative of the types of moves used throughout the lesson: one student proposed an idea (line 1), the teacher revoiced the idea and wrote it on the board (line 2), the teacher asked for responses to the student's idea (line 4), another student counter proposed an idea (line 5), students stated explicit disagreement about the idea (lines 6-10), and the teacher asked for elaboration/further clarification of the two ideas (line 11). This excerpt exemplifies how in Lesson ITIIS students were active in doing the work of asking and answering questions, providing further evidence of resolution of Frames 1-3 as well as partial resolution of Frame 7. Heidi encouraged students to do so through a series of moves and tools, such as asking students to elaborate and clarify each other's ideas and writing their ideas on the board. These moves reflect the nature of solutions Heidi developed and tested throughout Frame 7 and suggest these tested moves and tools became part of her regular practice.

Above excerpt #26 shows that even though a range of discourse moves were employed by the students, Heidi was integral to the discussion. Like each of the earlier lessons, discourse in Lesson ITIIS reflected an IRF sequence of teacher-student turns. However, in Lesson ITIIS the

teacher's follow up moves were more varied than in each of the earlier lessons and functioned to guide students in drawing conclusions about the ideas they discussed rather than Heidi drawing such conclusions herself. Excerpt #27 below is an example of Heidi guiding the class in drawing a collective conclusion about why the U.S. entered WWI according to the texts they read through discourse moves such as asking students for conclusion/summary (line 1) along with asking for agreement (line 3). At the same time, Heidi used a variety of instructional tools, such as writing on and removing ideas from the board to help track the argument (lines 1, 3, and 7), using a thumbs up/thumbs down technique to gauge student agreement (line 1), and referring to a sentence stem she introduced earlier in the lesson (the US was motivated to enter WWI because ...) to help students articulate clearer claims (line 7).

Excerpt #27

- 1 Heidi: Let's make this claim [written on the board] an accurate representation of what the video said. Let's try to get focused here ok. Is this claim an accurate representation of what the video said about why the US was motivated to enter WWI [pointing to all statements on white board]. Yes, or no? [Teacher indicates with thumbs and students hold thumbs up or down in response]. Jade says no. Daniella says no. Cassandra says no. A lot of people just are refusing to answer. Jade, do you want to talk about why you say no?
- 2 Jade: I say no for the first part because Ferdinand was assassinated because the US didn't really care about other countries. They were like "oh whatever." And then I agree with the last two [statements written on the board] because they were attacking American ships even though US [inaudible] entered war. That was like part of it, but once they saw that Germany telegrammed Mexico, that was also part of what the video was saying. Cuz [inaudible] the US even more mad.
- 3 Heidi: Ok so Jade said two things. One thing she said is we should get rid of Ferdinand [meaning remove Ferdinand from the board]. Does everybody agree with her? Do you agree Victor?
- 4 Victor: Yeah
- 5 Heidi: And Jacob, you said it earlier, you said Franz Ferdinand kind of started the war but it wasn't really a motivation for the US right?
- 6 Jacob: Yeah
- 7 Heidi: So does everybody agree we should get rid of that one? Ok [teacher erases from board]. Now Jade, also ... the way that she expressed the claim, it was like she was saying there were a variety of factors. Ok? In fact, maybe I could say "the US was motivated to enter WWI for a variety of reasons, for several reasons" ok? [writing on the board] And Jade, will you just review one more time, nice and loud for everyone to

hear what you said.
(Lesson ITIIS, 5/2/14, obs #65)

Thus, even though Heidi was heavily scaffolding the discussion, she worked at maintaining student voice in drawing a final, reasoned conclusion based on evidence from the texts. She made sure to gauge the class' collective agreement and to ask for their reasoning when they disagreed. She also ensured students heard and understood each other through asking Jade to repeat her explanation loudly (at the end of line 7). This indicates resolution of some of the issues Heidi talked about in Frame 7, such as getting students listen to and understand each other, to track the discussion, and to come to reasonable conclusions.

Evidence from Lesson ITIIS suggests that some of the issues Heidi was concerned about in Frame 8 may have also been partially resolved. In her reflections prior to this lesson, Heidi expressed concerns that eighth graders don't "buy in" to close reading (10/21/13, mtg #40; 10/22/13, mtg #41) and that they "act like everything's dumb, everything's boring" (2/10/14, mtg #51). However, evidence in Lesson ITIIS, suggests that, at least for this lesson, students had read the texts closely enough to critically engage in discussions to develop their argument, and that students were engaged, and at times even enthusiastic during discussion. One possible reason for this is that one of the texts students "read" was a video, which may have afforded greater content accessibility than other texts such as print sources. That greater accessibility may have facilitated a more engaged, historically on-track discussion.

Furthermore, evidence in Lesson ITIIS indicates more resolution of Frame 8 than Heidi's talk in her reflection after the lesson. In her debriefing of Lesson ITIIS, the teacher expressed concerns that she was doing "more of the cognitive work" with her eighth graders during discussion (5/2/14, mtg #60). However, excerpts #26 and #27 above indicate that students were

doing a lot of the work of constructing and refining a claim to address the overarching inquiry (why the U.S. entered WWI). It is unclear why there was some misalignment between the level of students' engagement in the inquiry in Lesson ITIIS and Heidi's reflection on the lesson. In her reflections on problems earlier in Frame 8, Heidi often made statements about needing to keep things "interesting" for her eighth graders (10/22/13, mtg #41). It is possible that the eighth graders found this lesson more interesting and therefore were more engaged than in other lessons (which could relate to the video as possibly a more accessible source for students). However, it is also possible that during Lesson ITIIS, the teacher was focusing on subtle aspects of the issue that were unobservable by the researcher in the video and field notes.

Lesson ITIIS included multiple incidents of Heidi talking about and guiding students in engaging in historical inquiry practices, both explicitly and less overtly. This provides further indication of resolution of Frames 4-6 about sourcing and corroboration as well as partial resolution of Frame 9 about contextualization. An example of a less overt way of engaging students in sourcing occurred after the class discussed what claims two texts made about why the U.S. entered World War I. After students decided the two texts' arguments, the teacher feigned surprise that the sources would state different claims and asked students to think about why that might be. She stated:

Excerpt #28

Heidi: It's so interesting to me that we looked at two sources and they gave us two different answers to our question. What do you think about the fact that the textbook just kind of very simply in one sentence said, "well yeah it was because of the Lusitania?" Talk to a partner real quick about what you're thinking about the fact that the two sources give us two different answers.

(Lesson ITIIS, 5/2/14, obs #65).

Heidi's task naturally set students up to bring up sourcing issues of trustworthiness and reliability. Students speculated that the two texts were "over-exaggerat[ing] on some things," not

being “100% accurate,” and “not saying like both sides of the argument” (Lesson ITIIS, 5/2/14, obs #65). The teacher then used a series of questions to guide students in thinking about the type of sources they had just read (secondary) and how secondary sources get their information (from primary sources), supporting students’ further reasoning about trustworthiness. More explicit engagement in sourcing in Lesson ITIIS included multiple instances of Heidi asking students to “source” documents and students subsequently discussing key sourcing issues, suggesting sourcing was a routine practice for the students. Thus, in Lesson ITIIS, Heidi demonstrated an artful approach of planning for sourcing, such as using texts that afford considerations of trustworthiness (indicating resolution of Frame 4), and helping students think in more nuanced ways about secondary source authors (indicating resolution of Frame 5).

The explicit focus of the second part of Lesson ITIIS was contextualization. This included Heidi modeling her own engagement in contextualization with a new text and asking students to practice contextualization with another new text. In meetings during Frame 9 preceding Lesson ITIIS, Heidi’s talk represented a deep understanding of the complex interrelation between contextualization, sourcing, and corroboration, making statements such as that contextualization was a way of “deepening sourcing” and that sourcing helps one “contextualize better” (3/24/14, mtg #57). The teacher’s talk in Lesson ITIIS mirrored her language about the complex interrelation between historical inquiry practices in these meetings. For example, in her explanation of contextualization in below excerpt #29, Heidi explicitly related the practice to sourcing, which seemed to be a way for the teacher to relate the “new” practice to something with which students were already familiar (sourcing).

