

Fostering Agency and Co-Regulation: Teachers Using Formative Assessment to Calibrate Practice in an Age of Accountability

Deborah L. Butler, Leyton Schnellert, and Stephanie Higginson*
University of British Columbia

* Authorship is equal between Butler & Schnellert

Introduction

Albeit from varying perspectives, multiple stakeholders (i.e., policy makers, researchers, administrators, teachers, parents) call for teacher professional development as a means of fostering and/or enacting educational reform (Borko, 2004; Cochran-Smith, 2004; Cochran-Smith & Fries, 2005; Darling-Hammond, 1996, 2000; Little, 2001; Timperley & Phillips, 2003; Zeichner & Noffke, 2001). But tensions often arise between stakeholders with varying roles, stemming at least in part from conflicting assumptions concerning where responsibility for decision-making should be situated, and the role of professional development in effecting change. For example, if professional development is offered with the goal of “training” teachers to implement mandated curricula using prescribed instructional methods in pursuit of performance indicators that they have had little hand in defining, then teachers are likely to feel disenfranchised from change processes. Yet at the same time, policy makers facing public pressure to improve outcomes for students may feel powerless to effect change in a system where responsibility for educational planning is distributed. To escape from the unfortunately all-too-common situation where stakeholders hold conflicting and seemingly irreconcilable perspectives, in our research we examine how professional development might be conceived in a context where teachers, administrators, parents, researchers and policy-makers act as partners in educational reform.

Indeed, emerging models of professional development emphasize the potential of teachers, as professionals, to engage in on-going inquiry into and improvement of practice. This movement is consistent with a shift within the educational research community from conducting research *on* teachers’ actions to research being conducted *with* and *by* teachers (Clarke & Erickson, 2004). Further, building from socio-cultural models suggesting that learning does not occur in isolation (Bruner, 1996; Lave & Wenger, 1991; Vygotsky, 1978), emerging professional development models are often designed to engage teachers jointly in inquiry-based, longitudinal, and critical examinations of practice (Carpenter, Fennema & Franke, 1996; Henry et al., 1999; Loughran, 2002; Luna et al., 2004; Morrell, 2004; Robertson, 2000; Schnellert, Butler, & Higginson, in press). These initiatives typically extend professional development activities into authentic communities of practice within or across schools wherein individuals work together to situate emerging knowledge and beliefs. But, while it is commonly suggested that teachers’ engagement in collaborative inquiry is a promising approach to fostering educational change, additional research is needed to clarify how and when inquiry-focused communities of practice (i.e., “communities of inquiry”) might lead to desired outcomes (as defined from multiple perspectives). The research reported here contributes by examining: (1) how inquiry processes

Summary of a poster presented at the 2007 (April) meetings of the American Educational Research Association. Funding for this project was provided by the Social Sciences and Humanities Research Council of Canada. For more information or related references, contact Deborah L. Butler at deborah.butler@ubc.ca.

are related to teacher professional development and meaningful shifts in practice; (2) when and how communities of inquiry support inquiry processes; and, linking back to our concern about how professional development is situated within a broader socio-political context, (3) when and how engaging teachers (and/or others) as active inquirers might position them to act as *agents* within educational reform efforts.

Thus, in the research reported here, we explored three interrelated questions:

1. How are inquiry processes related to teacher professional development and shifts in practice?
2. When and how do communities of inquiry support inquiry processes?
3. Under what conditions does engaging individuals or groups in inquiry position them to feel and be invested/influential in educational reform?

Context

This study was conducted within an urban, multicultural school district on the west coast of British Columbia (BC), Canada. Political context: In 2001, the BC provincial government instituted an accountability cycle requiring school districts to develop goals, implementation plans, and assessment strategies. They adopted a decentralized model that supported local decision-making at the district level. In previous work, we have traced multi-directional influences that emerged across levels as schools, districts, and government worked to set goals and monitor outcomes in this particular context (see Butler, 2005-b; Schnellert et al., in press). Local context: The school district within which our project was situated also supported decentralized decision-making. Schools were able to set local goals with their School Planning Councils, bodies that include parents and school representation. At the same time, because of communication and collaboration within and across schools, certain key goals were shared across secondary schools in the district. For example, the school district built from secondary schools' common interest in adolescent literacy to set a parallel, district-level goal in its accountability contract with the BC Ministry of Education. In addition, the district within which we were working explicitly values inquiry-based approaches to teacher professional development, and systematically invests in long-term, sustained professional development opportunities in particular areas (e.g., adolescent literacy). Study context: This study included three secondary schools participating in a larger project investigating strategies for fostering adolescent literacy (see Butler, Cartier, Schnellert, Gagnon, Higginson, & Giammarino, 2006; Butler, Schnellert, & Cartier, 2005; Schnellert et al., in press).

Research Design and Methodology

To address our research questions, we conducted an iterative, in-depth, case study of one complex community of inquiry in action. While we were informed by an initial theoretical framework (see Schnellert et al., in press), we analyzed data to revise, elaborate, and test an integrative and generative theoretical perspective. Thus, this poster summary presents a coherent set of evidence-based models for understanding inquiry processes within a community of inquiry. Our interconnected models suggest *the conditions under which positive effects might emerge* (Yin, 2003) for: (a) student learning; (b) teacher professional development; and (c) multiple stakeholders' perceptions of their positive engagement in educational reform.

Participants

The community of inquiry investigated in this study spanned three schools. At each school a teacher was identified as a literacy leader. This teacher coordinated the activities of a within-school team at a particular grade level (typically grade 8). These within-school teams worked collaboratively and in parallel with teams at other schools to collect situated assessment data, co-construct and implement responsive instructional practices, and monitor outcomes. Three literacy leaders and fifteen other teachers from across the three sites participated in the study reported here.

Data Collection

Multiple forms of data were collected to provide converging evidence related to each of our research questions (Merriam, 1998; Miles & Huberman, 1994; Yin, 2003). Data included: (1) semi-structured interviews with participants at the start and end of the year; (2) documents representing assessment data and instructional practices enacted by teachers; (3) field notes from meetings with researchers (focused on collecting, scoring, interpreting, and/or planning based on, situated assessment data; see Schnellert et al., in press), and (4) field notes from collaborations between teachers and a coordinating, district level consultant (at workshops; within schools).

Data Analysis and Representation

Interviews were transcribed and then analyzed in an iterative and recursive process to construct, test, revise, and coordinate codes (Lincoln & Guba, 1985; Merriam, 1998). First, three researchers generated an initial set of codes based on an open reading of interview transcripts to identify potential answers to our research questions. Initial codes were then refined and clustered into conceptual categories by moving back and forth between relationships revealed in the data and emerging theoretical frameworks. Interview data were systematically recoded with the final set of codes to test the theoretical frameworks constructed. Throughout the process, data were represented in a variety of displays to reveal patterns for interpretation and test for conceptual coherence (Miles & Huberman, 1994). For example, the quality of collaborative relationships between teachers was judged as falling into one of five categories, ranging from disconnected or surface level interactions to sustained, deep collaboration through complete inquiry cycles (see Appendix A). Relationship maps were then created within and across schools using *Agna* (Benta, 2003) and *VisuaLyzer* software (Medical Decision Logic, 2007) (see Figure 2). Finally, additional data (field notes, documents) were mined for confirming or disconfirming evidence. In the research report provided here, we represent our findings in the form of theoretical representations, coupled with a description of evidence undergirding the relationships depicted.

How are Inquiry Processes Related to Teacher Professional Development and Shifts in Practice?

As described above, emerging professional development models suggest engaging teachers in inquiry as a means of promoting both shifts in practice and teacher learning/development (Carpenter et al., 1996; Henry et al., 1999; Loughran, 2002; Robertson, 2000; Schnellert et al., in

press). These models reflect how conceptions of the nature of teaching have moved from process-product perspectives that focus on teaching as a technical transmission activity to conceptions of teaching as requiring contextualized decision-making (Ball & Cohen, 1999; Borko & Putnam, 1998; Butler, Novak Lauscher, Jarvis-Selinger, & Beckingham, 2004; Eisner, 2002; Palincsar, 1999; Schon 1987). In parallel, conceptions of how to promote teacher development have moved from single workshops designed to enhance particular skills to creating opportunities for on-going, sustained, reflection-on-action as a means for spurring teacher learning (Hobson, 2001; Little, 2001; McLaughlin & Talbert, 2006). Our study adds to a body of research focused on teachers' inquiry cycles in an effort to better understand the situated nature of practice and knowledge construction (Cochran-Smith & Lytle, 1993, 1999; Dillon, O'Brien, & Heilman, 2000).

In particular, our first research question led us to examine closely what it means to engage in "inquiry" within a learning community, and how cycles of inquiry might relate to shifts in practice and teacher learning/development. To that end, we present a multi-layered representation of teachers' reflective, contextualized inquiry cycles (see Figure 1) that emerged from our juxtaposition of various theoretical accounts with an iterative analysis of teachers' activities as they were attempting to make changes in practice and then monitor and account for outcomes associated with their efforts (Schnellert et al., in press).

What is "Inquiry"?

Our initial theoretical framework was influenced by multiple conceptions of inquiry offered within the educational literature. For example, a hermeneutical definition would suggest that inquiry is a cycle where a question is posed, possibilities are considered, action(s) is (are) taken and reflected upon, new questions arise and an individual engages in a new loop through the cycle (Reason, 1996). A common theme within discussions of teacher inquiry, teacher research, action research, and teacher self-study is what Cochran Smith and Lytle (1990) describe as "systematic, intentional studies by teachers of their own classroom practice" (p. 2). Lewison (2003) describes an inquiry cycle in which "teachers question common practice, approach problems from new perspectives, consider research and evidence to propose new solutions, implement these solutions, and evaluate the results, starting the cycle anew" (p. 100). In their research, Joyce and Showers (2002) describe iterative cycles wherein teachers learn as they experiment and reflect on new teaching strategies and approaches. Common across these descriptions of "inquiry," drawn from various literatures related to teacher professional development, are descriptions of teachers' engaging in problem-defining, action-oriented, reflective, and iterative cycles. The model we propose for teacher inquiry is consistent with these definitions.

