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**DIALOGIC TEACHER CHANGE: TWO CASES OF SUPPORTED
COLLABORATIVE INQUIRY¹**

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ABSTRACT

This paper describes the impact of dialogic inquiry (Wells, 1999) on two groups of teachers engaged in a specific model of professional development, termed supported collaborative inquiry (Nelson & Slavit, in press). After a discussion of the professional development and teaching contexts, elaboration of two teacher groups engaged in a year-long collaborative inquiry process are provided. Evidence suggests that the two teacher groups had various levels of success regarding the establishment of an inquiry community, and both experienced difficulties in collecting and managing data. Both groups found the dialogic nature of the professional development to be of significant benefit in a variety of ways. Implications on professional development and further research are provided.

KEYWORDS: Teacher Inquiry – Professional Learning Communities – Secondary Mathematics and Science

INTRODUCTION

The assumption that collaborative professional development can lead to positive professional growth has had a steady stream of support for more than 25 years (Lortie, 1975; Little, 1984; Garet, Porter, Desimone, Birman and Yoon, 2001; Wilson and Berne, 1999). However, because of various systemic and teacher-related factors, teachers are sometimes left to “implement” their professional development in individual classrooms without the support of colleagues (Darling-Hammond and McLaughlin, 1995). While individual teachers can be quite capable of supporting their own professional growth (Blanton, Westbrook and Carter, 2005; Clandinin and Connelly, 1994), there are obvious constraints to such an endeavor, including time, material resources, and the need for dialogic interaction from a “critical other” in support of professional growth (Wells, 1999; Little, Gearhart, Curry, and Kafka, 2003). As teacher buy-in is a necessary aspect of effective professional development (Supovitz and Zeif, 2000), it is important to find balance among who identifies the scope, focus, and method of teacher development activities. If the teacher has no control, then a lack of buy-in, interest, or connection to prior experience can hinder the effectiveness of the development activity². Likewise, “as teacher leadership grows, principals must let go of some authority and responsibility” (Lambert, 2005, p. 4).

Extending on traditional aspects of teacher professional growth, such as action research (Fullan, 1999; Mills, 2003) and professional learning communities (Dufour Eaker, and Burnette, 2002; Hord, 1997), we describe *supported teacher collaborative inquiry* as a model of professional development that includes long-term support for teacher-led inquiry in a group setting (Nelson and Slavit, in press). Two broad areas of support are critical: support for the immediate work of the teacher group, and support in enabling broader systemic affordances to positively impact this work. The latter involves “helping the teachers get help” by assisting them in identifying, forging, and making use of supports that emerge outside of the immediate inquiry work. Examples of this kind of support include working with the teacher groups in achieving buy-in and active support from building or district administrators as well as identifying and helping to find resolution with external barriers that might impede the teachers’ work or subsequent impact, such as potentially conflicting district or state initiatives. For teachers to fully benefit from participation in supported collaborative inquiry, the inquiry process cannot be stifled by these “external” forces. For example, a building administrator can quickly diminish the impact of teacher collaborative inquiry by failing to support teachers in their efforts to cohere around a common focus, or by dominating the decision-making and culture-defining activity within the school (Darling-Hammond, 1996; Louis and Kruse, 1995). Emerging evidence also exists to show that state and national policies, such as high-stakes assessments of student achievement,

can significantly alter the focus and potential power of data-based teacher inquiry (Giles and Hargreaves, 2006; Whittaker and Young, 2002).

This professional development model, based on “top-down support for bottom-up reform” (Darling-Hammond and McLaughlin, 1995), is grounded in teacher collaboration and scaffolded to support the participants’ ability to design and investigate their own paths of inquiry. Supported collaborative inquiry has the following specific criteria:

1. Teachers actively seek a shared vision of high quality teaching and learning through facilitated dialogic interaction.
2. Teachers actively strive to emerge as an interdependent group with a shared understanding of group needs, norms, and goals.
3. Teachers work with teachers in the design of an inquiry focus.
4. Teachers are supported in the design and implementation of the inquiry by a facilitator(s) with content and facilitation expertise.
5. The inquiry includes an action-oriented phase grounded in the teachers’ local context.
6. Teachers are actively supported in obtaining intellectual and material resource support of building administrators, and fitting their inquiry within the context of the larger district, state, and national goals.

There are a variety of possible implications on teachers resulting from such professional development. On one level, the classroom community is a potential area of impact, where there is an intersection among the teacher, the students, and the content at hand. A second potential level of impact is the teacher group, the forum for teachers to share understandings, ask questions, and create dissonance about practice that can become the focus of collaborative inquiry and eventually lead to impacts on instructional practice. Drawing from past frameworks of Ball and Cohen (1999) and Carroll, Moretti, and Mumme (2005), Figure 1 illustrates the distinction and connection between these two levels of potential impact. The second level focuses on teachers as learners, with the content being the facilitation of student learning, in a forum centered on the negotiation of beliefs and knowledge, and facilitated by a teacher or “critical friend”. It is at this level where the planning and negotiation of teacher collaborative inquiry occurs, and it is here where the focus of this paper rests: Our research purpose is to understand the dynamics of supported teacher collaborative inquiry and its impacts on the knowledge, beliefs, and dispositions of groups of teachers engaged in this process.