Excerpt #29

Heidi: Contextualization often feels a lot like sourcing to me and sometimes when I think I'm contextualizing I'm also partly sourcing and sometimes when I'm sourcing I'm also partly contextualizing, because they kinda go hand in hand, right? When you're sourcing you're

also trying to place that document in a time and place, right? So that's why I say you're already doing this, because I think a lot of times when I ask you to source something you are kind of starting to contextualize it. But this is going to have you go a little deeper in imagining the time and place.
(Lesson ITIIS, 5/2/14, obs #65).

Thus, evidence indicates that throughout Lesson ITIIS, Heidi engaged students in multiple historical inquiry practices, she engaged them in talk about these practices both explicitly and through more “natural” (less obvious) approaches, and her talk highlighted the interrelation between historical inquiry practices. This of course illustrates a drastic change from the first analyzed lesson (Lesson ITI), which included a heavy focus on literacy strategies and multiple “missed opportunities” to engage students in historical inquiry practices. Concerns about contextualization did not emerge for Heidi until Frame 9, suggesting that this practice was more complex for Heidi to address than sourcing and corroboration. It is possible that resolution of frames leading up to Frame 9 paved the way for the teacher to be able to focus on this practice with students and to talk about it in such complex, interrelated ways. For instance, regularly engaging students in thinking critically about sources and regularly engaging them in doing more of the “work” of developing arguments from sources may have provided more opportunities for students to gain deeper understandings of the historical context. Students’ deeper understandings of the contexts likely informed their interpretations of the historical event.

Heidi’s reflection on Lesson ITIIS marked the last problem episode of Frame 9 focused on contextualizing. Specifically, Heidi expressed concerns that it was “hard to make [contextualization] a focus skill” and that she didn’t want to “miss opportunities to be explicit about contextualization” (5/2/14, mtg #60). Heidi’s concerns do not seem to corroborate what happened in the lesson. First, Heidi clearly made contextualization a “focus skill” of this lesson, using the term and telling students contextualization was the focus of the lesson. For instance,

she explained, “The skill I told you we were focusing on, the skill of contextualization. Remember that big word? So today I want to actually talk about that word, talk about what that is when we contextualize and practice it a little bit.” (Lesson ITIIS, 5/2/14, obs #65). Second, Heidi did not seem to miss any opportunities to be explicit about contextualization. For example, students were asked to read lyrics from a war song written about World War I in 1918 and to think about questions such as “What was different at that time? What was the same about that time? How does like imagining the context help you understand the song better?” (Lesson ITIIS, 5/2/14, obs #65). During the ensuing discussion, students provided eight different ideas and Heidi explicitly linked each of the students’ comments about the text to contextualization, such as pointing out inferences they made based on their knowledge of the context. She made comments such as:

Excerpts #30-31

Excerpt #30. Heidi: Mmhmm, so it never says Germans in here, right? This song never ever says Germans. So part of contextualizing, this is understanding that it is talking about the Germans. (Lesson ITIIS, 5/2/14, obs #65)

Excerpt #31. Heidi: Yeah, so part of contextualizing this document is understanding that many Americans would have understood, they would have thought God was on their side in WWI. (Lesson ITIIS, 5/2/14, obs #65)

Therefore, it is unclear why Heidi expressed the concerns she did about this lesson. In her reflections on Lesson ITIIS, the teacher talked about the fact that she was already engaging her students in contextualization but she just wanted to be more explicit about the practice with them. It is possible, then, that since it was a new practice for her to talk so explicitly about contextualization with students, she felt insecure about how effectively she was able to do so.

In summary, Lesson ITIIS provides evidence of resolution of Frame 1-6 and partial resolution of Frames 7-9. Lesson ITIIS indicates eighth graders were highly engaged in

discussion and that their engagement was substantive, reflecting students doing the “work” of asking and answering historical questions. Similar to each of the earlier lessons, Heidi was integral to discussion; the structure of discourse in Lesson ITIIS reflected IRF sequences of talk. However, Heidi’s follow up moves and instructional tools supported students in exploring and scrutinizing each other’s ideas as well as coming to collective conclusions about the historical event under study rather than her doing some of this “work” herself. Lesson ITIIS also represented student engagement in multiple, interrelated historical inquiry practices. Heidi’s instruction supported these practices through the questions she asked and tasks she set up as well as through her explicit talk about and modeling of the practices. Heidi’s talk in meetings around the time of Lesson ITIIS reflected a deep understanding of the interrelation between sourcing, corroboration, and contextualization. The ITIIS observation corroborates her reflections across meetings leading up to this point.

5.0 DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

The complex, multilayered nature of change detailed in the current case study provides insights into why making core change to teachers' practice is rare and why, when it does occur, it takes time (Baird, 1992; Spillane, 1999). The nine problem frames with which Heidi engaged were interrelated and overlapping, and the evolution of the frames provides evidence of Heidi deepening her knowledge of multiple, laminated aspects of supporting students' historical inquiry. For example, shifts in her expectations for what she expected students to know and be able to do seemed to be related to changes in the teacher's own understanding of historical inquiry as well as ways to support students' engagement in productive historical discussions.

A large part of Heidi's dynamic process of change involved addressing parts of the problem, or shifting the focus of her problem solving to interrelated components that she tackled piece by piece (or frame by frame), leading her to eventually be able to more seamlessly integrate the components. For example, across frames over time, Heidi generally progressed from a focus on facilitating inquiry-based historical discussions, to a focus on engaging students in discipline-specific inquiry practices, to a focus on getting students to take a more active role in deepening their historical inquiry processes. These concerns roughly represent a shifting focus on components of productive disciplinary engagement (PDE) (Engle & Conant, 2002), moving from an initial focus on student engagement, then to engagement that was more disciplinary, and then to engagement that was more disciplinary and productive.

Heidi's trajectory provides a window into the micro-level issues that arise in the learning process as teachers orchestrate and balance multiple voices in the classroom: the voice of the disciplinary practices, the voice of scaffolding student participation, and the voices of students as they begin to take on and then take over a collaborative discourse that is productive. There are

few cases that open up this process to view in the ways that Heidi's case allows. At a macro-level, her trajectory is consistent with reports of other teachers' experiences learning to facilitate discussion (Alexander, 2010; Murphy et al, 2009; Harris, Phillips, & Penuel, 2012). The in-depth examination of Heidi's trajectory in the current study invites the conjecture that her pathway represents a sort of natural progression of teacher learning in this area. In other words, it is possible that first focusing on students' engagement and then on their disciplinary and productive engagement is a necessary or inevitable trajectory of teacher learning. More research is needed to explore and extend this conjecture.

It is likely that what teachers address first in their trajectories of change is that which seems more familiar or manageable in order to build to the more "difficult" aspects. In Heidi's case, it seemed she first needed to experience students talking more and needed to get comfortable with the messiness of inquiry before she could focus on the disciplinary and productive aspects of student engagement. Her initial focus on experimenting with inquiry-based discussion was likely related to her prior experiences with facilitating discussions as an eight-year language arts teacher. From the start of her participation on the project, Heidi focused on attempting to get students to do more of the intellectual work of historical inquiry during classroom discussion, shifting the dynamic of discussion from teacher recitation to student dialogue. Thus, it is evident that Heidi conceptually understood what discussion that was more dialogic in nature "could" or "should" look like. However, her theoretical understandings of this aspect of instruction may have been more developed than her practical know-how and her dispositions for enacting such discussions. Heidi revisited similar instructional goals over iterative cycles of trying things out and revising her approaches based on her assessment of the results with the students. Each opportunity to envision, design, enact, and assess the results

informed her evolving vision of inquiry-based discussion and what she was after in the classroom. In other words, Heidi was engaging in the back and forth process of linking theory and lived classroom experiences as a “double helix,” with the two “play[ing] off each other” (Grossman, 1990).