At the same time, we also build from definitions of inquiry put forward within literature focused on student learning. For example, calls for incorporating "authentic" inquiry into science curricula have been issued for well over 30 years (Butler, Pollock, Nomme, & Nakonechny, in press; DeBoer, 1991). While these descriptions characterize a particular process associated with formalized, scientific research (as accepted within the scientific community), the elements of inquiry cycles described in this context are also dynamic and recursive, echoing those that might be pursued more or less formally by teachers in educational settings. These include defining a

problem and framing questions, designing and implementing an approach for studying the problem, collecting, analyzing, representing, and interpreting indicators of outcomes, creating rich explanations or accounts for findings, revising knowledge about problems or methods given new understandings, and sharing new insights with a larger community (Chinn & Malhotra, 2002; Dunbar, 2000; White & Frederiksen, 1998). Similarly, models of self-regulated learning describe a recursive cycle of active, strategic activities engaged by students that include defining problems and/or expectations, setting goals, selecting, adapting, or inventing learning strategies, self-monitoring outcomes, and revising goals or approaches to learning to better achieve desired outcomes (Butler, 1998; Butler & Cartier, 2004; Butler & Winne, 1995; Winne & Hadwin, 1998; Zimmerman & Schunk, 2001). Collectively, these accounts of students' active learning processes also describe engagement in self-directed, reflective, and recursive inquiry cycles designed to address self-defined and/or at least well defined goals. Indeed, noting the parallel between descriptions across student learning and teacher professional development literatures, Butler and her colleagues have drawn on theories of "self-regulation" to characterize the interplay between individual and collaborative inquiry processes in teacher professional development (Butler, 2005-a; Butler et al., 2004).

Research Findings

Consistent with prior theory and research, our analysis of teacher inquiry in this study suggests that inquiry cycles are dynamic and recursive (see Figure 1). But we also extend prior research and theory by showing how recursive and dynamic inquiry processes might be enacted within and across multiple layers (Butler, 2005-a). For example, pivotal within the inquiry model depicted here is teachers' engagement in practice-level inquiry cycles (Schnellert et al., in press). At this inquiry level, teachers identify goals for practice (e.g., to help students draw inferences while "reading to learn"), plan approaches to achieve goals (e.g., access and draw from resources, plan a lesson), define and collect indicators of progress (e.g., informal or formal, formative or summative assessments), monitor progress by comparing outcomes to desired goals, and reflect on the meaning of findings for future practice (e.g., whether a given approach was working for students). Note that teachers can enact practice-level inquiry cycles across different time frames. For example, teachers might set start-of-the-year goals, plan for instruction across chunks of time, enact a sequence of lessons, and monitor outcomes at the end of the year. But ideally teachers adopt an inquiry stance in their approaches to teaching, engaging in inquiry cycles within and across instructional activities. Indeed, as is depicted in Figure 1 (see also Winne & Hadwin, 1998), any given inquiry phase (e.g., planning) can also be approached as an inquiry cycle-within-a-cycle (e.g., setting a goal to plan, planning to plan, trying some planning strategies, assessing if they are working, adjusting planning strategies).

As we observed in our prior research (Schnellert et al., in press), our findings here were that, while all teachers were engaged in practice-level inquiry to some extent (at least in setting goals and trying new instructional strategies), teachers varied in the extent to which they engaged fully and reflectively in practice-level inquiry cycles (including planning, reflective monitoring, and adjusting). Further, we found that all of our participating teachers reflected on how an inquiry cycle played out across one academic year. This level of inquiry was supported in good measure by structures in place within our project that encouraged monitoring outcomes across the year (i.e., Fall formative and Spring summative assessments reviewed systematically by

grade level teams). However, teachers varied in terms of how much they adopted an inquiry stance within and across lessons. For example, while some teachers adopted an integrative and long-term approach to planning, other teachers tackled shorter term goals without reflecting on connections across lessons. Further, while some teachers adopted an inquiry stance that undergirded almost all of their activities (within planning, within classes as they were interacting with students, across classes), others were less systematic, targeted, and/or explicit in their attempts to monitor and modify their approaches to teaching.

A parallel layer of inquiry no doubt emerged in this study because of the nature of the larger project within which teachers were working. Specifically, teachers' goals within our larger project were to develop instructional strategies that would support adolescents' active and constructive "learning through reading" (Butler et al., 2006; Cartier & Butler, 2004). Teachers and researchers were working collaboratively to develop situated assessments that would describe students' perceptions about, engagement in, and performance during self-regulated learning through reading (Butler et al., 2005; Schnellert et al., in press). Then, teachers collectively interpreted data and drew on other resources to identify challenges, set goals, plan and enact new strategies, and monitor and reflect on outcomes over time (i.e., engaged in data-supported, practice-level inquiry cycles). Thus, because of our project's focus, we are also able to identify qualities of student-level inquiry cycles. As depicted in the inner ring of Figure 1, at this level of inquiry, students identify problems and/or goals for learning, plan approaches to achieve goals, define and collect indicators of progress, self-monitor by comparing outcomes to desired goals, and adapt goals or activities as needed. In other contexts we have described what we are learning about student-level inquiry through the multiple forms of data collected in this project, including situated formative and summative assessments (see Butler et al., 2006). In this study-within-a-study, we restricted attention to analyzing how teachers explicitly defined goals, targeted instruction, and monitored outcomes in order to foster student-level learning. We also attended to instances where teachers created and/or offered opportunities for students to engage in their own individual or collaborative inquiry learning cycles.

Our findings were that, when teachers had in-hand formative assessment data (that they had collected and interpreted) suggestive of problems in students' reflective, self-regulated learning, they did set goals focused on fostering student learning (this was true for all participants) and student-level inquiry (this was true for several participants). Further, instructional changes teachers enacted were well targeted to grade-level and/or their personal goals for students. But, consistent with our prior research (see Schnellert et al., in press), we found that, while all teachers made at least some gains in terms of fostering self-regulated learning by students, only some teachers ultimately adopted systematic and sustained instructional approaches targeted at the full student-level inquiry cycle. Significantly, we observed that some of these teachers even drew students into practice-level inquiry cycles, for example by sharing assessment results with students to collaboratively set class goals based on those data.

Finally, within a community of inquiry, teachers can focus attention, not only on improving practice, but also on enhancing their own learning and development. Thus, we include in our model a third layer: teacher learning/development-level inquiry cycles (see Figure 1). At this inquiry level, teachers identify goals for their own learning or development (e.g., to learn more about how to promote adolescent literacy; to integrate planning and assessment practices), plan

approaches to achieve their own learning or development goals (e.g., working with colleagues to construct and test new ideas), define and collect indicators of progress (e.g., a sense of having developed new understandings; to have adopted a new approach to planning), and monitor success by comparing outcomes to desired goals. Teachers collaboratively inquiring with teacher learning and development goals in mind are characterized by Cochran-Smith and Lytle's (2004) description of teachers who "treat the knowledge and theory produced by others as generative material for interrogation and interpretation" (p. 614).

Our findings were, first, that most teachers defined their professional development goals in relation to student learning (i.e., "my goal is to help my students get better at making connections"), and gained insights into effective practices by reflecting on outcomes within practice-level inquiry cycles. When judging success at the end of the year, these teachers tended to highlight how newly implemented instructional practices were useful in achieving desired outcomes for students. In contrast, only a subset of teachers also explicitly set goals to further their own development as teachers. These teachers set intentional professional learning goals for themselves that ran in parallel to but also intersected with their instructional goals for students. These teachers articulated their own learning/development goals across the school year and sought out professional resources and supports as they revised their approaches to planning, assessment and/or instruction. Later, when reflecting on outcomes associated with their interdependent engagements in practice-level and teacher learning/development level-inquiry, these teachers articulated shifts in their thinking about teaching and learning and/or about themselves as learners. For example, several teachers described themselves as challenging their previous assumptions about the relationship between teaching content and fostering learning processes in secondary classrooms. Note that, in the context in which we were working, teacher learning or development goals were not defined or prescribed by any external agent. Instead, teachers who engaged fully in this inquiry level sought opportunities to extend their professional expertise and were highly self-directed.

Implications

Our work extends prior research by showing how teachers involved in one community of practice engaged in reflective inquiry to make meaningful shifts in practice. The model we developed by juxtaposing data analyses with prior theory depicts intersections between practice-level, student-level, and teacher learning/development-level inquiry. The evidence we collected here suggests that: (1) engagement in practice-level inquiry has the potential to foster reflective (data-driven) revisions to practice, (2) teachers' engagement in practice-level inquiry can be associated with defining instructional approaches that foster student-level inquiry; and teachers can even draw students into practice-level inquiry cycles so as to deepen students' sense of responsibility for their own learning (e.g., by working with a class to define class learning goals based on assessment data); and (3) teachers' *reflections on* practice-level inquiry (Schon, 1983) may feed into teacher learning/development inquiry cycles. But it is critical to note that not all of our participants engaged with equal frequency or depth in inquiry cycles, and not all teachers made leaps across inquiry layers in synergistic ways that might simultaneously spur student and teacher learning. Thus, in our research, we have also tried to account for why these differences across teachers have emerged.

When and How do Communities of Inquiry Support Inquiry Processes?

Recent research suggests that teacher professional development can be enhanced if teachers collaborate within a community of inquiry (Guskey, 2000; McLaughlin & Talbert, 2006; Morrell, 2004; Robertson, 2000; Schnellert et al., in press). As Van Horn (2006) argues, “teachers who are members of professional networks or learning communities may find themselves more apt to venture into the unknown, to engage in long-term inquiry, and/or to share what they are learning with others than those who are unsupported by their colleagues” (p. 61). Cochran-Smith and Lytle (1999) suggest that the social structure of a group adopting an inquiry stance helps teachers persevere in the exploration and application of new ideas. Hammerness, Darling-Hammond, Grossman, Rust, and Shulman (2005) assert that “an especially important aspect of adaptive expertise involves the ability to learn from others...having the skills and will to work with others in evaluating their own performance and searching for new answers when needed” (p. 365). Across discussions, common arguments for community-situated professional development are that, when teachers have opportunities to collaboratively problem solve, they have access to rich resources and are more likely to take risks, to sustain attempts to make change, and to develop, adapt and/or apply approaches designed to support students in their classrooms.

Further, a focus on establishing inquiry communities is consistent with calls for long-term, sustained approaches to fostering educational change. For example, literature on professional development and the change process in general suggests that “professional development should not be conceptualized as an event, but rather an ongoing process” (Voltz, Brazil, & Scott, 2004, p. 11) and that “successful professional development must be sustained over time and directly related to everyday teaching” (Kent, 2004, p. 428). Calls are to transform professional development “from single, fragmented efforts to long-range comprehensive plans... [and] from outside of school training by experts to school-based embedded learning in classrooms” (Kent, 2004, p. 428). As Hammerness et al. (2005) suggest, “lifelong learning along the innovation dimension typically involves moving beyond existing routines and often requires people to rethink key ideas, practices, and even values in order to change what they are doing” (p. 361).