Drawing from student-focused, social-constructivist perspectives (Vygotsky, 1986; Cobb, Yackel and Wood, 1992), we describe teacher learning not only as individual construction of meaning, but also through the social actions of talk and shared activity, or dialogic interaction (Wells, 1999). In professional learning communities (PLCs) teachers have the opportunity to share beliefs, instructional perspectives, and co-construct new meaning around notions of pedagogy. However, “teacher communities can become victims of

“groupthink”, where members insulate themselves from alternate ideas – turning shared visions into shared delusions (Giles and Hargreaves, 2006, p. 127).

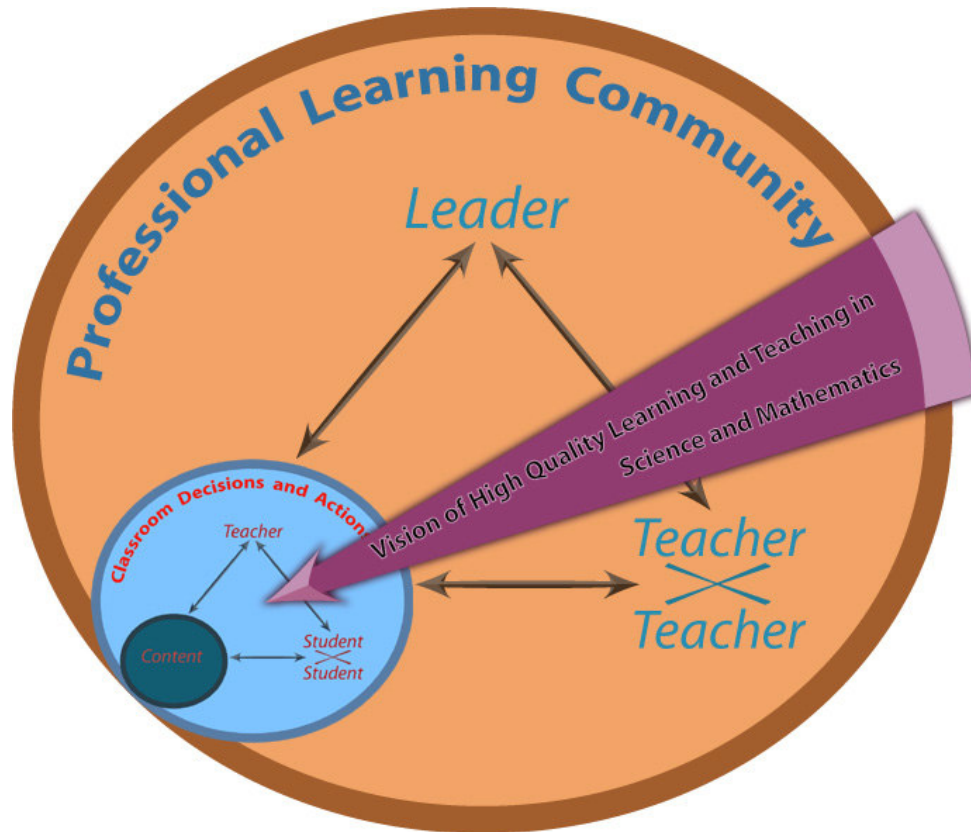


Figure 1: Diagram illustrating the Facilitator (Leader) and teacher interactions, centered on instructional practice and in the context of a search for a vision of high quality learning and teaching, which was utilized in the PRiSSM supported collaborative inquiry process.

Teachers engaged in supported collaborative inquiry implicitly or explicitly draw upon knowledge and beliefs about teaching from a variety of areas, including disciplinary goals and standards, pedagogy, learning and learners, and curriculum. Through this process, teachers are able to share understandings and beliefs about teaching and learning through critical, reflective dialogue (Ball and Cohen, 1999; Hawley and Valli, 1999; Lave and Wenger, 1991; Little, 2003). However, teachers can hold beliefs about content and teaching that are inconsistent, generally due to factors such as time, resources, and student behaviors (Raymond, 1997). These inconsistencies can make collaborative visioning, belief negotiation, and inquiry into practice problematic. In order to participate in these processes and change beliefs, teachers must be supported in reflective or dialogic

experiences that challenge beliefs and support the rebuilding of these notions in a coherent, appealing manner (Cooney. 1999).

Specific means of support, as discussed above, can be crucial to the overall success of a teacher collaborative inquiry process, including the negotiation of beliefs. Further, research has found that there are instances where authentic knowledge negotiation may not be present (Nelson, 2005) or where social and interpersonal dynamics may hinder opportunities for development (Barth, 2006). Using this perspective, our analysis will focus on the activity and outcomes of teachers engaged in collaborative negotiation of beliefs and knowledge, with a particular emphasis on the specific aspects of supported collaborative inquiry previously discussed.