Extant literature asserts that substantive change to teachers’ practice takes time (Baird, 1992; Borko et al., 1997; Spillane, 1999). Through Heidi’s case we learn more about why and what happens over iterative cycles of instructional change. Making core changes to one’s practice involves tackling multiple, interrelated layers of an overarching problem. Each of the layers is a complex puzzle to be identified and solved. Part of supporting teacher learning and change may involve helping teachers diagnose the parts of the overarching problem with which they are more comfortable, such as determining which aspects of theory they understand more or less comprehensively and which related instructional tools they need to build or hone. Supporting teacher learning also may need to involve helping teachers work through these beginning layers in order to push to the next layer of the problem. Had Heidi been attempting to make core changes to her practice absent the overarching support of the larger project and the regular, micro-level, collaborative reflection support, when she felt uncomfortable with the messiness of discussion, she might have discontinued facilitating such discussions. Instead, reflection seemed to serve as a way for her to make sense of her discomfort, working through the benefits of messiness and developing more sophisticated approaches to facilitating such discussions over time.

5.1 Learning to Support Productive Historical Inquiry Discussions: Deepening Knowledge of and about Facilitating Discussion

In Heidi's case, engaging in the iterative process of working through solutions for specific problems of practice about facilitating inquiry-based discussions seemed to beget newer, more complex problems. For example, Heidi's testing/retesting of solutions progressed to a focus on ensuring students' inquiries were "going somewhere" (Engle & Conant, 2002) and that students took a more active role in collectively developing reasonable historical arguments. The focus of her problem solving evolved to center on figuring out the nuanced complexities of how to hone discourse moves and tools to support discussion that was engaging, disciplinary, and productive. This indicates a complex relation between the types of solutions Heidi was testing and changes to her knowledge of what effective inquiry-based discussion comprises as well as changes to her disposition and her practical know-how about how to go about enacting such discussions. For a reflective practitioner, developing and testing solutions to address these types of issues may be an ongoing process as part of a dynamic instructional context in which there are multiple layers to supporting students' productive disciplinary engagement.

Heidi's sustained focus on this aspect of her teaching speaks to the situated nature of developing PCK in that her learning was incremental and constantly being recontextualized with every related experience (Brown et al, 1989). Heidi's ongoing testing of solutions and reflecting on the outcomes of those solutions suggests Heidi needed to go through the process of experiencing and experimenting with various instructional approaches to develop intermediate theories about inquiry-based discussion (Hennessey, 2014) and continually refining these theories to eventually come to a more thorough, principled (Applebee, 1986; Grossman, 1990; Smagorinsky, 2009) rationale about how support her students' inquiries that were becoming

progressively more historical and productive. Heidi needed to experience facilitating such discussions with varying circumstances over time to determine how theories about these discussions translated to her own context.

Although situated learning is theorized in the literature as fundamental to teachers' learning and change (Brown et al., 1989; Darling-Hammond & Bransford, 2005; Lave & Wenger, 1991; Putnam & Borko, 2000; Tripp 1993/2012), extant research about teacher learning does not align with theories about teacher learning. Rather, studies about teacher learning tend to take place over short periods of time, are often disconnected from teachers' specific contexts, and are typically presented from top-down, researcher perspectives of the teachers' experiences. When studies do address teachers' perspectives, they often rely on teachers' impressions (e.g. from interviews or surveys) of their practice rather than examining their actual experiences. Thus, new methods, such as the ones used in the present study of exploring teachers' iterative reflection on their authentic problems of practice over time, are needed to advance the field's understanding of teacher learning. Likewise, most professional development programs are not based in models of long-term change and are not situated in practitioners' authentic teaching contexts (Ball & Cohen, 1999; Webster-Wright, 2009). The current case study shows how the time and space to incrementally link theory and practice in her own context and in the context of the supportive collaborative reflection environment was integral to her change process. Not providing teachers with these necessary conditions for professional growth is analogous to expecting students to learn absent the requisite scaffolds. Just as students need multiple and varied opportunities to deepen their historical inquiry practices, teachers need opportunities to revisit and recontextualize their work.

Not only did Heidi develop her PCK of facilitating inquiry-based discussions, but also in some ways, the teacher grew to be an expert in this domain, reaching layers of the problem that other teachers, researchers, and teacher-educators have not encountered. Heidi's ongoing testing of solutions to refine her discourse moves helped her build a deep understanding about how much, when, and why to be invisible or not in discussion through the purposeful use of specific discourse moves and tools to ensure the productivity of historical inquiry discussions. The expert knowledge the teacher developed over time through reflection aligns with the growing body of literature that argues for more nuanced ways of characterizing the dialogicity of classroom discussions, such as not simply labeling certain moves as inherently "good" (such as asking open-ended questions) or "bad" (such as asking closed or known-answer questions) (Boyd, 2012; Boyd & Markarian, 2011; O'Connor & Michaels, 2007; Wells, 2007). These characterizations are indeed nuanced in that there is no single "right way" to plan for and facilitate inquiry-based discussions (Michaels et al, 2010), yet the literature often frames evidence-based practices as straightforward "best practices" for teachers to follow (Smagorinsky, 2009; Spencer, Detrich, & Slocum, 2012). Determining what comprises productive discussion depends on the details of the context, such as the grade level and the specific content under study. In other words, teachers need to flexibly adapt recommendations for how to engage students in dialogic discussion in ways that "work" for the specifics of their instructional contexts. These classroom contexts change from year to year and even from period to period. Different teachers attempting to make similar changes to their practice will identify different problems in their efforts to do so, as problems of practice are intimately tied to the context (Davis & Krajcik, 2005; Eick and Dias, 2005; Putnam & Borko, 2000). Heidi even grappled with very different issues depending on the

developmental levels of her students, such as problems with sixth graders sticking to illogical arguments and problems with eighth graders not buying in to aspects of the inquiry process.

Thus, it is important to emphasize that research-based recommendations, such as discourse moves that serve to make discussions more productive (i.e. revoicing), are just that – recommendations. Teachers need to develop their own situated understandings of what such recommendations imply for their instruction. This involves teachers developing a principled practice (Applebee, 1986; Grossman, 1990; Smagorinsky, 2009) of what engaging, disciplinary, productive inquiry means for *their* students, in *their* classrooms, for *their* particular learning goals. It is also key to underscore the role that teachers play in learning about teacher learning. Teachers are key agents in the ongoing process of theory informing practice informing theory. As this case study illustrates, teachers add substance to theories through their trial and error in determining the when, how, and why of theory vis-à-vis the particulars of their contexts, such as Heidi did in her ongoing attempts to ensure her students’ engagement in inquiry-based discussions were disciplinary and productive.

5.2 Learning to Support Productive *Historical Inquiry* Discussions: Deepening Knowledge of and about History

Heidi’s challenges in moving students’ historical inquiry practices toward being more disciplinary and productive aligns with problems identified in the research literature about supporting young students’ historical reasoning (Lee, 2005; van Drie & van Boxtel, 2008; VanSledright, 2002). The problems Heidi faced in this area reflect a larger unsolved puzzle in history education - the dual challenge of designing tasks to get students to grapple with the uncertainty of the past while also finding ways to support students in making interpretations that

are well-reasoned and evidence-based when engaging in such inquiry. In other words, teachers, especially teachers of younger students, need to make decisions about the tradeoffs between supporting students' in "cultivating their historical imaginative powers" versus ensuring students learn disciplinary-specific, "arbitrated limits on their imaginative interpretations" (VanSledright, 2002, p. 1104).