But, while many researchers are associating collaborative inquiry with positive and significant changes in classroom practice and student achievement, published literature, with a few notable exceptions, tends to fall in two categories: (1) rich, individual accounts of inquiry and learning; and (2) descriptions of generic models for use with professional learning communities. As a result, questions have been raised about the extent to which professional communities actually have an impact on teaching and learning in the classroom (Little, 2003). Further, while investigations into teacher research have made significant inroads in terms of building understandings about the nature of teaching and teachers’ knowing (e.g., Clandinin & Connelly, 2000; Lortie, 1975; Loughran & Northfield, 1998), participants in studies are often a select group of teachers who elect to take part or who wish to study themselves (often as part of graduate work). Thus, more research is needed that examines how intact communities of inquiry do or do not function to promote teacher professional development and educational change.

Our research contributes to filling this gap by studying the participation of teacher teams involved in a community of inquiry who, while having chosen to participate, were not

necessarily equally invested in making change and/or “like-minded” in terms of their dispositions towards teaching or professional development. Thus, in this research, we had the opportunity to construct a complex picture of the collaborative inquiry that emerged within a community of practice. Our data analyses allowed us to address complementary questions:

1. What kinds of relationships develop within an inquiry community?
2. When and how do teachers collaboratively regulate practice and professional development within inquiry cycles?, and
3. When and why do close collaborative relationships develop?

What Kinds of Relationships Develop Within an Inquiry Community?

Research has shown that communities of inquiry have the potential to foster sustained and meaningful shifts in practice, at least among teachers equally invested in making change (Campbell, McNamara & Gilroy, 2004; Hinchman & Lalik, 2000; McLaughlin & Talbert, 2006). However, Achinstein (2002) complains that research on community inquiry has often underplayed the role of diversity, dissent and disagreement. Similarly, Little (2003) calls for “systematic attention to participation patterns ... [in order to] show how opportunities to learn and participate are also collectively shaped, co-constructed, and distributed” (p. 939). Thus, in this research, we wanted to characterize in a richly descriptive way the kinds of collaborative relationships that developed over time between teachers in our community of inquiry, and to see if we could associate the depth and quality of collaboration with the extent to which teachers worked together to engage in and sustain inquiry into practice.

In our analysis, we had to take into account that certain kinds of collaborative relationships among our participants were established and enabled as part of the project structure. For example, the district and schools within our project had decided to establish literacy goals, with a focus primarily on grade 8 students. This collaboratively constructed target served to shape the construction of school-level teams (i.e., more and less enthusiastic grade 8 teachers were drawn into the project). Further, certain common resources were available across schools to support teachers in pursuing this goal. These included district-level workshops that could be attended by a delegation from each school, access to a district level consultant who was available to work collaboratively with teachers, release time for a staff member to serve as a literacy leader in each school, and release time for teams to meet four times during the school year. These structural supports provided teachers with opportunities to share ideas, to engage in grade-team planning, and to be in the same space with other school teams from across the district. Another common structure derived from our collaborative efforts to develop literacy assessments that would paint a complete picture of students’ perceptions about and engagement in “reading to learn.” As part of the project, all team members had opportunities to participate in meetings where data reports were interpreted and discussed, and where grade level goals were established (in the Fall) and/or progress reviewed (in the Spring).

At the same time, it was consistently clear to teachers that they had the freedom (and responsibility) to drive instructional decision-making within their classrooms and schools. For example, the data we collected were “situated” in teachers’ classrooms (e.g., grounded in the curriculum and level for students) and were reported back at the classroom, grade, and school

levels (depending on requests from school-level teams). Teachers were assisted to identify unique patterns in the data as relevant to particular classes. Further, while they participated in setting grade level goals reflecting challenges observed for students across classes, teachers were also encouraged to target foci most relevant to and/or most problematic for their students (i.e., problem defining/goal setting). Finally, while resources were available to help teachers in planning and making instructional decisions (e.g., co-teaching with the district consultant; workshops; reading materials; examples, modeling, discussions with colleagues), teachers were encouraged to select, adapt, or invent approaches to practice based on the goals they were trying to achieve (see Butler, 1998, 2003 for a parallel description of an instructional model designed to promote student learning). While most teachers did collaborate with others to reshape instruction to some extent (see below), they were, for the most part, working independently in their classrooms to tailor and enact approaches and reflect-in-action (Schon, 1987).

Keeping these structural parameters in mind, we drew from our coding of interviews, coupled with evidence from field notes and documents, to create visual displays of forms of collaboration between the 18 teachers involved in our project (including the three literacy leaders), the district consultant who provided support (the second author here), a university researcher (the first author here) and other teachers who did not take part in our project but who were involved in practice-level inquiry with participants. We then constructed criteria for categorizing the quality of collaboration revealed in each display based on the degree to which pairs collaboratively engaged in inquiry cycles, from 0 (no collaboration) to 5 (sustained, joint inquiry at the practice and teacher development/learning levels) (see Appendix A). Note that, because the majority of teachers participated in setting grade-level goals as a team, some degree of collaborative goal setting was evident for most (but not all) pairs. That said, clear differences emerged in terms of the extent to which shared goals were pursued in tandem by teacher pairs when and if they worked together, and in the extent to which teachers engaged in joint inquiry at both the practice and teacher learning/development levels.

As a last step in this analysis, we used software tools designed to support analysis of social networks, *Agna* (Benta, 2003) and *VisuaLyze* (Medical Decision Logic, 2005), to create visual representations of the strength and depth of relationships between teachers within and across schools (see Figure 2). In this figure, colours are used to cluster teachers working within the same school. Line width is used to represent progressively deeper/more sustained relationships. Individuals represented with triangles were interviewed as part of the project. Line direction (see arrows) is used to indicate who described a collaborative relationship with whom based on the interview data (e.g., a line from NW to LW represents NW's description of her collaboration with LW).

A number of notable patterns are evidenced in the collaboration map depicted in Figure 2. First, our findings suggest that the community of inquiry we were studying was complex and dynamic, with different kinds of relationships forming within and across schools. Second, it is notable that many relationships emerged through membership on grade-level inquiry teams as part of this project. Some of these remained relatively superficial, particularly when teachers had not worked together previously, were new, and/or did not know each other well (e.g., that between DM and NW; ST and AG). But on some occasions rich, collaborative partnerships developed within school-teams (e.g., that between MB and ST), especially when teachers had

opportunities to develop relationships over time. Third, we observed that some of the strongest relationships (e.g., between MD, CM, and KE; between the district consultant and literacy leaders) spanned school boundaries and were grounded in long-standing relationships. In some cases (e.g., CM), these well-developed partnerships superseded and overshadowed support perceived to be available within school teams. These patterns underline the importance of understanding when and how collaborative relationships are established within a community of inquiry, and how and when those relationships generate the positive benefits that have been associated with participation in an inquiry community.

When and How do Teachers Collaboratively Regulate Practice and Professional Development within Inquiry Cycles?

As have other researchers (e.g., Lave & Wenger, 1991), Clarke and Erickson (2004) emphasize that “the notion that learning as described in terms of an individual constructing personal meaning in relation to their interactions and experiences with phenomena has been challenged by a description of learning as a social phenomena resulting from the multifaceted interactions between an individual and a complex set of social and cultural forces” (p. 45). We are in accord with this position, but suggest that a challenge facing educational researchers who emphasize the social-embeddedness of meaning and practice is to characterize the interplay between individual and social processes without underestimating the contribution of either (Butler et al., 2004). In terms of teacher professional development, the emergence of communities of practice (and inquiry) as both a theoretical model and practical approach to studying and fostering teacher learning has offered one framework for characterizing the interplay between social and interactional factors in practice-based learning.

In our work, we also draw on a socio-constructivist model of self-regulated learning, which, in spite of the seemingly incompatible label (i.e., a focus on the “self”), actually provides a useful framework for capturing individuals’ adaptive and situated performance within social practice (Butler et al., 2004; Butler, 2005-a; Zimmerman & Schunk, 2001). For example, in our work on students’ engagement in literacy, we seek to characterize how the quality of students’ engagement in learning derives from interactions between what students bring to contexts (conceptions, perceptions, prior knowledge) and multiple, socially-, culturally- and historically-situated layers of context (see Butler & Cartier, 2004; Cartier & Butler, 2004). Similarly, we suggest it is useful to consider the collaboration established between teachers in a community of inquiry as a form of “co-regulation” of practice and/or learning within and across environments. Indeed, to construct our collaboration map (Figure 2), we started by developing pictorial representations of how pairs of teachers shaped each others’ participation in inquiry cycles at the practice- and/or teacher learning/development level. In Figure 3 we present three examples representing low, medium, and high levels of co-regulation, respectively. These examples graphically illustrate how collaboration can be characterized in terms of how much teachers support one another to engage in and reflect on inquiry cycles.

Our findings suggest that the strongest and most sustained relationships could be characterized as rich collaborative engagements in interconnected inquiry cycles. For example, in MD and CM’s collaboration (see Figure 3), a cross-school team of teachers (also including KE, JA, and EG) co-regulated each other’s engagement in practice-level inquiry by sharing

resources and insights derived from their unique experiences and expertise. They worked together to set goals, plan lessons, teach in parallel (i.e., enacting the same lessons at different schools), debrief and reflect on outcomes, and they regularly co-constructed new understandings about teaching by stepping out of practice-level cycles to reflect on what they were learning. Thus, this team of teachers constructed rich collaborative relationships that directly shaped practice in classrooms, and their co-reflections on practice spurred teacher learning and development. At the same time, these teachers' connections with the inquiry community were overlapping and complex. For example, the engagement of each of these teachers in practice-level inquiry was also shaped and constrained by the unique classroom and school contexts within which they were working. Each was also involved to some degree in co-regulating inquiry with the district consultant and/or with other teachers (see Figure 2).

When and Why Do Close Collaborative Relationships Develop?

The findings presented above suggest that the quality of relationships established within a community of inquiry can be highly variable. Consistent with Little's (2003) observation that "communities of practice develop their own language and normative practices" and "can become insular" (p. 939), we observed that not all teachers in our inquiry community had equal opportunity to access resources (e.g., to attend district level workshops) or to collaborate with others. Thus, in a final set of analyses focused on relationships within our community of inquiry, we considered when and why deeper collaborative relationships seemed to develop.

First, it appeared to us that the district within which we were working established structures that allowed for relationships to form in different configurations within and across school boundaries. Examples of district-level supportive structures included: (1) sustained attention by the district to topics over time (e.g., adolescent literacy), (2) collaborative setting and coordination of district level and school level goals so that teachers across boundaries were working towards similar objectives, and (3) provision of incentives and resources that created opportunities for collaboration, such as funding for literacy leaders, provision of district level workshops, release time during which teachers could meet as within-school teams, and funding for a district consultant who both coordinated the literacy project and was available to collaborate with teachers. The district's endorsement and support for distributed decision-making and collaborative models of professional development also encouraged teachers to work within and across teams in flexible ways to co-regulate their engagement in inquiry.