METHODOLOGY

A case study methodology was employed to address the following research question:

How do the interactions between teachers engaged in supported collaborative inquiry in a cross-school, cross-disciplinary setting impact the nature and use of the knowledge and beliefs of the teachers engaged in this process?

Three principles of case study methodology (Yin, 2003) were incorporated into the design. First, multiple sources of evidence, as articulated below, were collected and examined. Second, a coherent set of evidence that supports an examination of the research question was targeted. Third, a chain of evidence that supports description and conclusion were specifically examined. While case study design can be limiting in regard to powers of generalization and allowing the reader to make specific connections between data and broad conclusions, its power lies in the ability to both describe and explain phenomena occurring in specific contexts (Yin, 2003). In this instance, case descriptions will be used to develop theoretical propositions about the cases themselves and, where appropriate, to issues associated with the broader impacts of supported collaborative inquiry.

A participant researcher (Merriam, 1998) approach was taken, as both authors were principal investigators of the professional development project that frames both cases, details of which are provided below. Our dual roles in both research and project support were known, with the latter role involving project oversight, planning and implementation of project-wide activities, and coordination with school district personnel.

Analysis is focused at the teacher group level; we investigate the manner in which dialogic inquiry, supported by project staff, led the participants to a collective reexamination of their professional beliefs, knowledge, and practice. As Bolam et al. (2005) state:

Although PLCs have common characteristics and adopt similar processes, the practical implications for developing a PLC can only be understood and worked out in the specific conditions . . . of particular contexts and settings (p. i).

From this perspective, we sought to address our research question.

Context

Evidence comes from two case studies developed in a broader research study around Partnerships for Reform in Secondary Science and Mathematics (PRiSSM), a three-year professional development project for secondary teachers (Nelson and Slavit, in press). Project goals center on creating and supporting sustainable, school-based teacher inquiry communities that explore and adopt a common vision of high quality learning and teaching in science and mathematics. As discussed above, this common vision provides a base for examining and improving teaching in order to increase student learning (Garet et al., 2001). The first year of the project involved 45 “lead teachers” working in collaborative inquiry groups. Each group consisted of 4-6 teachers from 2-3 schools (related middle and high schools in a district), different disciplines (science and mathematics), and across grades levels (6th – 12th). Project-wide institutes supported the teacher collaborative inquiries; these involved an initial one-week summer institute prior to the site-based inquiry work and a one-day follow-up in the spring. The teachers participated in a variety of experiences during the institutes, including model lessons and videotaped case examination of reform-based instruction, facilitated discussions of beliefs about high quality teaching and learning in mathematics and science, and a series of activities on conducting inquiry, including framing inquiry questions, collecting and analyzing data, and sharing results. These professional development foci continued throughout the year at the district sites, with each group holding periodic meetings, supported by a facilitator, to refine the inquiry focus and further the collaborative inquiry process.

Specific support for the inquiry process enacted by each teacher group was provided by a project facilitator, funded by PRiSSM, who specialized in mathematics and science education as well as group facilitation. The facilitator’s role was resource provider, including materials and guidance in group organization and interaction, community building, and various aspects of inquiry related to focus, implementation, and dissemination. It was explicitly planned that, while the facilitator would provide guidance, the teachers would continuously have control of the direction and focus of their inquiry. The facilitator, along with other project staff, also worked with building and district administrators in support of the teacher inquiry goals. Additional details of the structures of PRiSSM are provided in the case study discussions.

Because the final two years of the project involve the lead teachers translating these experiences into the development of school-based inquiry groups with building colleagues, we have chosen to only focus here on the Year 1 activity and the cross-school collaboration. Both cases emanate from teacher groups in a large, suburban school district with a somewhat diverse student population (80% white, 33% Free or Reduced Meals). All 1472 district teachers meet the United States federal definition of “highly qualified”. All of the teachers in the cases were white, most of whom were in the beginning to middle stages of their teaching careers.

Data Collection and Analysis

Case study evidence emerged from three data sets: PLC meeting activity, formal and informal teacher and facilitator interviews, and from specific project-wide activities. Direct observation and field notes of PLC meetings was the primary observation tool, supplemented by audio- or video-records taken of a small percentage of meetings at both case sites. PLC meeting artifacts, such as meeting agendas and notes as well as data samples from the inquiry (such as student work) supplemented the observations. Analysis of the PLC meeting activity focused on specific descriptions of the development of community within the group, the progression of the inquiry process, and the emergence of specific knowledge and beliefs about learners, learning, and teaching that emerged over time. Hence, general synopses of PLC meetings were made along these themes and used as the primary source of data reporting. Some direct transcripts are also included.

Interviews with both the teachers and facilitators were conducted over the course of the year. One structured interview was conducted with each teacher group. This interview occurred toward the end of the academic year and included questions targeted at reflecting on the processes and products of the inquiry process and specific supports and limitations encountered. In addition, more informal, unstructured conversations organically emerged through our participation in the project, including interviews before and after PLC meetings, during project-wide activities, at school sites, and more informal settings.