If, as Seixas (1993) has suggested, teachers serve as the bridge between the classroom and the larger discipline, then teachers need a deep understanding of historical inquiry practices as well as how to make these practices accessible to students in relation to their developmental levels, their motivational levels, and their understanding of the historical content and context. Historical inquiry practices represent specialized, sophisticated ways of reading, writing, and reasoning (Monte-Sano, 2008; Shanahan & Shanahan, 2008; Shanahan, Shanahan, & Misischia, 2011; Wineburg, 2001). These practices are often an unknown territory for teachers, as approaching history from an inquiry stance is usually drastically different from how most teachers were taught. Thus, teaching history from an inquiry perspective can involve teachers designing radically new ways of teaching (Ball, 1996) and significantly different ways of understanding history as a domain.

At the beginning of the project, Heidi did not have the same knowledge and experience from which to draw to construct a vision of what historical inquiry "should" or "could" look like as she did with inquiry-based discussion. Heidi's insecurities in this domain may have contributed to the teacher focusing on this component of the larger problem after she worked through some of the pieces about inquiry-based discussion that were more accessible to her. Furthermore, working through the initial pieces of the larger puzzle likely paved the way for her

to explicitly focus on the more historical problems (reflecting issues with which she was less familiar).

Heidi's reflection process involved intentionally working to deepen her knowledge of historical inquiry practices, both her content knowledge and her knowledge of how her students learn, or her PCK. Her deepening knowledge played a role in changes to her instruction as well as in shifts to her framing of problems. Engaging with material resources to deepen her own understandings of historical inquiry practices was central to Heidi's process of solving problems about how to support her middle school students' engagement in such practices. Earlier instances of engaging with material resources seemed to reflect a more didactic dynamic between the researcher and teacher in planning/debriefing meetings. For example, analyzing advanced placement high school students' annotations of primary sources (Frame 5) involved Jackie scaffolding Heidi's process of interpreting the disciplinary nature of the high school students' annotations and how they reflected students' thinking about sourcing primary sources. This process of closely examining specific examples of sourcing likely helped Heidi concretize her knowledge of what sourcing entailed in order to translate what this practice could mean at a middle school level. In later meetings, instances of the teacher and researcher engaging with material resources evolved to include both Heidi and Jackie demonstrating and articulating specific historical inquiry practices in which they were tacitly engaging, such as talking through how they contextualized letters between John and Abigail Adams. This instance occurred near the end of the study (Frame 9) and reflected Heidi's deep knowledge of what contextualization entailed and her complex understanding of how contextualization was inextricably linked to sourcing and corroboration over time. The teacher's multiple instances of engaging with material resources in the meetings as part of her process of reflection over time presumably served to

concretize her understandings of historical inquiry practices in tandem with her experimenting with various ways of supporting students' engagement with such practices. In this way, part of Heidi's process of linking theory and practice involved gaining a deeper understanding of the theory through engaging with the historical content at her own level.

It is interesting that Heidi seemed to focus on deepening her understanding of one historical inquiry practice at a time. Initially, she focused on sourcing (Frames 4-5), then moved to corroboration (Frame 6), and then contextualization (Frame 9). Focusing on each historical inquiry practice in sequence may relate to Heidi's expressed insecurities about her knowledge of history and of historical inquiry. As well, at the same time that she was focused on contextualization (Frame 9), Heidi's reflections indicated that she had also developed an understanding of nuanced relations of contextualization, sourcing, and corroboration. It is possible that the teacher needed to deepen her knowledge about and strengthen her confidence in one area before moving on to another and before being able to understand their interrelation. Heidi's case thus provides evidence consistent with claims in the literature that history teachers' epistemologies and content knowledge relates to their instructional approaches (Newmann, 2010; Wilson & Wineburg, 1988). It is likely that deepening her understanding of historical inquiry practices informed the teacher's independent development and testing of solutions in her classroom. Just as she designed a trajectory for her students, there was a trajectory of her own learning. With each successive attempt, the teacher deepened her understanding of historical inquiry practices in herself as well as what to expect from her kids.

Heidi's need to deepen her history content knowledge presumably relates to her being new to teaching history. Heidi's participation in the larger project coincided with the start of only her third year teaching history/social studies, having been a language arts teacher for eight years

prior. Thus, even though Heidi was an experienced teacher with vast knowledge about and experience with supporting students' literacies, that knowledge and experience could only take her so far in developing a thorough understanding of the literacies that were specific to the domain of history. This case study provides evidence to suggest the importance of considering the role of deepening teachers' content knowledge in relation to developing pedagogical solutions during reflection. Since there is a clear relation between teachers' content knowledge and their pedagogy (Ball, 1991; Ball, Thames, & Phelps, 2008; Monte-Sano & Budano, 2013), supporting teachers in building their knowledge of the inquiry practices of their respective discipline is an integral part of the reflection process. In Heidi's case, she was asked to teach a content area (history) for which she had little preparation, which is not an uncommon situation for teachers of elementary and middle school. Interestingly, the role of content knowledge is not emphasized in the literature as a fundamental part of the problem solving process. There is much focus on teachers' development of practical know-how through linking theory and practice via testing solutions and evaluating their outcomes (Koole et al, 2011; Rodgers, 2002; Schön, 1983). However, less emphasis is placed on the centrality of knowledge of what you are teaching in generating solutions to problems that are fundamentally about the disciplinary practices and their roots in the epistemology of the discipline. Heidi's case illustrates that a huge part of the work of determining how to engage students in historical inquiry involved unpacking the complexities of history and the inquiry process herself. Again, this was an incremental process that entailed unraveling multiple, interleaving layers piece by piece, making the way for Heidi to develop deeper and deeper understandings of what it meant to design ways to increasingly engage middle school students' in the sophisticated ways of historically reading, writing, and reasoning.

Reflection focused on teachers' more explicit and deeper understandings of the functions of different historical inquiry practices could inform how these processes might "play out" with students of diverse ages and backgrounds. Heidi, being new to teaching history, was at a point of seeking out assistance in developing more effective methods of teaching history. However, since the shift to supporting students' historical inquiry is a fundamental change in the instructional practices of most history teachers (Cleary & Neumann, 2009; Neumann, 2010), even veteran history teachers are likely to benefit from exploring and deepening their explicit awareness and understanding of their own historical inquiry practices. Heidi's later experiences with engaging in such practices, even when she clearly had a thorough understanding of what the practices entailed (such as with contextualization), still seemed to contribute to building a comprehensive awareness of these practices to inform her instructional decisions.

5.3 Limitations of the Study

The findings of the current study should be considered in light of several limitations of the study. One limitation of this study is inherent with all case study design. Namely, the findings of this study are specific to the particular case and cannot be generalized to other teachers or collaborative reflection contexts. Also, this study was a case of *one* teacher, which further limits the generalizability of findings. However, careful selection of focal participants can strengthen case studies (Seawright & Gerring, 2008; Willis, 2013). In the current study, Heidi was purposefully selected as an intense-sample because her situation represents an "information rich" example of the phenomenon under study (Miles & Huberman, 1994; Patton, 1990). Since the goal of the study was to provide a nuanced, holistic account of teacher reflection and change

rather than to generalize to a larger population (Merriam, 1998; Willis, 2013), the goals of this study have been attained.

Another limitation of this study is that the planning/debriefing meetings and classroom observations did not take place every day and that only a sample of the classroom observations were analyzed, making it difficult to comprehensively trace Heidi's enactment-reflection process. A more extensive analysis of the classroom observation data could have afforded a more direct link between Heidi's reflection and instruction, such as links between her development of solutions in meetings and her testing of solutions in the classroom. However, every study's design decisions involve tradeoffs. The tradeoff of conducting more thorough analysis of classroom data would have meant sacrificing the deep level of analysis of the planning/debriefing meetings. Since the research questions of this study aimed at describing the teacher's framing of problems and her problem solving process in the context of collaborative reflection, the decision was made to focus the analysis on the meetings. Furthermore, the large data corpus and the duration of the study - 65 planning/debriefing meetings and 71 classroom observations across two and half school years – provided the opportunity to trace more of the teacher's problem solving process than most studies examining teachers' reflection.