That said, not all teachers availed themselves of opportunities to collaborate, and some felt limited in their access to resources or collaborative partners. For example, DM felt excluded from opportunities to access district level workshops when a limited number of teachers from each school could attend. NW felt constrained in developing relationships among colleagues who resisted embedding literacy instruction within content area courses. Teachers who developed the richest relationships explained that they were able to identify partners within or across schools with compatible or complementary interests, working styles, philosophies, and/or backgrounds, were able to work with colleagues with a commitment to working towards shared goals, and had access to multiple resources that supported their joint engagement in inquiry cycles (for example, workshops they could attend in teams, school-based support by the district consultant, assistance from the research team in interpreting assessment data, coordination of

team activities by a literacy leader, and administrative support for collaboration).

Implications

Our research suggests why it is not possible to directly relate membership in a community of inquiry with educational change (Little, 2003). First, it is clear that development of collaborative relationships is not a given within an inquiry community, and it is possible that the depth of relationships is related to the quality of instructional change made. While our research suggests some factors that might be associated with relationship development (i.e., structural supports at the district level; opportunities to work with “like minded” colleagues), more research is needed on how to nurture relationships among community members. Second, understanding how communities of inquiry impact on practice also requires tracing how collaboration influences teachers’ engagement in inquiry cycles. As we push this research forward, given the data we have available, we will be able to consider when and how different forms of co-regulation are related both to shifts in practice and teacher learning. For now, we suggest that the theoretical framework we are constructing through our longitudinal research program (focused simultaneously on teacher and student inquiry) has potential to open the “black box” in research on teacher professional development (Little, 2003, p. 949) by identifying individual and social mediators between participation in a community of inquiry, teacher professional development, and sustained revisions to practice.

Under What Conditions Does Engaging Individuals or Groups in Inquiry Position Them to Feel and Be Invested/Influential in Educational Reform?

This study is timely given broader policy considerations: Researchers’ calls for the re/conceptualizations of professional development (Borko, 2004; Darling-Hammond, 1996, 2000) have coincided with the rise of accountability agendas (Earl, 1999; Fullan, 2000) and “top-down” reform efforts (Cochran-Smith & Fries, 2005; Darling-Hammond, 2004; Winter, 2000). A final contribution of the research reported here is an examination of how agency, inquiry and accountability are interrelated (see also Schnellert et al., in press). Thus, our research contributes not only by articulating how teachers’ engagement in critical, collaborative cycles of inquiry can be associated with shifts in practice and teacher learning, but also by investigating threats to teachers’ agency that might arise depending on how accountability agendas are defined and enacted. We examine conditions that enable or constrain individuals or groups to exercise agency in educational change, and offer a model describing how professional development and reform efforts can be structured so that teachers feel that they can make a difference, both through their classroom teaching and by influencing professional and political directions at the school, community, district and Ministry levels.

As noted at the outset of this paper, multiple stakeholders are invested in educational reform, and our focus is on conditions that enable teachers to work as partners in a multi-layered collaborative endeavors. We are fortunate that our work is situated within a context where efforts are being made to distribute decision-making across government, district, community, school, and classroom levels. Nonetheless, in dynamic contexts like schools, roles and relationships are continually renegotiated (as individuals move between and across positions at different levels; as social and political climates change). Further, as an international press towards accountability

increases, the temptation to impose top-down agendas becomes correspondingly intense. For example, it is increasingly prevalent to ask schools and districts to develop improvement plans that integrate and/or are based on large-scale assessment data (Barnett, 2004; Borko, 2004; Guskey, 2002; Robertson, Hill & Earl, 2004). And, as is well-described by Cochran-Smith and Lytle (1999):

As pressures for school- and classroom-accountability intensify, research-based whole school improvement models become increasingly wide-spread, the concept of best practice guides discussions about student achievement and teacher education, and the authoritative role of outsiders in school improvement becomes the rule rather than the exception. Part of what these developments have in common is that is a set of underlying assumptions...that de-emphasizes differences in local contexts, de-emphasizes the construction of local knowledge in and by school communities and de-emphasizes the role of the teacher as decision maker and change agent (p. 22).

In our theoretical perspective, we recognize that educational reform can be positively influenced by educational leaders and should be informed by research. At the same time, we consider how education-in-practice is highly situated and relies on professional, contextualized decision-making by teachers accessing and adapting resources in the design of instruction and in their interactions with students. Thus, we focus attention on what is required for multiple stakeholders, including teachers, to perceive themselves as having an influence (i.e., a sense of “agency”) in educational change.

What is “Agency”?

An emphasis on the importance of agency is apparent in multiple, not-often-connected strands of the educational literature. For example, Bandura (1989) draws on social cognitive theory to suggest that agency is “the capacity to exercise control over one’s own thought processes, motivation, and action” (p. 1175). Similarly, he defines individuals’ perceptions of self-efficacy, which derive from individual-environment interactions, as “people’s beliefs about their capabilities to exercise control over events that effect their own lives” (p. 1175). In the model of self-regulated learning on which we draw (see Butler, 1998; Butler & Cartier, 2004; Butler & Winne, 1995; Cartier & Butler, 2004), we follow Bandura (1989,1993) to suggest that perceptions of self-efficacy shape engagement in inquiry (e.g., whether or not an individual invests effort in a difficult task). We also suggest that self-efficacy perceptions are modified when individuals reflect on the impact of actions on outcomes in relation to valued goals (i.e., when monitoring). Indeed, research has shown that, if students are encouraged to reflect on progress after having successfully engaged in an inquiry cycle (e.g., successful self-regulated learning), they are more likely to feel in control over learning outcomes (e.g., Butler, 1998).

Thus, in our model we capture how a sense of agency for an individual or group can be fostered through monitoring positive outcomes that emerge when action is taken to achieve valued goals (see Figure 4). However, at least three additional issues must be considered to understand how agency plays a role in teacher professional development and educational change. The first of these concerns how the knowledge teachers generate through inquiry is considered

and/or respected in the wider educational community (i.e., among teachers, parents, policy makers, educational researchers, students). Kincheloe (2004) and Ball and Cohen (1999) argue that for teachers to feel empowered in classrooms requires respecting the knowledge they have constructed about education through their experience in classrooms. Unfortunately, teachers may feel devalued as contributors to knowledge production, being treated by researchers more as a source of data about classrooms than a source of expertise (Luna et al., 2004). Similarly, Kincheloe (2004) argues against embedding “expert knowledge” in top-down policies that conceive of teachers as simple implementers of experts’ research findings. Cole and Knowles (2000) are concerned that “individually and collectively, teachers are still not given or have not taken the authority over their own learning and development” (p. 12).

In contrast, the theoretical model we are developing positions teachers as active inquirers contributing new understandings to a progressive discourse (Bereiter, 2004; Black & Wiliam, 1998a, 1998b) between and among stakeholders concerned with educational improvement. We do agree that calls for “evidence-based” practice should be heeded if we are to escape from cyclical fads and practice swings based more on ideology than on evidence related to the benefits for students (and society). Teachers can certainly be informed by the prior experience and “wisdom” generated by others, including university-based researchers, colleagues, and other professionals (Cole & Knowles, 2000, p. 12). That said, teachers are well positioned to contribute to the generation of evidence on which practices might be based, and evidence derived in classrooms is a powerful indicator of the efficacy of practices in a given situation. Further, it is the classroom teacher who must ultimately situate empirically-grounded theory and practice as appropriate to a given context. Thus, it is crucial to better understand how knowledge generated in one setting (i.e., by a teacher or a researcher) might be shared in a way that supports changes to practice elsewhere. Our model suggests that it is through teachers’ engagement in collaborative inquiry that expertise can be shared and that research-practice connections might be productively established.

Consider, for example, how other researchers have characterized the process and outcomes associated with teachers’ engagement in collaborative inquiry. Cochran-Smith and Lytle (1999) have argued that “working together in communities, both new and more experienced teachers pose problems, identify discrepancies between theories and practices, challenge common routines, draw on the work of others for generative frameworks, and attempt to make visible much of that which is taken for granted about teaching and learning” (p. 293). This description is echoed by others (e.g., Goswami & Stillman, 1987; Montano, Lopez-Torres, DeLissovoy, Pacheo, & Stillman, 2002) who also describe how collaborative inquiry creates the opportunity for resources and tools to inform teachers’ problem-solving, and how, as professional decision-makers, teachers critique, synthesize, integrate, or reject ideas as they select, adapt, or invent new approaches to classroom practice, and as they then reflect on practice-level inquiry to build new knowledge about teaching and learning. As Schon (1983) described in his seminal work:

When someone reflects-in-action, he becomes a researcher in the practice context. He is not dependent on the categories of established theory and technique, but constructs a new theory of the unique case...He does not keep means and ends separate, but defines them interactively as he frames a problematic situation ...

Because his experimenting is a kind of action, implementation is built into his inquiry (p. 68).

Connecting back to the relevance for teachers' perceptions of agency, Fichtman Dana and Yendol-Silva (2003) suggest that, when teachers are engaged in inquiry, they develop "a sense of ownership in the knowledge constructed, and this sense of ownership heavily contributes to the possibilities for real change to take place in the classroom" (p. 6).

A second additional issue that must be considered when considering how inquiry and agency might be connected concerns the extent to which an individual or group perceives themselves as having a role and investment in shaping an inquiry cycle (see Figure 4), that is in identifying problems, defining valued goals, choosing and enacting action, identifying indicators of success and monitoring outcomes, and making change when outcomes are not as hoped or expected. Fullan (1993) suggests constant inquiry is linked to agency "when teachers work on personal vision-building and see how their commitment to making a difference in the classroom is connected to the wider purpose of education" (145). However, we suggest that agency can be undermined at any stage within an inquiry cycle. For example, even if teachers play a role in defining goals for student learning, they may feel disenfranchised from change efforts if they did not have a say in defining the problem to be addressed in the first place, in considering how goals might be achieved, and/or in identifying indicators for monitoring progress that are useful for guiding instruction in classrooms. This suggestion is consistent with our prior research (Schnellert et al., in press) where we found that teachers who were given opportunities to participate in defining performance indicators (e.g., were involved in co-constructing situated assessments that fed into accountability contracts) were energized to engage in inquiry cycles and make classroom-level change over time. Note that a sense of agency can emerge for individuals or groups with an investment in education from different positions, not only for teachers, but also for parents wishing to affect the goals at his/her child's school, or a policy maker setting an accountability framework, a kind of broadly applied inquiry cycle.