The final data set consisted of observations and artifacts from the previously-described PRiSSM events. These included further observation of the teacher groups’ collaborative inquiry, two videotaped group reports of PLC progress, informal interviews with those building and district administrators in attendance, and artifacts produced from the professional development activities.

Analysis focused on identification of themes relative to the above framework. Specifically, we drew from the above theoretical discussion of teacher growth to frame our analysis of those impacts observed at the PLC-level and which emanated from the dialogic inquiry observed within the teacher groups.

Instances where groups did and did not seek to collectively achieve meaning regarding their individual and collective perspectives on students, learning, and instruction were identified and used to frame the case discussions. The role of teachers' knowledge and beliefs was made central in this analysis. Data saturation around particular themes relative to the six characteristics of supported collaborative teacher inquiry provided the main scaffolding for reporting the results.

RESULTS

A discussion of two teacher groups engaged in year-long supported collaborative inquiry will now be described. Both groups consisted of a mathematics and science teacher from each of two middle and one high school (6 teachers per group) from the previously described large, suburban school district. The cases were chosen to illustrate multiple examples within a school district as well as exhibit a range of successful and inhibiting characteristics regarding the six traits of supported collaborative inquiry. The teachers in both were all recognized as potential leaders by their principals. The mathematics and science district specialists, Arne and Dan, shared the facilitation duties for both groups.

Case 1: The Questioners

Some members of the first group of teachers, to whom we refer as the "Questioners", had some collaborative experiences prior to PRiSSM. All three of their buildings made efforts to build content-based teams in mathematics and science, and most of the Questioners had participated in mathematics or science district leadership teams. Therefore, the community building activities, discussion of inquiry methods, and shared collaborative planning time during the summer academy allowed the entire teacher group to build on these experiences and establish a common inquiry focus. Appendix A contains details of the group's inquiry plan for the forthcoming academic year, including the formulation of the following inquiry question: What types of strategies can we use to encourage high quality (student) questions in our classrooms? The Questioners emerged from the week-long PRiSSM summer academy with an expanded sense of community as well as a mutually agreed-on focus. As later noted by Arne, the group facilitator, the Questioners were "off and flying" and "really came together early on". Alan, one of the teachers, attributed this to the fact that "the PLC work was up to us", explicitly noting the availability of choice for both focus and process inherent in the inquiry project as well as the collaborative nature in which the group was approaching the inquiry. Although Alan also stated that "defining the focus was a lot of work", each member of the PLC agreed that this was critical to their early success.

However, despite this apparent progress, the Questioners encountered numerous difficulties early on in regard to data collection and analysis. Specifically, although the Questioners had a focus, the enactment of their inquiry plan was a bit haphazard in regard to data collection. Efforts to videotape each others' classrooms early in the school year were described as "artificial"; in addition, poor sound quality made it difficult to hear student questions, leaving the group frustrated during an early PLC meeting. The group decided to audiotape student questions during classroom instruction, then elicited them in writing from both individual and groups of students during classtime, but both actions left the group equally dissatisfied. Finally, each PLC member acquired a small pocket audiorecorder and agreed to immediately repeat student questions into this device as they emerged during classroom discussions, a method they described as the "Captain's Log". At the conclusion of the school year, Alan reflected, "The kids thought it was corny, but it worked", and the PLC members agreed that "the kids really started to ask more and better questions."

As a result of this collaborative success, the Questioners continued to solidify their relationships and became more enthused with the nature of their inquiry. But midway through the school year, the group was still in search of a method to analyze the student questions, as articulated by Doug:

We had a bunch of data but didn't really know what to do with it . . . The lit reviews led us more toward Bloom's taxonomy as opposed to strategies on how to make kids good questioners. That was one difficulty. But the main difficulty was identifying the range of these questions in some way that was consistent for each person as well as amongst our group. . . At that point, we realized we needed to devise a way to somehow rank these questions.

This issue was resolved through the creation of a "question dichotomy", which each group member attributed to Doug (Figure 2). Question levels could now be easily identified, and the group had a common language to discuss the student questions being posed in their classrooms. Discussing the question dichotomy, Alan noted:

It seems simplistic, but at the same time it's something that, you know, you put Bloom's taxonomy up on the wall and try to have students generate questions based off that, it's more difficult for (the students) to figure out where they're at than this simplified dichotomy. So this dichotomous key – simply yes or no, yes or no - and you end up at a certain tier. That's where we are right now, just invented this and we're using it in the classroom.

Group members also posted the question dichotomy on their classroom walls so that students would be fully aware of this framework. All PLC members indicated that this had an immediate impact on the students' participation in classroom discussion, as Diane discussed in February:

We spent most of our time until now on how to collect data and how to categorize data. But an unexpected result out of the whole process turned out to increase both the quantity and quality of questions. When you pull out the Captain's log recorder, just having this dichotomy up on the wall where kids can see and try to categorize their own questions has increased tremendously the quality of questions. . . we're finding the whole process of data collection has provided us with our further research questions.