Finally, an additional limitation to this study was the atypical amount of support Heidi was provided to facilitate her change process. Heidi's reflection process was supported by one university researcher consistently over two and a half years and the pair's meetings were situated within their participation on a design-based research team. The one-on-one "focused professional dialogue" (Baird, 1992, p. 39 citing Ruddock, 1987) and the regular Design Team meetings likely afforded the teacher a unique context to collaboratively reflect that extends beyond what most professional development contexts are able to provide. Furthermore, Heidi's reflections in

planning/debriefing meetings were with a researcher rather than with other teachers.

Collaborating with a partner who brings a different expertise to the table than what fellow teachers would bring undoubtedly shaped the nature of Heidi's reflection process.

Limitations notwithstanding, this case study allows for rich descriptions of teacher reflection and change that can inform broader questions about teacher professional growth in the context of collaborative reflections.

5.4 Conclusion

The current case study provides a unique, longitudinal picture of how one teacher's problems evolved, including problems that were resolved and disappeared; problems that were resolved and morphed into deeper, more complex concerns; and problems that did not seem to be resolved or to evolve. It thus illustrates the kinds of changes that occur over time when there is ongoing support for a change process. Collaborative reflection is one means of this support; there may well be others. The examination of Heidi's perspective on problems of practice and how these were problem solved, submerged by others, or re-appeared in somewhat altered forms begins to give texture and substance to why changes to core teaching practices do not happen rapidly.

Understanding the specific problems of practice one teacher faced in her attempts to support students' inquiry-based discussions can inform how teacher-educators support teachers working to make similar core changes to their practice, such as being prepared to help teachers tackle comparable problems of practice. Details of Heidi's case can also inform how researchers examine teachers' problems of practice, as it provides an example of one teacher's trajectory of

problem framing from which to compare to other teachers' framing of the multiple layers of problems in which they encounter.

The current case study serves as a model of a teacher-centered methodology for supporting and exploring teacher learning, as it focused on close examination of the problems of practice of import to the teacher. The planning/debriefing meetings flexibly allowed for Heidi to iteratively reflect on issues that emerged as central for her vis-à-vis her particular goals at the time of her reflections. The meetings allowed her to ground her learning in the realities of her context and on her terms. The case study further honored the teacher's perspective by focusing analysis on the problems of practice that were central to the teacher's reflection process. Methodologically, this approach afforded exploration of the teacher's authentic, situated learning. This study served as a means to both support Heidi's learning and to provide a window into her learning. This methodology also provides an example of how practice informs theory, shifting from focusing solely on how teachers should enact theory, as many studies do, but also on what theory can learn from practice.

Collaborative reflection between teachers and researchers is theorized to be mutually beneficial for both types of participants, as it serves as a way for each to draw from each other's expertise (Baird, 1992). Although the focus of the current study was on the teacher's learning, the researcher also learned in the process of collaboratively reflecting with the teacher. For example, the researcher benefitted from being able to "get inside" Heidi's head to gain an in-depth understanding of the nature of the problems she faced, her reasoning about these problems, and how her perspectives changed based on what she tested and discovered in her instruction. The researcher also gained a deeper understanding of what it entails to support middle school students' historical inquiry through Heidi's experiences and the teacher's growing expertise in

this area.

The details of Heidi's case allow other researchers and teacher-educators to learn from her change process. Learning from teachers is key to helping teachers learn. If the goal of professional development and research is to support teacher change in ways that more closely align with how teachers learn, then it is important to better understand how teachers actually learn. As Webster-Wright (2009) contends, more research is needed that investigates the *experience* of teachers "in a situated manner while questioning philosophical assumptions underpinning such research" (p. 705).

If collaborative reflection contexts allow the time and space for teachers to work through authentic problems of practice, then these professional development contexts have the potential to change the landscape of professional teacher learning by informing teacher-educators' and researchers' understandings of teachers' professional growth. It is not a simple endeavor to support teacher's authentic learning, given the time and resources it takes to do so. It is also not a straightforward process to make such core changes to teacher professional development, given the current educational climate of teacher accountability and traditional, top-down notions of facilitating teacher change may be difficult to displace. This case study serves as a rich example in support of efforts to argue for dramatically different orientations to teacher learning and provides some indication of what it takes to support lifelong learning situated in teachers' workplace.

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APPENDICES

APPENDIX A

Classroom Observation Data

Iteration	Grade level/content	# of lessons observed	# of field notes	# of lessons video recorded	# of lessons audio recorded
Iteration I	7 th grade U.S. History	9	8	6	9
	8 th grade U.S. History	7	7	5	6
Iteration II	6 th grade Ancient Civilizations	30	30	29	30
Iteration III	6 th grade Ancient Civilizations	18	18	18	18
	8 th grade U.S. History	7	7	5	7
	Total	71	70	63	70

APPENDIX B

Planning/Debriefing Meeting Data

	# of meetings	Field notes	Audio recordings	Written lesson plans/ reflections (by week)	Email exchanges (beyond communication of lesson plans)
Iteration I	11	8	11	0 ^a	4
Iteration II	28	26	28	21	15
Iteration III	26	26	26	20	15
Total	65	60	65	41	34

^aIteration included co-construction of educative module (Little Rock Nine) and therefore does not include the teacher's individual lesson plans. The teacher did not write reflections of her lessons during this iteration either.

APPENDIX C

Problem Episodes Within and Across Meetings

Iteration	Meeting #	Date	# Problem episodes
IT I	1	5/7/12	
IT I	2	5/15/12	
IT I	3	5/16/12	1
IT I	4	5/17/12	
IT I	5	5/18/12	1
IT I	6	5/21/12	
IT I	7	5/24/12	4
IT I	8	5/25/12	2
IT I	9	5/30/12	2
IT I	10	5/31/12	
IT I	11	6/10/12	
			10
IT II	12	10/1/12	
IT II	13	10/2/12	
IT II	14	10/3/12	1
IT II	15	10/4/12	1
IT II	16	10/5/12	
IT II	17	10/15/12	
IT II	18	10/16/12	
IT II	19	10/17/12	1
IT II	20	11/2/12	2
IT II	21	11/5/12	
IT II	22	11/7/12	2
IT II	23	11/14/12	1
IT II	24	11/19/12	1
IT II	25	11/21/12	1
IT II	26	12/3/12	2
IT II	27	1/14/13	2
IT II	28	1/15/13	
IT II	29	3/12/13	
IT II	30	3/13/13	
IT II	31	3/14/13	
IT II	32	4/8/13	2
IT II	33	4/11/13	3

IT II	34	4/17/13	
IT II	35	4/23/13	1
IT II	36	5/1/13	
IT II	37	5/2/13	
IT II	38	5/31/13	1
IT II	39	6/10/13	
			21
IT III	40	10/21/13	5
IT III	41	10/22/13	1
IT III	42	11/13/13	
IT III	43	11/21/13	
IT III	44	11/22/13	
IT III	45	12/2/13	
IT III	46	12/3/13	
IT III	47	12/12/13	1
IT III	48	12/13/2013(A)	4
IT III	49	12/13/2013(B)	3
IT III	50	12/17/13	2
IT III	51	2/10/14	2
IT III	52	2/17/14	2
IT III	53	2/18/14	4
IT III	54	2/26/14	1
IT III	55	3/10/14	1
IT III	56	3/20/14	1
IT III	57	3/24/14	1
IT III	58	4/9/2014(A)	
IT III	59	4/9/2014(B)	
IT III	60	5/2/14	2
IT III	61	5/13/14	1
IT III	62	5/27/14	1
IT III	63	5/29/2014(A)	1
IT III	64	5/29/2014(B)	
IT III	65	6/4/14	
			33
Total Problem Episodes			64