A final additional consideration in linking inquiry to agency concerns the relative roles of individuals and collectives in fostering social change. On one hand, we suggest that a sense of agency is necessary to spur reflective, strategic action by individuals working in practice settings. For example, teachers may be energized when they observe how changes they make to instruction can be associated with positive outcomes for students (i.e., enhanced self-efficacy constructed through reflecting on outcomes associated with action within practice-level inquiry). But if we re-broaden our perspective to consider teachers' roles in educational reform, it is important to recognize how agency is also situated within a socio-political context. For example, in a study by Montano et al. (2002) five teachers working within an activist organization suggested that broader social change did not come from one teacher "working their butt off," but rather emerged from "the organized efforts of communities who come together to struggle against broader social, political, and economic injustices" (p. 271). Indeed, in discussions of agency, many researchers emphasize the importance of collectives in challenging assumptions, values, or practices embedded within social and power structures (Ayers, 1995; Bruner, 1996; 1996; Cochran-Smith & Lytle, 1999; Darling-Hammond, French & Garcia-Lopez, 2002; Lasky, 2005). For example, Cochran-Smith and Lytle (1999) argue that, "fundamental to our notion of inquiry as a stance is the idea that the work of inquiry communities is both social and political –

that is, it involves making problematic the current arrangements of schooling; the ways knowledge is constructed, evaluated, and used; and teachers' individual and collective roles in bringing about change" (p. 18). Thus, moving forward collectively might require the educational community to engage in a progressive discourse (Bereiter, 2004) wherein multiple voices are pulled into multi-level collaborative inquiry, and where a commitment is made to allow different stakeholders' voices to be heard as part of decision-making at all levels.

Findings

Based on the juxtaposition of evidence from our project with varying theoretical accounts related to agency and inquiry, we have developed a theoretical model for describing conditions that foster agency within a community of inquiry (see Figure 4). Specifically, we build from prior research and theory to suggest that agency can be viewed as emerging from how inquiry cycles play out for individuals and groups, in consideration that: (1) self-perceptions of agency may shift based on reflections on the success of actions in achieving desired goals; (2) a sense of agency depends on how stakeholders' roles in knowledge creation and application are valued in the educational community; (3) a true sense of agency requires an individual or group to perceive themselves as having a role and investment in shaping an inquiry cycle; and (4) individual and collective agency are both implicated in change at the classroom and societal levels.

When we analyzed data in the current study relating engagements in inquiry to agency, we found that most teachers focused attention on practice-level inquiry cycles at the classroom or grade level. For example, most teachers described how they were better able to target instruction and effect outcomes for students, suggesting a greater sense of control over practice in terms of achieving instructional goals. Further, consistent with our prior research (Schnellert et al., in press), most teachers were pleased at having the opportunity to influence how data were collected and interpreted in relation to student learning and to choose how they would address goals within their unique classrooms (i.e., control over goal setting, instructional strategies, and indicators in practice-level inquiry).

Interestingly, in this study, only some teachers, typically literacy leaders, focused attention on inquiry cycles playing out in parallel at the school, district, or provincial levels. For example, MD, a literacy leader, asserted that what mattered most was her team's ability to monitor outcomes in relation to the goals they had established collectively. In terms of our model, this finding suggests that she valued her grade-level team's ability to direct the shape of inquiry cycles in their own setting as appropriate to their students. But MD also begrudgingly recognized the need to attend to how inquiry cycles (i.e., goals, indicators) were defined at the school and district levels, acknowledging the expectation that school-based activities would be coordinated with priorities constructed by other stakeholders and/or at other levels. For example, MD felt she could influence school-level goal setting by interacting regularly with the School Planning Council (SPC), which is composed primarily of parents. She described how, over time, SPC members began to value her ideas and recommendations. She also perceived her ability to impact the professional development plans for the district by explicitly and repeatedly outlining her school team's unique needs to district consultants. But overall, few of the teachers in our study discussed and/or focused attention on the broader social implications of the work they were doing individually or collectively. This latter finding was somewhat surprising given that, even

though our project focused somewhat narrowly on working collectively to enhance adolescent literacy, there were considerable attempts to coordinate school-level activities with decision-making at the district- and Ministry-levels.

Implications

Consistent with prior research on student level inquiry (Butler, 1998; Zimmerman & Schunk, 2001), our research suggests that engaging individuals in inquiry cycles has the potential to build self-perceptions of control over outcomes (i.e., a sense of agency). For example, teachers in this research felt more able to target their instruction in ways that effected positive outcomes for students. But in the model we developed based on our data (see Figure 4), we also depict *how and when* external conditions might enable or constrain the ability of individuals or groups to exercise agency in a given situation, for example, in whether teachers have a say in setting goals for students, or in taking control over their professional development (Cole & Knowles, 2000). Our model suggests that agency can be undermined for any individual or group if efforts towards valued goals do not appear to affect outcomes and/or if an influence on any stage of the inquiry cycle is compromised. In contrast, engaging stakeholders at multiple levels in collaborative and coordinated inquiry may well have the potential to nurture agency and investment at multiple levels simultaneously, for example, if partnerships are established that honour different stakeholders' voices in establishing parallel, complementary, and coordinated engagement in inquiry cycles (see Schnellert et al., in press)

Conclusions

At the heart of our research program is a concern for how engaging multiple stakeholders in parallel, coordinated, and/or collaborative inquiry might simultaneously support teacher professional development, foster a constructive, progressive discourse in education, and enhance efforts towards educational reform. In this relatively complex paper, we present findings in the form of theoretical accounts derived by juxtaposing prior theory/research with a year-long, empirical case-study of one community of inquiry in action. Across several sections, we have documented how teachers' engagement in practice-level inquiry might influence on-the-ground instruction (in practice-level cycles), students' engagement in inquiry, and teacher professional development/learning; extended our analysis to consider how the quality of collaborative relationships mediates between engagement in a community of inquiry, shifts in practice, and teacher learning; and considered how the quality of teachers' individual and collective engagement in inquiry might be associated with real and perceived agency within educational reform efforts. Within each section we have drawn out the implications of our findings, which we will avoid repeating here. Instead, we simply close by calling for further, similar, research that contributes to understanding how teachers' engagement in inquiry is fostered within communities of practice, is related to teacher learning, and can be productively associated with change efforts at the classroom, school, community, and policy levels.

References

- Achinstein, B. (2002). Conflict among community: The micropolitics of teacher collaboration. *Teachers College Record, 104*(3), 421-455.
- Ayers, W. (Ed.) (1995). *To become a teacher: Making a difference in children's lives*. New York: Teachers College Press.
- Ball, D., & Cohen, D. (1999). Developing Practice, Developing Practitioners. In Sykes, D., H. & Sykes, H. (Eds.), *Teaching as the Learning Profession: Handbook on Policy and Practice*. San Francisco: Jossey-Bass.
- Bandura, A. (1989). Human Agency in Social Cognitive Theory, *American Psychologist 44* (9): 1175-1184.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*, 117-148.
- Barnett, E. (2004). Characteristics and perceived effectiveness of staff development practices in selected high schools in South Dakota. *Educational Research Quarterly, 28*(2), 3-18.
- Benta, I. M. (2003) *Agna Version 2.1* Retrieved March 25, 2007, from <http://www.geocities.com/imbenta/agna>.
- Bereiter, C. (1994). Implications of postmodernism for science, or science as a progressive discourse. *Educational Psychologist, 29*, 3-12.
- Black, P., & Wiliam, D. (1998a). Assessment and classroom learning. *Assessment in Education, 5*(1), 7-74.
- Black, P., & Wiliam, D. (1998b). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan, 80*(2), 139-148.
- Borko, H. (2004). Professional development and teacher learning: Mapping the terrain *Educational Researcher, 33*(8), 3-15
- Borko, H., & Putnam, R. (1998). Professional development and reform-based teaching: Introduction to the theme issue. *Teaching and Teacher Education, 14*(1), 1-3.
- Bruner, J. (1996). *The culture of education*. Cambridge, MA: Harvard Business School.
- Butler, D. L. (1998). A Strategic Content Learning approach to promoting self-regulated learning. In B. J. Zimmerman & D. Schunk (eds.), *Developing self-regulated learning: From teaching to self-reflective practice* (pp. 160-183). New York: Guildford Publications, Inc.
- Butler, D. L. (2003). Structuring instruction to promote self-regulated learning by adolescents and adults with learning disabilities. *Exceptionality, 11*(1), 39-60.
- Butler, D. L. (2005-a). L' autorégulation de l'apprentissage et la collaboration dans le développement professionnel des enseignants *Revue des sciences de l'éducation, 31*, 55-78.
- Butler, D. L. (2005-b, Oct). Researcher-school-district-government partnerships: A case study of dynamic and generative innovation. Presented at an international conference on *The Roles and Relationships among Universities, Schools, and Government in Educational Reform*. Beijing, China.
- Butler, D. L., & Cartier, S. C. (2004, May). Learning in varying activities: An explanatory framework and a new evaluation tool founded on a model of self-regulated learning. Paper presented at the annual meetings of the Canadian Society for Studies in Education. Winnipeg, MB.
- Butler, D. L., Cartier, S. C., Schnellert, L., & Gagnon, F. (2006). Secondary students' self-regulated engagement in "learning through reading": Findings from an integrative research