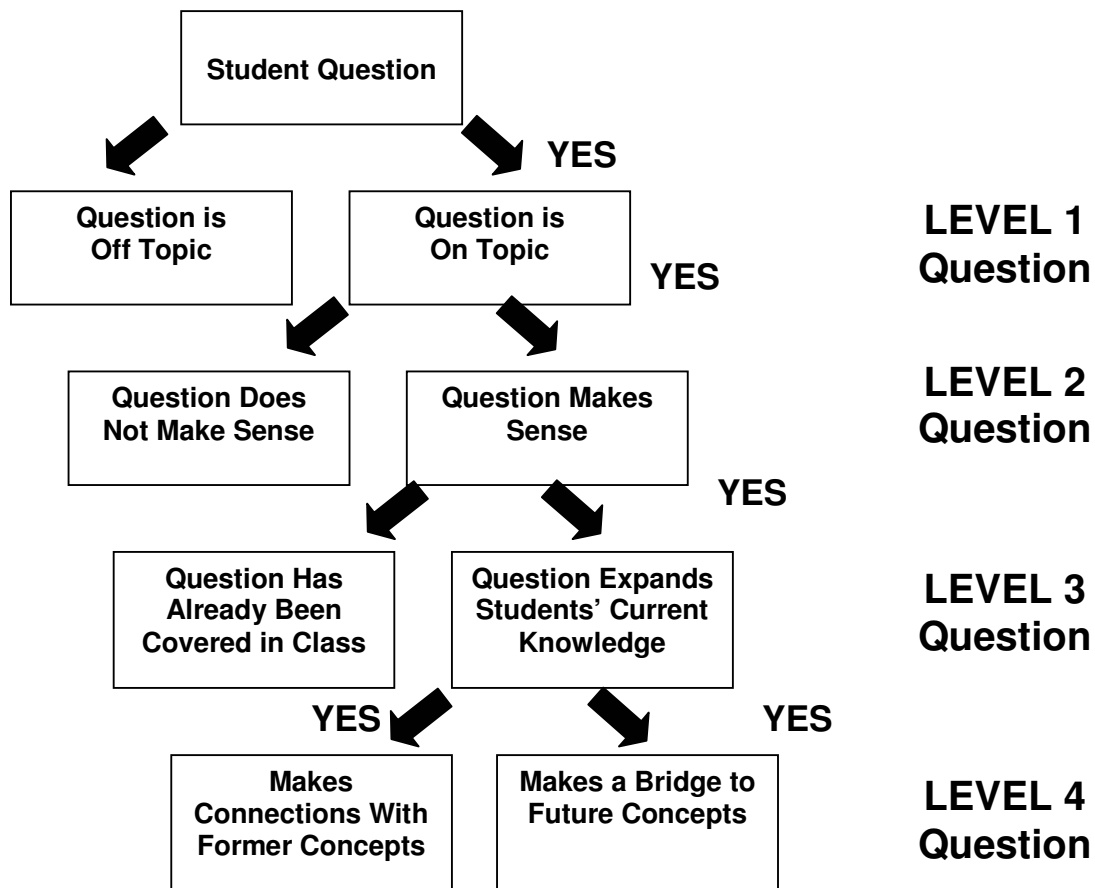


Figure 2: Inquirers' Question Dichotomy Schematic.

Reflecting on the group's data analysis and discussion, Doug also stated, "Our data collection increased the quantity (of questions), but our reactions to them increased the quality." The direct impact on practice, as noted here, was a common theme in the nature of the Questioners' inquiry and an important reason why the group cohered around this common inquiry focus. The methods of data collection morphed into specific teaching strategies.

Not only did the Questioners conclude, through their data collection efforts, that students were asking “more and better” questions, but the collaborative inquiry provided a safe and productive environment for reflecting on instructional practice at both an individual and group level. Further, student reaction to an individual teachers’ instruction was being discussed in a caring, reflective environment that was focused on supporting positive teacher change and provided multiple lenses and environments from which to consider instructional practice. The shared responsibilities, ownership, and successes inherent in this environment led the teachers to positive self-perceptions and high levels of enthusiasm toward their practice. Although pleased, the Questioners are still dissatisfied with their understanding of how these specific changes in instructional practice have directly impacted student learning.

Case 2: The Searchers

Unlike the Questioners, the Searchers did not emerge from the summer academy with a well-articulated inquiry focus. However, in part because some of the PLC members had prior collaborative experiences in science and mathematics district teams, the Searchers did show signs of beginning to establish a common vision and goals at this time. Early in the school year, it was clear that two group members were not fully vested in the project activity. In addition, the Searchers also added two members to their group from another PLC that never obtained sufficient numbers of teachers, adding further complexity to the group dynamic and increasing its size to eight teachers. At the conclusion of the inquiry, Karen reflected back on the early phases of the group’s work:

One of the big things we got from the academies was the team building . . . Everyone has voice, and you need to include those voices.