APPENDIX D

Sample Analyzed Lesson Topics, Texts, and Tasks

Sample lesson	Iteration Grade Date	Lesson observation #	Lesson topic	Texts used in lesson	Main tasks
ITI	Iteration I 8th grade 5/10/2	Obs #4	Little Rock Nine incident of 1957	<ul style="list-style-type: none"> • Photo of one of the Little Rock Nine students (Melba Beals) • Textbook excerpt providing background information about Little Rock Nine event 	<ul style="list-style-type: none"> • Discuss own experiences of being mistreated • Teacher introduce reading strategies • Read photo of Melba Beals • Teacher model and guided practice of reading strategies with textbook excerpt
ITIF	Iteration II 6th grade 10/4/12	Obs #20	Historical artifacts	<ul style="list-style-type: none"> • Cartoon strip of cat and piranha • Photo of rug beater • Excerpt from catalog advertising rug beater from 1918 	<ul style="list-style-type: none"> • Discuss observations and inferences with examples (i.e. cartoon) • Teacher define observation and inference, model making observations and inferences with photo of rug beater • Preview rug beater catalog and discuss "what [type of text] is this?" and "how do I know?"

ITHS	Iteration II 6th grade 5/31/13	Obs #44	Chicago Haymarket riot of 1886	<ul style="list-style-type: none"> • Newspaper article about dynamite written by one of the accused conspirators, 1885 • Excerpt from autobiography of one of the accused (August Spies), 1886 	<ul style="list-style-type: none"> • Source Dynamite text and discuss how text relates to essential question (were the conspirators named in the riot guilty?) • Teacher define and model corroboration with Dynamite text • Source Spies autobiography, discuss text in relation to corroboration and essential question
ITHSF	Iteration III 8th grade 10/21/13	Obs #47	Chicago Haymarket riot of 1886	<ul style="list-style-type: none"> • Excerpt from autobiography of one of the accused (August Spies), 1886 • Video clip about dolphins • Excerpt from autobiography of one of the accused (Albert Parsons), 1886 	<ul style="list-style-type: none"> • Write about Spies' main claim (text read as homework) • Define "claim" • Watch video and determine main claim • Source Parsons autobiography • Discuss Parsons' autobiography in relation to claims, corroboration, and essential question
ITHS	Iteration III 8th grade 4/2/14	Obs #65	World War I	<ul style="list-style-type: none"> • Video excerpt about WWI • Textbook excerpt about WWI • Woodrow Wilson's war message to Congress, 1917 • Song Lyrics: The Battle Hymn of Democracy, written by Bradford Webster, 1918 	<ul style="list-style-type: none"> • Identify claims from video and textbook excerpt about why US entered war • Discuss why claims from two sources differ • Teacher define contextualization and tell story/analogy related to contextualizing • Source Wilson's war message • Teacher model contextualizing Wilson's message • Read and discuss song lyrics with focus on contextualizing

APPENDIX E

Coded Teacher and Student Discourse Moves

Teacher discourse moves		
Discourse move	Definition	Example
Ask known-answer/closed question	Ask a question with an expected, known, or “correct” answer; ask a question to test students, to display students’ knowledge	"So what Plessey v Ferguson said was that students could be separated for what reason?"
		"Does anybody know what the word scapegoat means?"
		"I would like to hear your experience reading this text."
Ask open-ended/authentic question	Ask a question without “pre-specified” answer, without a "known" answer, or a question with multiple possible answers	"Why do you think we would sometimes use textbooks to learn about life in ancient Egypt?"
		"Any other thoughts? What can artifacts tell us about a person's history and culture?"
Evaluate idea	Appraise or assess a student's idea	"Excellent. Great question. Really good."
		"Yeah I think that makes sense."
Rephrase/revoice	Restate a student’s idea either using the student’s language or different language (such as using more technical or domain-specific language)	Student: [textbooks] tells [us] about the subject we're learning about.
		Teacher: a lot of information about a subject. Textbooks can be useful because textbooks have a lot of information.
		Student: I was thinking like another newspaper ...
Elaborate idea	Extend or add to a students' idea	Teacher: Yeah, especially because did you notice at the bottom, it says this is one of three anarchist newspapers that August Spies published. We could look at all of his newspapers right?

		"We've determined that this is a speech. This was made by President Wilson 97 years ago today. "
Teacher summarize	Provide a statement about the main points addressed in a discussion	"Here's what we have so far: Newspapers give us details and help us to see what people believed at the time. Disadvantages [of newspapers] is sometimes they just present rumors. If we just found one of these articles we would be deceived. Looking at two [articles] shows there were different ideas out there about what happened at the time."
Ask for clarification	Ask students to restate, to explain, or to confirm/disconfirm the meaning of an idea	"If I understand you right are you saying it's possible that maybe Britain or um, maybe Britain attacked an American ship and made it look like it was Germany so America would get involved in the war?" "You can learn if its Mexican. What do you mean?"
Ask for elaboration	Ask students to add to, expand on, provide more details about an idea	"Like, what do you, tell me a little bit more about what you're thinking about that ..." "Would anyone like to add to what [Student Name] said?"
Ask for reasoning	Ask students to explain their thinking about or provide a rationale for a proposed idea	"What makes you think that a textbook might give us more information?"
Ask for textual evidence	Ask students to back up an idea with information from a text or to identify where in a text they found information related to a proposed idea	"What from the map makes you think that?" "What evidence do we have that ... what evidence that soldiers were protecting African American students?"

Ask for agreement/ disagreement	Ask students to indicate whether or not they concur with an idea on the floor	"Maybe life flourished because life was perfect for farming. Thumbs up if you agree." "You're saying in this particular event Fox [news] has more bias and CNN gave a more fair interpretation. Agree?"
Ask for summary/conclusion	Ask students to outline the main points addressed in discussion or to weigh in on/settle on a final judgment about what has been discussed	"[reading from the whiteboard] The US was motivated to enter WWI because Franz Ferdinand was assassinated, because Germany sent a telegram to Mexico offering a deal, and because Germany was attacking American ships even though the US hadn't entered the war ... What do you think about this as our claim statement?"

Student discourse moves

Discourse move ^a	Definition	Example
Answer known- answer/closed question	Provide an answer to the teacher's question that had an expected, known, or "correct" answer	Teacher: So what Plessey v Ferguson said was that students could be separated for what reason? Student: For their race? "Maybe [ancient Egyptians] used the river to get gold from it."
Propose idea/claim	Put forth an idea for discussion	"I was talking with my group about how the bottom picture was maybe two houses used for education, but even though there was two houses they wanted to over-exaggerate and just show one."

Repeat/rephrase own or other's idea

Restate own or another student's idea using the same language or different phrasing

Student 1: Like yesterday I was thinking, like you know how those like shows how they, you think there's a random guy but then it's actually like your friend or something. I was thinking you know how the mayor left before the bomb happened? What if the mayor was the one that did it?

Student 2: I was thinking since it said like they made their own bombs they might get a headache, and they should have thought of like seeing the mayor, the mayor, if the mayor like ... had a headache and that's why he left, maybe, they, it was, said that he's the one that threw the bomb.

Elaborate own or other's idea

Add to, expand on, provide more details about own or another student's idea

Student 1: [art] helps [ancient Mesopotamians] design the stuff they had, like shadufs.

Student 2: I think art is important because they used art to build their home, farms, fences around it or something.

Student 3: I think art's important because without art they wouldn't have made the shaduf and would have a whole bunch of water. They had to plan it out and draw it out.

Explain reasoning

Provide rationale for a proposed idea or claim

"It's all green by the Nile River [on this map] so that's probably where the floods came by."