- project. Paper presented at the annual meetings of the Canadian Society for Studies in Education. Toronto, ON.
- Butler, D. L., Cartier, S. C., Schnellert, L., Gagnon, F., Higginson, S., & Giammarino, M. (2005, June) Reading to Learn in the Content Areas: From Assessment to Intervention. CAEP session presented at the annual meetings of CSSE, London, Ontario.
- Butler, D. L., Novak Lauscher, H. J., Jarvis-Selinger, S., & Beckingham, B. (2004). Collaboration and self-regulation in teachers' professional development. *Teaching and Teacher Education*, 20, 435-455.
- Butler, D. L., Pollock, C., Nomme, K., & Nakonechny, J. (in press). Promoting authentic inquiry in the sciences: Challenges faced in redefining first-year university students' scientific epistemology. In B. M. Shore, M. W. Aulls & M. A. B. Delcourt (Eds.), *Inquiry in education: Where ideas come from and where they lead*. Mahwah, NJ: Erlbaum.
- Butler, D. L., Schnellert, L., & Cartier, S. C. (2005). Adolescents' engagement in "reading to learn": Bridging from assessment to instruction. *BC Educational Leadership Research*, 2, Retrieved December 2, 2005, from <<http://slc.educ.ubc.ca/eJournal/index.htm>>
- Butler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of Educational Research*, 65, 245-281.
- Campbell A., McNamara, O., & Gilroy P. (2004). *Practitioner Research and Professional Development in Education*. London: Paul Chapman Publications.
- Carpenter, T. P., Fennema, E.T., & Franke, M. L. (1996). Cognitively guided instruction: A knowledge base for reform in primary mathematics instruction. *The Elementary School Journal*, 97, 3-20.
- Cartier, S. C., & Butler, D. L. (2004, May). Elaboration and validation of the questionnaires and plan for analysis. Paper presented at the annual meetings of the Canadian Society for Studies in Education. Winnipeg, MB.
- Chinn, C. A., & Malhotra, B. A. (2002). Epistemologically authentic inquiry in schools: A theoretical framework for evaluating inquiry tasks. *Science Education*, 86, 175-218.
- Clandinin, J. & Connelly, M. (2000). *Narrative Inquiry*. San Francisco: Jossey-Bass.
- Clarke, A. & Erickson, G. (2004). The nature of teaching and learning in self-study. In Loughran, Hamilton, LaBoskey & Russell's (eds.) *International handbook of self-study and teacher education practices*. London: Kluwer. Academic Publishers.
- Cochran-Smith, M. (2004). Defining the outcomes of teacher education: What's social justice got to do with it? *Asia Pacific Journal of Teacher Education*, 32(3) 193-212.
- Cochran-Smith, M., & Fries, K. (2005). Researching teacher education in changing times: Politics and paradigms. In Cochran-Smith, M., & Zeichner, K. (ed.), *Studying teacher education: The report on the AERA panel on research and teacher education* (pp. 69-109). Washington, DC: AERA.
- Cochran-Smith, M., & Lytle, S. L. (1990). Research on Teaching and Teacher Research: The Issues that Divide. *Educational Researcher*, 19 (2), 2-11.
- Cochran-Smith, M., & Lytle, S. L. (1993). *Inside/ outside: Teacher research and knowledge*. New York: Teachers College Press.
- Cochran-Smith, M., & Lytle, S. L. (1999). Teacher learning in communities. In A. Iran-Nejad & D. Pearson (Eds.), *Review of research in education*. Washington, DC: American Educational Research Association.
- Cochran-Smith, M., & Lytle, S. L. (1999). The Teacher Research Movement: A Decade Later. *Educational Researcher* 28 (7), 15-25.

- Cochran-Smith, M., & Lytle, S. L. (2004). Practitioner inquiry, knowledge, and university culture. In *International handbook of self-study and teacher education practices*. London: Kluwer. Academic Publishers.
- Cole, A. L., & Knowles, J. G. (2000). *Researching teaching: Exploring practice through reflexive inquiry*. New York, NY: Allyn & Bacon.
- Darling-Hammond, L. (1996). The quiet revolution: Rethinking teacher development. *Educational Leadership*, 53(6), 4-10.
- Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Educational Policy Analysis Archives*, 8, (1). Retrieved April 13, 2004, from <http://epaa.asu.edu/epaa/v8n1>.
- Darling-Hammond, L. (2004). From “separate but equal” to “No Child Left Behind”: The collision of new standards and old inequalities. In D. Meier & G. Wood (eds.), *Many children left behind* (pp. 3-32). New York: Beacon Press.
- Darling-Hammond, L., French, J., & Garcia-Lopez, S. P. (2002). *Learning to teach for social justice*. New York: Teachers College Press.
- DeBoer, G. E. (1991). *A history of ideas in science education*. New York: Teachers College Press.
- Dillon, D.R., O’Brien, D.G., & Heilman, E.E. (2000). Literacy research in the next millennium: From paradigms to pragmatism and practicality. *Reading Research Quarterly*, 35, 10–26.
- Dunbar, K. (2000). How scientists think in the real world: Implications for science education. *Journal of Applied Developmental Psychology*, 21(1), 49-58.
- Earl, L. M. (1999). Assessment and accountability in education: Improvement or surveillance. *Education Canada*, 39(3), 4-6, 47.
- Eisner, E. (2002). From episteme to phronesis to artistry in the study and improvement of teaching. *Teaching and Teacher Education* 18, 375-385.
- Fichtman Dana, N. & Yendol-Silva, N. (2003). *Learning to Teach and Teaching to Learn Through Practitioner Inquiry*. Thousand Oaks, CA: Sage Publications.
- Fullan, M. (1993) *Change forces: Probing the depths of educational reform*. London: Falmer.
- Fullan, M. (2000). The return of large-scale reform. *Journal of Educational Change*. 1 (1)
- Goswami, D. & Stillman, P. (Eds.). (1987). *Reclaiming the Classroom: Teacher research as an agency for change*. Westport, CT: Heinemann-Boynton/Cook.
- Guskey, T. (2000). *Evaluating Professional Development*. Thousand Oaks, CA: Corwin Press.
- Guskey, T. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, 8(3/4), 380-391.
- Hammerness, K., Darling-Hammond, L., Grossman, P., Rust, F., & Shulman, L. (2005). The design of teacher education programs. In Darling-Hammond, L. & Bransford, J’s (Eds.), *Preparing teachers for a changing world: What teachers should learn and be able to do* (390-441). San Francisco: Jossey-Bass.
- Henry S. K., Scott, J. A., Wells, J., Skobel, B., Jones, A., Cross, S., Butler, C, Blackstone, T. (1999). Linking university and teacher communities: A "Think Tank" model of professional development. *Teacher Education and Special Education*, 22(4), 251-268.
- Hinchman, K. A., & Lalik, R. (2000). The meanings of literacy instruction to two teacher educators: Deconstructing the traditions woven into our work. *Journal of Educational Research*, 93, 182-192.

- Hobson, D. (2001). Action and Reflection: Narrative and Journaling in Teacher Research. In Burnaford, G., Fischer, J & Hobson, D's (eds.) *Teachers Doing Research: The Power of Action Through Inquiry*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Joyce, B., & Showers, B. (2002). *Student achievement through staff development* (3rd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.
- Kent, A. M. (2004). Improving teacher quality through professional development. *Education*, 124 (3) 427-435.
- Kincheloe, J. L. (2004). The knowledge of teacher education: Developing a critical complex epistemology. *Teacher Education Quarterly*. 32(1), 49-66.
- Lasky, S. (2005). A sociocultural approach to understanding teacher identity, agency and professional vulnerability in a context of secondary school reform. *Teaching and Teacher Education*, 21 (8), 899-916.
- Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.
- Lewis, M. (2003). Teacher inquiry. In St. John, Loescher, & Bardzell's (Eds.) *Improving Early Reading and Literacy in Grades 1-5: A resource guide for programs that work*. Thousand Oaks, CA: Corwin Press, Inc.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.
- Little, J. W. (2003). Inside teacher community: Representations of classroom practice. *Teacher College Record*. 106 (6). 913-945.
- Little, J. W. (2001). Professional development in pursuit of school reform. In A. Lieberman and Miller, L. (Eds.) *Teachers caught in the action: Professional development that matters*. (pp. 23-44) New York: Teachers College Press.
- Lortie, D. (1975). *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.
- Loughran, J. (2002). Effective reflective practice: In search of meaning in learning about teaching. *Journal of Teacher Education*, 53(1), 33-43.
- Loughran, J., & Northfield, J. (1998). A framework for the development of self-study practice. In M. L. Hamilton et al. (eds.) *Reconceptualizing teaching practice: Self-study in teacher education*. 7-18. London: Palmer Press.
- Luna, C., Botelho, J., Fontaine, D., French, K., Iverson, K., & Matos, N. (2004). Making the road by walking and talking: Critical literacy and/as professional development in a teacher inquiry group. *Teacher Education Quarterly*. (32) 1, 67-80.
- McLaughlin, M., & Talbert, J. (2006). *Building School-Based Teacher Learning Communities*. New York, NY: Teacher College Press.
- Medical Decisions Logic (2005). *VisuaLyzr software*. Retrieved April 3, 2007, from <http://www.mdlogix.com>.
- Merriam, S. B. (1998). *Qualitative Research and Case Study Applications in Education*. San Francisco: Jossey-Bass.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage.
- Montano, T., Lopez-Torres, L., DeLissovoy, N., Pacheco, M., Stillman, J. (2002). Teachers as activists: Teacher development and alternate site of learning. *Equity and Excellence in Education*, 35(3), 265-275.
- Morrell, E. (2004). Legitimate peripheral participation as professional development: Lessons from a summer research seminar. *Teacher Education Quarterly*, (32)1, 89-99.

- Palincsar, A. (1999). Response: A community of practice. *Teacher Education and Special Education*, 22(4), 272-274.
- Reason, P. (1996) Reflections on the purposes of human inquiry. *Qualitative Inquiry* 2(1):15-28.
- Robertson, J. M. (2000). The three R's of action-research methodology: Reciprocity, reflexivity and reflection-on-reality. *Educational action research*, 8(2), 307-326.
- Robertson, J., Hill, M., & Earl, L. (2004). *Conceptual frameworks in school-university action research communities*. Paper presented at the New Zealand Research in Education conference. Wellington, N.Z.
- Schön, D. (1983). *The reflective practitioner*. New York: Basic Books.
- Schön, D. (1987) *Educating the reflective practitioner*. San Francisco: Jossey-Bass.
- Schnellert, L., Butler, D. L. & Higginson, S. (in press). Co-constructors of data, co-constructors of meaning: Teacher professional development in an age of accountability. *Teaching and Teacher Education*.
- Timperley, H., & Phillips, G. (2003). Linking teacher and student learning and professional learning to improve professional development in systemic reform. *Teaching and Teacher Education*, 19(6), 643-658.
- Van Horn, L. (2006). Re-imagining professional development. *Voices in the Middle*, 13 (4), 58-63). Urbana: NCTE.
- Voltz, D. L., Brazil, N., & Scott, R (2004). Professional development for multicultural education: A teacher-directed approach. *Action in Teacher Education*, 26 (3), 10-20.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press
- White, B. Y., & Frederiksen, J. R. (1998). Inquiry, modeling, and metacognition: Making science accessible to all students. *Cognition and Instruction*, 16, 3-118.
- Winne, P. H., & Hadwin, A. (1998). Studying as self-regulated learning. In D. Hacker, J. Dunlosky & A. Graesser (Eds.), *Metacognition in educational theory and practice* (pp. 279-306). Hillsdale, NJ: Erlbaum.
- Winter, C. (2000). The state steers by remote control: Standardizing teacher education. *International Studies in Sociology of Education*, 10(2), 153-175.
- Yin, R. K. (2003). *Case study research: Design and methods*. Thousand Oaks, CA: Sage.
- Zeichner, K. M., & Noffke, S. E. (2001). Practitioner research. In V. Richardson (Ed.), *Handbook of research on teaching* (4th ed.; pp. 298-330).
- Zimmerman, B. J., & Schunk, D. H. (2001). Reflections on theories of self-regulated learning and academic achievement. In B. J. Zimmerman & D. H. Schunk (eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed.) (pp. 289-307). Mahwah, N.J.: Erlbaum.