Other PLC members also talked about the importance of team building and the need to nurture a focus in the early stages of the inquiry, particularly in the unstable climate in which the group worked. Despite their efforts, the Searchers were not able to articulate a precise inquiry question in the Fall, settling on, “How can we improve written communication by paying attention to science lab write-ups and math extended response items?” Data collection was also sporadic, as the group chose to administer a pre/post student survey on the components of good writing in mathematics and science, a pre/post content assessment with extended response items, and to “visit each others’ classrooms to see how written communication is encouraged”. The latter led to the collecting of student work samples from students they deemed high, medium, and low in regard to content-based writing. The samples were to be used in the construction of “posters of quality work”, to be shared as examples of outstanding written work in future PLC meetings. As evidenced in the following discussion from a Fall PLC meeting, the teaching observations stood out as the most useful activity:

Jim: There is power in watching a master craftsman work. You know, for me to go watch Nate in the [interrupted]

Perry: I think that might help the first, second, third year teachers or something, but the mass of our teachers, I think, have pretty good pedagogy and they have pretty good content and I think it's getting to the next level. Having people collaborate and going to the next level.

Arne (facilitator): I have talked to two or three math teachers in my career that have told me flat out that they don't know how to teach CMP (a mathematics curriculum and textbook series) and they need to watch somebody do it. And they've been teaching for 25 years and they are not comfortable doing it . . .

Karen: You know, I come in to watch you teach and I watch Erica teach and each time I watch somebody teach I pick up something. You know, I should not say each time. But probably-

Erica: I'd almost like to see a blend. It's more powerful when it's collaborative and it comes from the teachers than if it's any kind of hierarchal [indistinguishable few words].

Karen: I think it is a balance though. I think each one has its point and each one has its place, but the key thing in all of this is collaboration. Whether we do it as lesson study or whether we do it as "I watch you, you watch me". We get together and put our heads together – "You know what am I saying about graphing that is working? What did I say about graphing that needs some help?" And then you go try it and I go watch you . . .

Perry: I think the ability, like you said, just getting the chance to step back and watch somebody else do it, you get that reading and you're a little more observant.

Besides emphasizing the benefits of teacher observations, this dialogue also illustrates the trust and caring that emerged amongst the eventual participants of the PLC activity (with the exception of Perry, who left the PLC in January). Despite the difficulties in group composition, focus, and data collection, the Questioners continued to say that their collaborative inquiry was more meaningful than the professional development they normally experienced. Their inquiry was "about our own classrooms", while other professional development experiences "have no real connection for the teachers". The PLC members credited the facilitators for their ability to move their work forward, as one articulated:

They have come to our meetings, helped us narrow our focus, and have modeled excellent questioning strategies . . . If there is something they haven't done to help us, we don't know what it is!

Midway through the school year, the group composition stabilized, as both teachers who were intermittent participants had withdrawn, new participants with a greater commitment to the project emerged, and the two teachers from a separate PLC left to begin their own group. However, despite the stabilization of group composition, the inquiry was still in a state of turmoil. Karen drew from the professional development literature to refer to the group as suffering from DRIP – being Data Rich and Information Poor. Overall, the PLC members felt “swamped with data” and were unsure if their data collection had been valuable, although the group’s mid-year quantitative analysis of student writing did show improvements at all three of their self-defined writing ability levels. The teachers also continued to see value in the teacher observations, particularly in regard to the building of their teacher community, as Karen notes:

We did classroom observations because we didn't know each other as teachers and professionals . . . we didn't get a whole lot of (useful) data out of that, but we did get to know each other.

Despite the lack of inquiry focus, the Searchers made early use of data to shape project direction. Group analysis of the content-specific pretest confirmed the PLC members’ belief that the students “had difficulty expressing their thinking”. Further, after an analysis of the pre-survey on quality content-based writing, the teachers concluded that “students do not know what good writing is, nor what things would help”. To support their own individual data analysis and to add a component of shared responsibility to group activity, the teachers decided to inform their students that another teacher would read their work. It was hoped that this might move the inquiry forward and improve the students’ writing. The teachers also utilized document cameras to allow the students opportunities to assess each others’ writing, and implemented a variety of other writing strategies as well. However, Erica stated that “we don’t have best practices research to back up what we’re doing in our classrooms . . . Our main struggle right now is we need to find . . . strategies we can use in the classroom to improve students’ writing.”

The lack of a satisfying teaching intervention troubled the Searchers the entire year. However, at an all-day PLC meeting in April, each teacher brought 12 student work samples, exchanged them with a like-content teacher, and discussed issues of assessment, student thinking, and instruction. Erica noted “how exciting it was to spend a full day with the group talking about student work . . . it’s amazing how energizing it is”. Although group members attempted to discuss teaching implications from their data analysis, differences in the manner in which curriculum was implemented across schools and differences in class period length made this

difficult. However, the group conversation revealed that the teachers made explicit their tendencies to assume various things about their students when analyzing their work, which their companion grader did not. The degree to which this change in perspective, or any other aspect of the inquiry process, impacted the instructional perspective or practice of the Searchers remains unclear. Nevertheless, by the end of the year, the PLC members reported satisfaction with their year-long inquiry despite the multiple changes in group composition and difficulties in data analysis.