"Because people probably choose to live [near the river] because they use the river for water and to travel."

Use textual evidence	Refer to a text or part of a text to support a claim	"I think ordinary people in ancient Egypt were joyful because it says 'every jaw laughs and every tooth is uncovered ... rejoice, he arises.'" "But right here it says 'nor were the speeches anarchistic.'"
Explicitly agree	Overtly concur with an idea	"I agree because ... " "I also agree with [Student Name] that [the river helped to] provide jobs."
Explicitly disagree	Overtly oppose, challenge, or take issue with an idea	"I disagree. What if their house is built next to the river? The river is in back of the house and rises up and crashes it down?"
Ask authentic question	Ask a question about the text/content/historical context unprompted by the teacher to do so; put forward a genuine inquiry	"Were the laws written in English or did the Mesopotamian people have a different language?" "If the definition for 'hymn' is to praise Christ and this document was made in 2100 BC, Christ wasn't born yet. So how would ancient Egyptians know about praising Jesus?"

^a Discourse move codes and definitions adapted from plethora of empirical and theoretical literature about classroom discussion that is dialogic and that centers on idea improvement, as well as literature about instruction aimed at supporting students' disciplinary practices across grade levels and content areas, especially in the domain of history (e.g. Applebee, Langer, Nystrand, & Gamoran, 2003; Ashby et al., 2005; Bain, 2005; Baker, 2008; Bielaczyc, Kapur, & Collins, 2013; Boyd, 2012; Boyd & Markarian, 2011; Cazden, 2001; Chin, 2007; Christoph & Nystrand, 2001; Engle & Conant, 2002; Greenleaf & Freedman, 1993; Herrenkohl & Cornelius, 2013; Hynd et al., 2004; Lee, 2005; Lemke, 1990; Mercer, 2002; Monte-Sano, 2008; Mortimer & Scott, 2003; Nystrand, 1997; O'Connor & Michaels, 1993; O'Connor & Michaels, 2007; Reisman, 2011; Scardamalia & Bereiter, 2006; Seixas, 1993; Scott, Mortimer, & Aguiar, 2006; Sharpe, 2008; Wells & Arauz, 2006; Wineburg, 1991, 2001).

VITA

JACQUELYNN S. POPP

AREAS OF SPECIALALIZATION AND INTEREST

- K-12 literacy, disciplinary literacy, curriculum development, teacher professional growth, teacher reflection, professional learning communities, whole school sustainable change, qualitative research methodology

EDUCATIONAL BACKGROUND

University of Illinois at Chicago

Chicago, Illinois, expected graduation December 2016

- Ph.D., Learning Sciences
- Dissertation topic: Teacher problem solving in the context of collaborative reflection
- Dissertation Committee: Susan R. Goldman (chair), Taffy E. Raphael, Cynthia Shanahan, Joshua Radinsky, Donald Wink

University of St. Thomas

St. Paul, Minnesota, May 1997

- B.A., Psychology and Education double major; German minor
- Graduated summa cum laude
- Studied abroad at University of Trier, Germany, Spring 1995

RESEARCH EXPERIENCE

Research Assistant, Project READI

University of Illinois at Chicago (Chicago, Illinois), 2010-2016

- Supported 6th-12th grade Social Studies/History teachers in the iterative design and implementation of curriculum aimed at helping students engage in argumentation with multiple sources
- Co-designed and facilitated professional development to support history teachers' learning about argumentation and disciplinary literacy
- Collaborated with colleagues in collecting, cataloguing, and analyzing data from and reporting findings about student and teacher learning and the curriculum design process in science, history, and literature
- Collaborated with educators and researchers in the development of teacher-friendly educative curricular materials for online public access. Materials aimed at supporting middle school and high school students' historical inquiry and helping teachers deepen their understanding of standards-based history instruction
- Principal investigator: Susan R. Goldman

Research Assistant, Partnership READ

University of Illinois at Chicago, (Chicago, Illinois), 2009-2010

- Supported literacy coordinators, teachers, and principals in Chicago Public Schools in implementing and sustaining the Standards-Based Change Process, a whole-school, systematic approach for evidence-based student learning
- Engaged in ongoing data collection and analysis of and reporting about teacher collaborative meetings
- Principal investigator: Taffy E. Raphael

TEACHING EXPERIENCE

Instructor, Northeastern Illinois University

Chicago, Illinois

Fall 2015 and Spring 2016, Instructor

- LTCY 511: Research Seminar in Literacy Education: Planned and taught graduate level course for students in Literacy Education program. Coursework focused on understanding, conducting, and evaluating educational research methodologies to increase knowledge base and inform practice.
- Designed and implemented course objectives, tasks, and assessments in alignment with evidence-based accreditation standards (CAEP, ILA) and contributed to writing the university's Specialized Professional Associations (SPA) report.

Instructor, University of Illinois at Chicago

Chicago, Illinois

Fall 2014, Guest Instructor; Fall 2013, Teacher Assistant

- CI535: Studies in Literacy Research and Teacher Inquiry. Assisted instructor in planning and teaching graduate level course for students in the Literacy, Language and Culture program. Coursework focused on helping teachers gain deeper understandings of literacy research topics and methodologies and develop skills in designing and conducting literacy research.

Summer 2010, Instructor; Spring 2010, Teacher Assistant

- CI503: Foundations of Literacy Instruction, K-8. Planned and taught graduate level course for students in the Literacy, Language and Culture program. Coursework covered research-based theoretical models for instructional practices and assessment tools in comprehension, writing, fluency, and word knowledge.

Third Grade Teacher, Washburn Elementary School

Bloomington, Minnesota, 1999-2000

Second Grade Teacher, St. Peter's School

North St. Paul, Minnesota, 1997-1999

CONSULTING EXPERIENCE

Consultant, SchoolRise

Chicago, Illinois, 2010-2014

- School Liaison (2011-2014): Designed and provided professional development, facilitated educator collaborative groups, and consulted with school administrators to support PreK-8th grade schools in the school reform process and to build educator knowledge in multiple subject areas, such as literacy, math, disciplinary literacy, and the Common Core State Standards.
- Chicago Public Schools Professional Development Facilitator (2010-2012): worked with district personnel to plan and facilitate professional development aimed at building PreK-8th grade educator knowledge and constructing curriculum and assessments around the Common Core State Standards.

Independent Consultant

Chicago, Illinois, Fall 2011

- Supported educators at Horace Greeley Elementary (Chicago Public School) in building understanding of the Common Core State Standards through planning and facilitating school-wide professional development and helping administrators develop school-wide goals.

OTHER WORK EXPERIENCE

Assistant Office Manager, Colemont Insurance Brokers

Chicago, Illinois, 2001-2009

Immigration Services Coordinator, South-East Asia Center

Chicago, Illinois, 2000- 2001

PUBLICATIONS

Popp, J.S., & Goldman, S.R. (2016). Knowledge building in teacher professional learning communities: Focus of meeting matters. *Teaching and Teacher Education*, 59, 347-359.

Ko, M.L., Goldman, S.R., Radinsky, J., James, K., Hall, A., **Popp, J.S.**, Bolz, M., & George, M. (2016). Looking under the hood: Productive messiness in design for argumentation in science, literature, and history. In V. Svihla & R. Reeve (Eds.) *Untold Story: Design as Scholarship in the Learning Sciences*. (pp. 71-82). New York, NY: Routledge.

Raphael, T.E., Au, K.H., & **Popp, J.S.** (2013). Transformative practices for literacy teaching and learning: A complicated agenda for literacy researchers. In S. Szabo, L. Martin, T. Morrison, L. Haas, and L. Garza-Garcia (Eds.), *Literacy Is Transformative. Association of Literacy Educators and Researchers Yearbook, Volume 35*.