Figure 1. Multiple layers of inquiry.

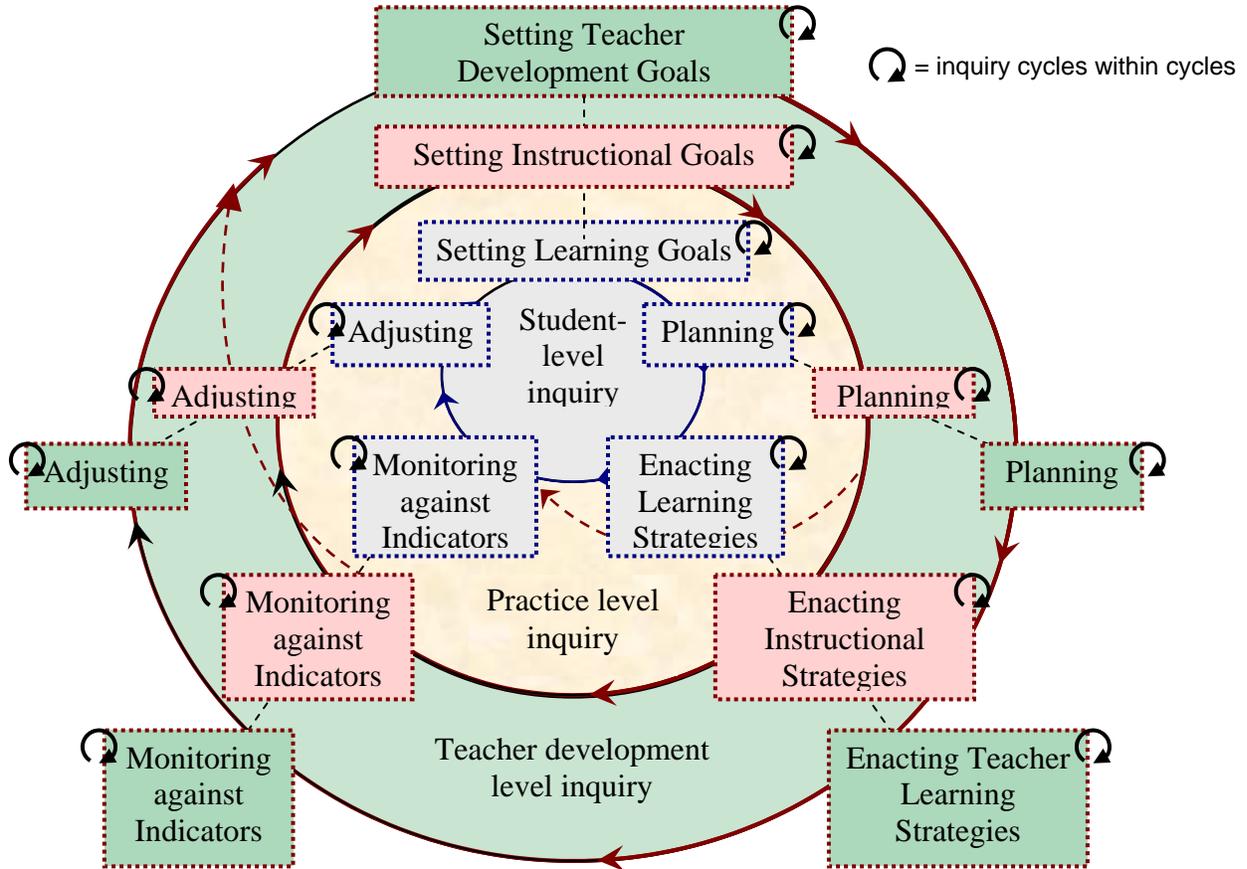
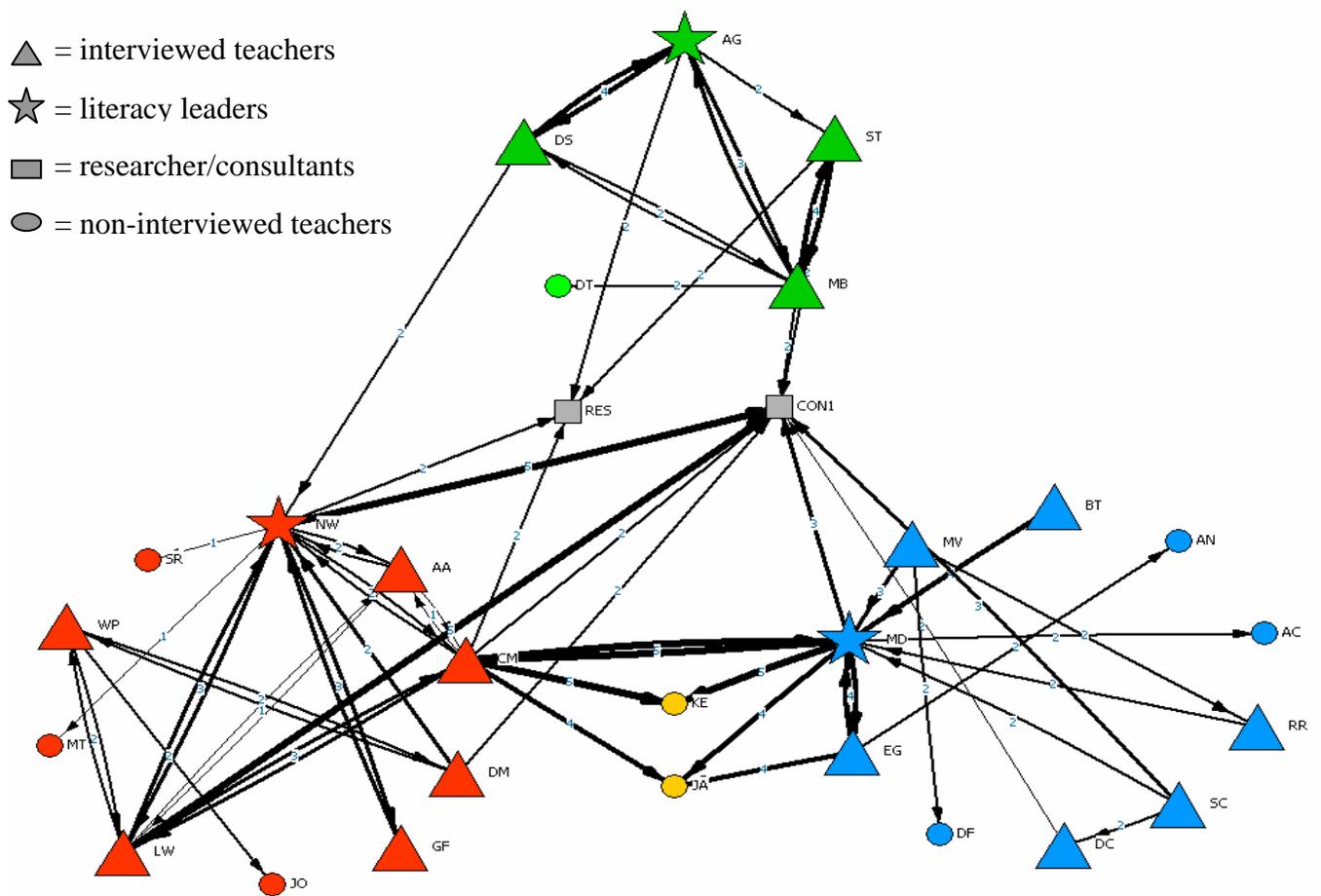


Figure 2. Collaborative relationships with a community of inquiry.



Notes: Colours are used to represent the three schools in the project (red, blue, green), teachers from a fourth school not included in this study (yellow), and the research/district consultant who were part of the district level inquiry (grey); initials are used to represent individuals; line thickness and the numbers associated with lines represent the depth of the collaboration between pairs of teachers (see Figure 3 and Appendix A); arrows are used to indicate the individual describing a pair’s relationship (e.g., the depth and quality of NW’s description of her collaboration with AA would be represented with an arrow going from NW to AA).

Figure 3. Engagement in Collaborative Inquiry Cycles: Three Examples

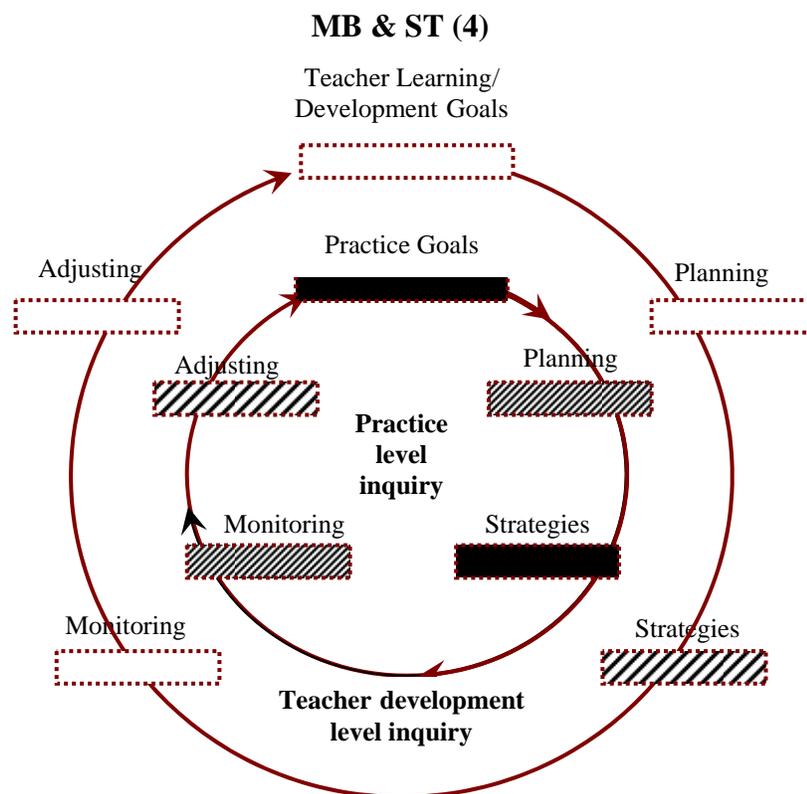
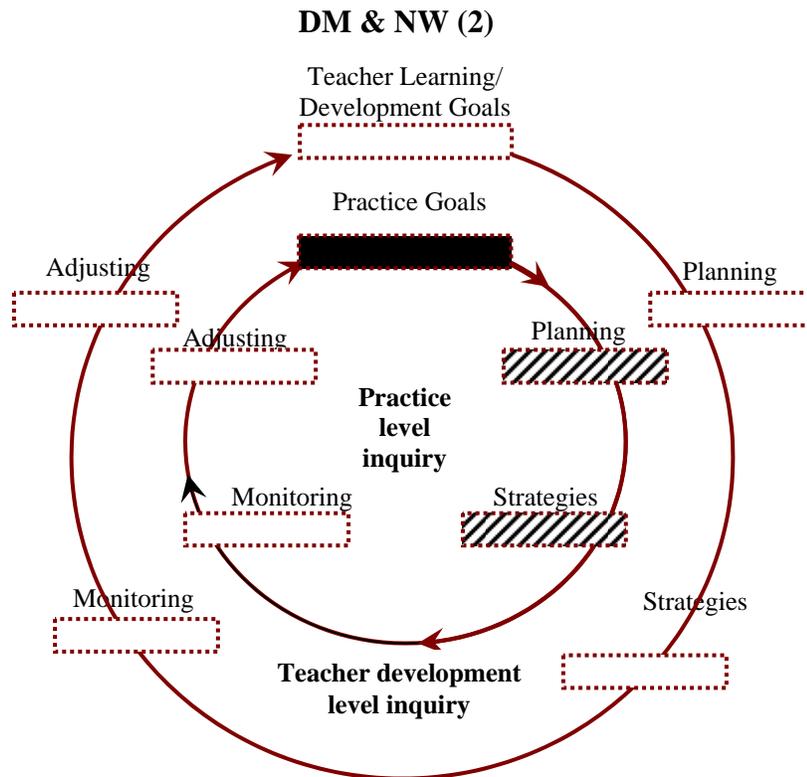