CONCLUSIONS

Although evidence exists to support the notion that collaborative teacher inquiry can provide a reflective environment that supports the negotiation of beliefs and instructional change (Wilson and Berne, 1999), there is still a need to better understand the broader dynamics and impacts of PLCs, particularly in regard to those contexts and structures that lead to the development of both individual and groups of teachers. This paper provides specific evidence on the formation, processes, and results of two different teacher groups engaged in a year-long supported collaborative inquiry. Although mixed results were found, the data indicate that these collaborative, data-based, and supported environments can provide a setting for teachers to take control of their own professional development and enact specific changes in their classroom environment and practice. Specific negotiations of beliefs about learners, learning, and teachers were provided in both cases. These data included beliefs which surfaced in the examination of student work, during dialogic inquiry processes, and during reflection on group processes. The social interactions and group structures that framed the year-long inquiry were vital to the development realized by both the individual teachers and the group as a whole.

Both the Questioners and the Searchers had difficulty managing and manipulating data, even wondering about its purpose. Although the Questioners were able to overcome this dilemma, the Searchers were never able to utilize their data in support of instructional change. Further, the Searchers' early data collection may have reinforced their beliefs about students' writing in a problematic manner, as a very limited data set and analysis was used to support their conclusions; specifically, students were labeled "high", "medium", and "low" prior to analysis, which may have reinforced already held beliefs about students and student writing. What appeared to be most beneficial to the Questioners was their ability to ground their inquiry directly into their instructional practice. As the inquiry developed, there was a seamlessness between the data collection process and the ensuing instructional change, all of which were initiated and developed inside the teacher group through a dialogic process. The Questioners were able to create an environment, supported by the facilitator and the overall project structure, that allowed each teacher to go beyond

their individual means in support of their own instructional change. The Searchers had difficulty doing this, despite late progress in understanding their inquiry focus and data corpus, and very little evidence was found to indicate subsequent change in instructional practice. The Searchers were also limited by a revolving door of participants that left the group composition in flux for much of the academic year.

IMPLICATIONS

The cases provide clear evidence that these teachers were quite capable of identifying their own professional development needs and constructing data-based inquiry to address their self-identified learning goals, but may be hindered by constraints of time, resources, and a limited ability to analyze data. These results are consistent with the other case studies in the project and with those found in the research literature (Darling-Hammond and McLaughlin, 1995; Putnam and Borko, 2000). Facilitation and other means of support are important to a collaborative teacher group's ability to focus and move forward in the inquiry (Wilson and Berne, 1999), and steady group composition is also vital to the community building and inquiry focus processes. Specifically, teacher groups who take time to identify a well-articulated inquiry focus and purposeful data collection process are likely to have a more organized inquiry, particular when this focus has direct implications on their day-to-day practice (Garet et al., 2001; Gamoran et al., 2003). A facilitator can provide critical support to this organizational and intellectual process, but it seems that narrowing the gap between inquiry and practice is extremely critical to the clarity and power of a teacher group's development (Little et al., 2003). This was evident in the contrast between the Questioners and the Searchers. Prior collaborative experiences also appeared to play an important role in the building of community and the establishment of a collaborative inquiry focus in both groups.

The variety of supports provided by the facilitator and project events did seem to be effective in regard to the team building aspects of the PLC work, but less effective in regard to their ability to collect and manipulate data. Potential reasons for this are quite complex, including the inherent difficulties in conducting inquiry, time, inadequate support provided by the project and facilitator, and, in the case of the Searchers, a lack of connection to instructional practice. For these cases, a more concentrated level of support may have been needed regarding the inquiry aspects of the PLC dynamic.

It is clear that, in both cases, the teacher groups extended their individual perspectives on teaching and learners through a careful examination of beliefs and data-based inquiry into classroom practice (Fullan, 1999; Gamoran et al., 2003; Hord, 1997; Little, 2003). In both cases, the teachers utilized classroom experiences and student work to negotiate what they believed about high quality teaching and learning throughout the year. While the Questioners shared the belief of the importance of student

questioning all along, their collaborative inquiry refined both their individual and collective beliefs and led to a specific instructional change. The Searchers also shared the belief of the importance of utilizing student work to measure understanding, and their collaborations led to changes in beliefs about their own ability and procedures for analyzing student work. In both cases, it would seem that teachers who work together on a targeted goal are forced into positions to individually and collectively examine their beliefs, but the degree to which the beliefs change, the nature of how the belief is held, and the subsequent impacts this might have on instruction can vary greatly.

While “relatively little research examines the specific interactions and dynamics by which professional community constitutes a resource for professional learning and innovations in teaching practice (Little, 2003, p. 914)”, this paper furthers the available empirical data base on the specific processes and impacts of this form of teacher development. However, more evidence is needed to clarify the specific impacts of this professional development structure at both the individual teacher and group levels.

NOTES

1. Support for this work has been provided by a Mathematics Science Partnership grant from the U.S. Department of Education and by the National Science Foundation Grant ESI-0554579. The opinions expressed in this document are solely those of the authors.
2. This situation has direct parallels with regard to student learning and the degree to which teachers distribute control of content and/or lesson activity to their students.