Boyd, F. B., Sullivan, M.P., **Popp, J.S.**, & Hughes, M. (2012). Vocabulary instruction in the disciplines. *Journal of Adolescent and Adult Literacy*, 56, 1, 18-22.

Sullivan, M. P., **Popp, J. S.**, & Raphael, T. E. (2010). Book review of *Interdisciplinary Perspectives on Learning to Read: Culture, Cognition and Pedagogy*, edited by K. Hall, U. Goswami, C. Harrison, S. Ellis and J. Soler. *Literacy*, 45(2), 98.

MANUSCRIPTS IN PROGRESS

Popp, J.S., Bolz, M., Manderino, M., Heppeler, J., & Shanahan, C. R. (in progress). Designing Text-Based Inquiry: Supporting Students' Evidence Based Argumentation in History. *The History Teacher*

RESEARCH CONFERENCE PAPERS/PRESENTATIONS

Popp, J.S. (November, 2016). *Illinois Responds to the edTPA*. Discussant for symposium at the Midwest Educational Research Association Annual Conference (MWERA), Evanston, IL.

Popp, J.S. (2015). *The role of teacher-researcher collaborative reflection in a teacher's change process*. Paper presented at the Literacy Research Association Conference, Carlsbad, CA.

Popp, J.S., & Goldman, S.R. (2015). *Interactivity and knowledge building discourse in teacher team meetings*. Paper presented at the American Educational Research Association Annual Meeting, Chicago, IL.

Popp, J.S., & Hoard, J. (2015). *Teacher-researcher collaborative reflections on supporting middle school students' historical inquiry*. Paper presented as part of symposium: Teacher-researcher partnerships: Advancing research, practice, ownership, and agency in disciplinary literacy teaching and learning, at the American Educational Research Association Annual Meeting, Chicago, IL.

Bolz, M.J., **Popp, J.S.**, Manderino, M., Heppeler, J., & Shanahan, C.R. (2015). *Designing text-based inquiry: Supporting students' evidence-based argumentation in history*. Paper presented at the American Educational Research Association Annual Meeting, Chicago, IL.

Popp, J.S. (2014). *Confronting the challenges of supporting middle school students' disciplinary literacy practices through dialogic discussion in history*. Paper presented at the Literacy Research Association Conference, Marco Island, FL.

Popp, J.S. (2014). *Critical issues around supporting students' disciplinary inquiry practices: Collaborative reflections between a middle school history teacher and researchers*. Paper presented at the Mid-Western Educational Research Association Annual Meeting, Evanston, IL.

Popp, J.S. (2013). *A case study of one teacher's reflections on facilitating classroom discussion*. Roundtable discussion at the Literacy Research Association Conference, Dallas, TX.

Popp, J.S., Groza, G., Hall, A.H., & Raphael, T.E. (2013). *Conflict in collaboration: Challenges as a discourse move in one teacher team's meetings*. Paper presented at the Mid-Western Educational Research Association Annual Meeting, Evanston, IL.

Shanahan, C.R., Britt, A.M., Cribb, G., Goldman, S.R., Hale, G., Heppeler, J., Hoard, J., Lawless, K.A., Manderino, M., **Popp, J.S.**, Puklin, D.V., Radinsky, J.L., & Sosa, T. (2013). *Enriching history instruction for urban youth: Evidence-based argument instruction modules and collaborative design research*. Paper presented at the American Educational Research Association Annual Meeting, San Francisco, CA.

Popp, J. S. & Goldman, S. R. (2012). *Discourse and idea development: Teacher teams' shared understandings of literacy pedagogy topics*. Paper presented at the Literacy Research Association Conference, San Diego, CA.

Popp, J. S. (2012). *Teachers perspectives on the what, why, and how of text selection and use for History and Social Studies lessons*. Poster presented at the American Educational Research Association Annual Meeting, Vancouver, Canada.

Puklin, D.V., Hall, A.H., Bolz, M.J., & **Popp, J.S.** (2012). *Doing history: Impact of texts and tasks on engagement*. Poster presented at the American Educational Research Association Annual Meeting, Vancouver, Canada.

Shanahan, C.R., Britt, A., Cribb, G., Goldman, S.R., Hale, G., Lawless, K.A., Manderino, M., Moe, M., **Popp, J.S.**, Puklin, D.V., Radinsky, J.L., & Sosa, T. S. (2012). *Historical frameworks to guide research and design*. Paper presented at the American Educational Research Association Annual Meeting, Vancouver, Canada.

Hughes, M., Sullivan, M.P., & **Popp, J.S.** (2011). *Disciplinary literacy pedagogy: Instructional literacy and disciplinary practices within and across History, Science, and Literature classrooms*. Paper presented at the Literacy Research Association Conference, Jacksonville, Florida.

Popp, J. S. (2010). *Collaborative teacher talk: The nature of productive meaning-making and decision-making*. Paper presented at the Literacy Research Association Conference, Fort Worth, TX.

George, M. A., **Popp, J. S.**, & Weber, C. M (2010). *Professional development for educational leaders*. Paper presented at the Literacy Research Association Conference, Fort Worth, TX.

PRACTITIONER CONFERENCES/ PROFESSIONAL DEVELOPMENT PRESENTATIONS

Manderino, M. Heppeler, J., **Popp, J.S.**, & Bolz, M. (2014). *Designing text sets to support students' historical inquiry*. Poster presented at the National Council for the Social Studies Conference, Boston, MA.

Hoard, J. & **Popp, J.S.** (2014). *Teacher discussion strategies that support student argumentation in primary and middle school Classrooms*. Professional development presentation at Mariano Azuela Elementary (Chicago Public School). Chicago, IL.

Hoard, J. & **Popp, J.S.** (2014). *Teacher discussion moves that support students' argumentation in Social Studies/History*. Professional development presentation at the Chicago Public Schools Department of Literacy Social Science Summer Institute. Chicago, IL.

Popp, J.S. & Hoard, J. (2013). *Literacy as a tool in History and Social Studies*. Presentation at the Illinois Reading Council Conference, Springfield, IL.

Popp, J. S., Waechter-Versaw, A., & Sullivan, M. P. (2011). *Did my students get it? Collaboration around formative assessments and wise instructional decisions*. Presentation at the Illinois Reading Council Conference, Springfield, IL.

Popp, J.S. (2011). *Increasing teachers' literacy knowledge base in elementary and secondary schools*. Facilitation of session for pre-conference institute: Literacy, Leadership, and Whole School Change: Perspectives, Practices, and Possibilities, with featured speakers Regie Routman, Kathryn H. Au, and Taffy E. Raphael at the International Reading Association Convention, Orlando, FL.

SERVICE WORK AND AFFILIATION WITH PROFESSIONAL ORGANIZATIONS

Illinois Council for History Education

- Board member, 2012-current
- Newsletter correspondent, 2013-2014
- Assist in planning annual local practitioner conference, 2012-2016

Holy Trinity High School Education Committee

- Committee member, 2016

Literacy Research Association

- Conference proposal reviewer, 2011-2015
- Yearbook manuscript reviewer, 2011-2015
- Conference session chair, 2011-2014
- Secretary, Graduate Student Innovative Community Group, 2011-2012

International Society of the Learning Sciences

- Conference proposal reviewer, Conference on Computer Supported Collaborative Learning (CSCL) 2015

Routledge Publishing Company

- Book proposal reviewer, March 2012

Phi Delta Kappa, Evanston Chapter

- Future Educators Association conference proposal reviewer, 2011-2012
- Communications Chair and Co-Editor of newsletter, Evanston local chapter, 2009-2013

International Literacy Association

- Assisted in organizing and facilitating International Reading Association 2010 pre-convention institute: *Literacy, Leadership, and Whole School Change: Perspectives, Practices, and Possibilities*, with featured speakers Regie Routman, Kathryn H. Au, and Taffy E. Raphael.

UIC Learning Sciences Student Association

- Secretary, 2011-2012