Figure continues ...

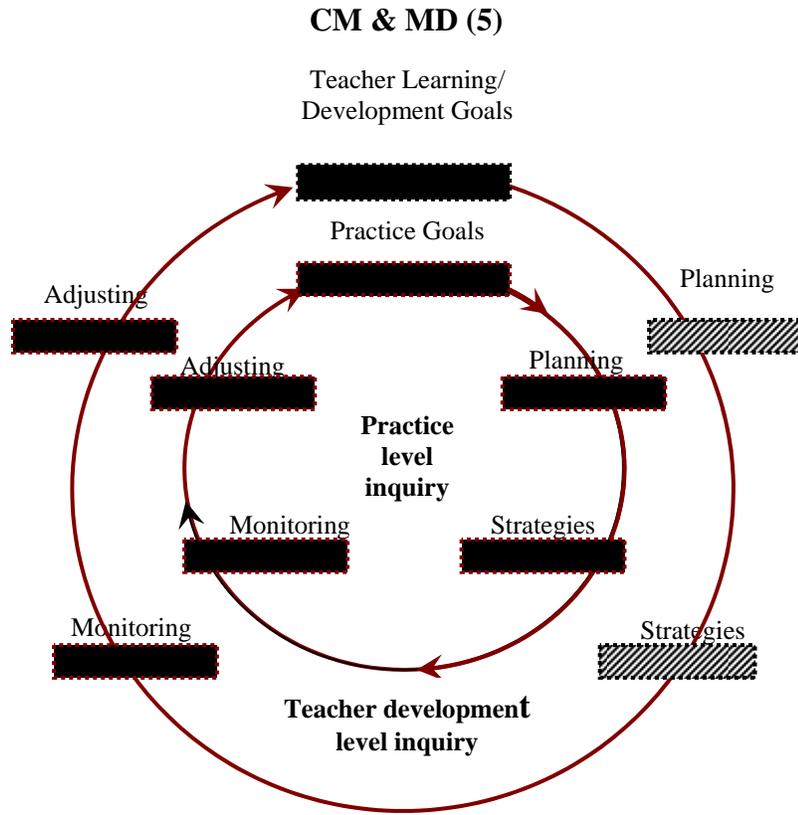
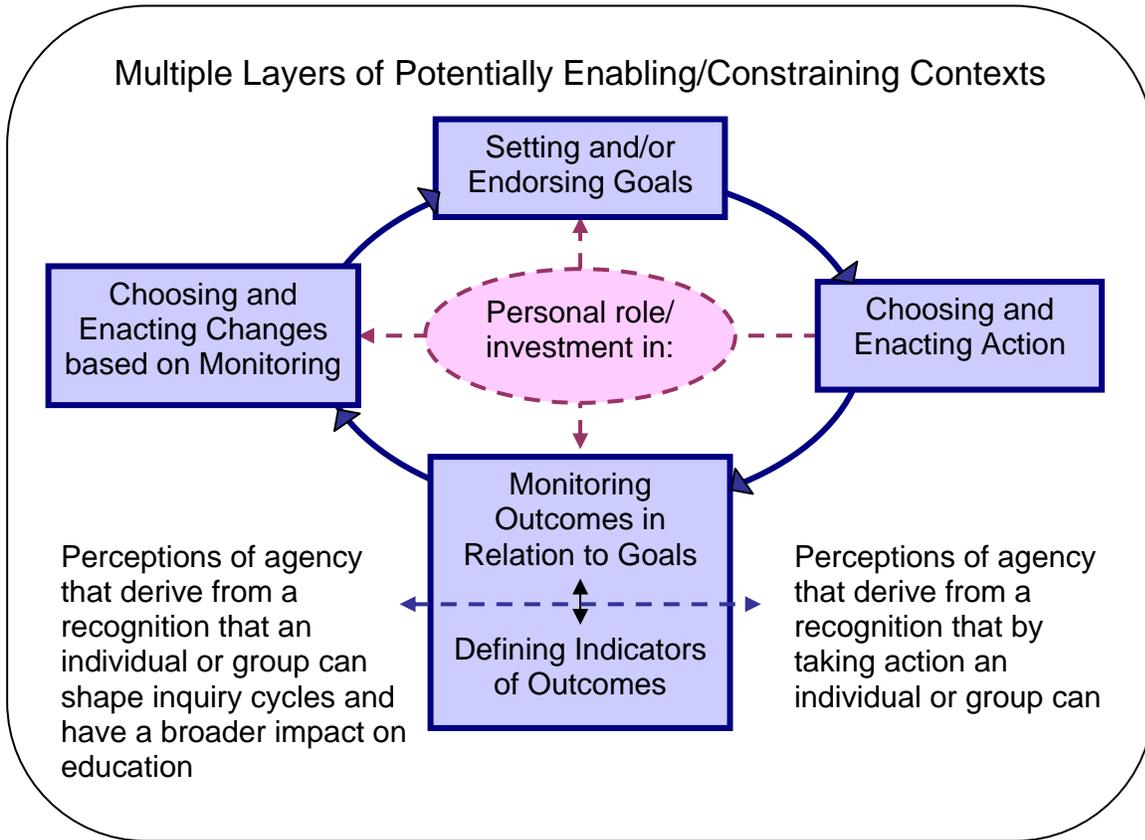


Figure 4. Agency as Related to the Quality of Engagement in Inquiry Cycles.



Appendix A
 Criteria for Judging the Depth and Quality of Collaborative Relationships

Level	Label	Criteria	Pairs
0	No collaboration	<ul style="list-style-type: none"> No collaboration: explicitly stated that there was no collaboration 	NW:WP NW: BR
1	Little Collaboration (partners often disconnected)	<ul style="list-style-type: none"> Co-assessed; set group scoring situation; may not have set <i>shared</i> goals Little to no co-planning, rarely refer to goals in interactions If co-teaching, partners are not in agreement on goals or relationship of activities to goals No co-monitoring (i.e., debriefing, feedback) conversations May state that partner does not have shared understandings/intent 	CM:AA NW:MT AA:LW LW:WP NW:SR WP:DM
2	Consultative Information Sharing	<ul style="list-style-type: none"> Set shared goals, usually in group scoring situation <i>Sharing resources and ideas in relation to goal</i> Sharing resources or ideas, but no integrative co-planning (surface level collaborative planning) If co-teaching, most likely modeling (often lack of co-planning) No co-monitoring (little to no sustained conversation about goals and related actions over time) 	CM:CON1 WP:LW MV: DF MV:RR CM:NW NW:CM WP:JO RR:MD SC:DC DC:CON1 AG:ST MB: DT MB:DS DS:MB AA:NW EG:AN DM:NW SC:MD MD:AC DM:WP AA:CM DM:CON1
3	Intermittent Shared Inquiry into Practice	<ul style="list-style-type: none"> Set shared goals, usually in group scoring situation Some co-planning, typically refers to goals when planning Sharing of resources or ideas, some sense of addressing shared goals over time If co-teaching, there are shared goals in 	CM:LW AG:MB MV:MD NW:GF GF:NW MB:AG SC :CON1

Level	Label	Criteria	Pairs
		mind, sense of working together to develop practice <ul style="list-style-type: none"> • May check in regarding implementation, sharing of examples (i.e., sharing implementation stories or examples), but little to sustained shared attention to progress regarding goals over time 	NW:LW LW:NW MD:CON1 LW:CM
4	Iterative Shared Inquiry into Practice	<ul style="list-style-type: none"> • Set shared goals for students, usually in group scoring situation • Co-planning with goals in mind, sustained conversation about goals as related to practices • If co-teaching, shared goals in mind, sense of working together to develop and implement practices • Debriefing regarding implementation of strategies/approaches • Some co-reflection and problem-solving • Collaborative, longitudinal work within a practice-based inquiry cycle 	BT:MD ST:MB MB:ST DS:AG CM:JA EG:MD MD:EG MD:JA AG:DS
5	Iterative Shared Inquiry into Practice and Teacher Learning	<ul style="list-style-type: none"> • Set shared goals for students, usually in group scoring situation • Set and shares own goals for professional learning • Ongoing co-planning with sustained conversation about goals as related to practices • Collaborative development of strategies and approaches • If co-teaching, there is a sense of working together to implement, adapt and refine practices related to goals • Sharing and critiquing of one another’s classroom examples • Ongoing co-reflection and problem-solving and adaptation of approaches with own and student-learning goals in mind • Longitudinal collaborative work within an inquiry cycle • Partners/group have shared inquiry stance to practice and own learning goals • Partners relate practice and learning goals to inquiry cycle 	MD:CM CM:MD CM:KE MD:KE LW:CON1 NW:CON1 EG:JA