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APPENDIX A:
“Questioners” PLC Collaborative Inquiry Detailed Plan
Version 1, from PRiSSM Summer Academy, August 13, 2004

Please keep this in your building PRiSSM binder. Create new charts as revisions are made. Save old charts to document revisions.

High Quality Learning & Teaching Focus (from PLC plan): Increasing our understanding of students’ thinking through the quality of student questions.			
Question/Problem (from PLC plan): What types of strategies can I use to encourage high quality questions in our classrooms?			
Information Source: <i>What types of data will we collect? (from PLC collaborative inquiry plan)</i>	Data Collection: <i>How?</i> <i>When?</i> <i>By Whom?</i> <i>Where?</i> <i>Evidence?</i>	Data Analysis <i>How?</i> <i>When?</i> <i>By Whom?</i> <i>Where?</i> <i>Evidence?</i>	Resources <i>(books, videos, PD experiences, people, existing programs/ initiatives, etc.)</i>
Classroom observations	How: Video Tape sessions of each of the six PLC members When: We will do a videotape session each trimester. Our first video taping will be accomplished by Sept. 25 th . By Whom: Each of us will videotape ourselves (camera on a tripod) Where: In classroom Evidence: Every PLC member will have a hard copy of the video session.	How: Meet together outside of school day to review the videotapes. Brainstorm good techniques to score and analyze all videos at later date. When: Sept 25, 2004 at 7:00 By Whom: PLC group Where: At Connie’s house. Evidence: Team will create a plan to score and analyze each video. We will have a written plan to follow for each subsequent video analysis.	
Student work	How: The last day of the school week we will each give our students a reflection sheet that asks the following questions: What did you learn this week and how did you learn it?; What questions remain unclear?; and If I were the teacher, what questions would I ask my students to make sure they understand this weeks lessons? When: The last day of each school week By whom: Each of us will do this Where: In classroom Evidence: The reflection	How: Meet outside of school to review student work and score the level of questions from the reflection sheets When: November 1, 2004 at 11:30 By whom: PLC group Where: At Forest Middle School in room 12 (bring your lunch) Evidence: We will record the score/level of questions from the reflection sheets	

	sheets that we get from students		
Research/lit	<p>How: We will research different methods of identifying and classifying question types. We will also research how to teach our students to become better questioners.</p> <p>When: By Sept 25th</p> <p>By whom: By our first meeting, each PLC member will bring and summarize (written summary) one strategy to improve the quality of student learning</p> <p>Where: Internet, library, college, colleagues</p> <p>Evidence: each member will leave with 6 summaries as well as the name of a resource</p>	<p>How: Read and discuss the six resources that we find</p> <p>When: Sept 25th</p> <p>By whom: each PLC member</p> <p>Where:</p> <p>Evidence:</p>	
Student performance data	<p>How:</p> <p>When:</p> <p>By whom:</p> <p>Where:</p> <p>Evidence:</p>	<p>How:</p> <p>When:</p> <p>By whom:</p> <p>Where:</p> <p>Evidence:</p>	
Demographic data	<p>How: We will record gender, ethnicity, ESL/EI, Highly capable (EXCELL), and special education students in our classes</p> <p>When: Sept 25th</p> <p>By whom: each PLC member</p> <p>Where:</p> <p>Evidence: We will each have a sheet with our demographics on it</p>	<p>How: Discuss and identify the strengths and weaknesses of the different populations of students within our classes</p> <p>When: Sept 25th (and continue the discussion at latter meetings TBA)</p> <p>By whom: each PLC member</p> <p>Where:</p> <p>Evidence: We will have one member record the results of that discussion</p>	
Other data sources:			
<p>What actions will be taken after data analysis? This will be a year long study. We will continue to analyze video of ourselves and the classes of our PLC members throughout the year. Modifications to instruction will continue to evolve after each viewing session.</p>			
<p>How does this action tie to existing initiatives? We are focused on creating high standards of learning.</p>			
<p>What questions still need to be addressed?</p>			

**CAMBIO DOCENTE DIALÓGICO: DOS CASOS DE INDAGACIÓN COLABORATIVA CON
ASESORAMIENTO**

RESUMEN

Este artículo presenta el impacto de la indagación dialógica (Wells, 1999) en dos grupos de docentes participantes en un modelo específico de formación continua definido como *indagación colaborativa con asesoramiento* (Nelson y Slavit, en prensa). Después de discutir los contextos de enseñanza y formación continua se presentan dos grupos de docentes implicados en un proceso de indagación colaborativa durante un año académico. Las evidencias sugieren que los dos grupos tuvieron cierto éxito con respecto a su capacidad para establecer una comunidad de indagación y ambos grupos tuvieron dificultades a la hora de recoger y procesar sus propios datos. Por una variedad de motivos ambos grupos encontraron significativamente positiva la experiencia de formación continua dialógica. Se discute las implicaciones para la formación continua y la investigación futura.

PALABRAS CLAVE: Indagación docente - Comunidades de aprendizaje profesionales - Matemáticas y ciencias en educación secundaria