In this article, we describe our professional development model, Content-Based Collaborative Inquiry (CBCI). The purpose of the CBCI model is to engage educators in inquiring and constructing their own knowledge as they focus on both student understanding in specific content areas and their own learning processes. We first explain the empirical foundations of CBCI. Through 3 cases we illustrate how content knowledge is developed via collaborative inquiry, originating in teachers’ classrooms, and expanding to create and sustain collaborative communities of inquiry in the multiple contexts where educators work. We conclude by discussing challenges and continuing issues for efforts to support lifelong teacher learning and educational reform.

We are collaborating with teachers in an educational reform effort called Schools for Thought (SFT). The SFT approach reflects foundational principles derived from current theoretical and empirical work on cognitive and social dimensions of learning in organizational contexts (Bransford, Brown, & Cocking, 1999). Essentially, the SFT approach attempts to shift the focus of classroom instruction from memorizing facts to learning with understanding (Lamon et al., 1996; Secules, Cottom, Bray, & Miller, 1997). Learning with understanding means that students organize foundational facts and ideas meaningfully in conceptual frameworks that facilitate retrieval and application in new situations. Our goal has been to create professional development opportunities that support teachers in making this change. As our professional development model has evolved over the past 10 years, we have learned that such a shift requires that teachers examine the meaning of student understanding in content areas. In our efforts to develop professional development experiences that accomplish this goal, we have incorporated principles derived from current work on teacher learning (Cochran-Smith & Lytle, 1999; Lieberman, 1996; Little, 1993; McLaughlin, 1993; Putnam & Borko, 1998) and the school culture (Barth, 1991; Fullan & Hargreaves, 1992; Murphy, 1991). Specifically, our model fosters the development of professional learning communities that support collaborative inquiry focused on student understanding.

We confront two fundamental challenges in this process: developing teachers’ understanding of what it means to learn with understanding in a content domain, and developing teacher communities of collaborative inquiry. The former is needed if teachers are to figure out what students understand, why they understand it, and what may help them continue to develop understanding (Cooney & Shealy, 1997). The latter is needed because they provide teachers with learning experiences that parallel processes supporting students’ learning with understanding. Such communities of collaborative inquiry also provide a supportive context for sustained reflection on teaching practices and student understanding (Cochran-Smith & Lyle, 1999; Darling-Hammond & Ball, 1997; Kruse, Louis, & Byrk, 1995; Lieberman, 1996; Little, 1993; McLaughlin, 1993).

In this article, we describe the model we have developed, Content-Based Collaborative Inquiry (CBCI), to meet the professional development challenges posed by reform efforts such as SFT. Due to the fact that this model grew out of our reflections on our own prior experiences and those of others concerned with teacher learning and educational reform, we first set the CBCI model in those contexts. We then provide a conceptual perspective of the CBCI model. The organization
and enactment of CBCI is illustrated through three cases of collaborative inquiry, one in the classroom, one in a school community, and one in the SFT teacher community. We conclude the article by reflecting on challenges and continuing issues for efforts to support lifelong teacher learning.

ORIGINS OF THE CONTENT-BASED COLLABORATIVE INQUIRY MODEL

The goal of our reform efforts over the past 10 years was to develop student understanding of important concepts in mathematics, science, literacy, and social studies. We originally thought that we could achieve this goal by transforming teaching materials, teachers’ practices, or both. Our professional development fit the “knowledge-for-practice” mode (Cochran-Smith & Lytle, 1999) in that teachers learned from us, the university researchers, about materials we had created and that were intended to “carry” the reform (Cognition and Technology Group at Vanderbilt [CTGV], 1997). In 1993, we began the SFT project in the knowledge-in-practice mode, working together with teachers to develop curriculum units that would embody the foundational practices and principles of SFT (Brown & Campione, 1994; CTGV, 1994; Lamon et al., 1996; Scardamalia, Bereiter, & Lamon, 1994). New teachers turned to other teachers who were “doing it right” for guidance on classroom practices. In 1996 when district-mandated curriculum changes made it necessary to adapt SFT curriculum units to new scope and sequence requirements, we realized that the focus on developing curriculum units had not lead to sufficient understanding of the foundational principles of SFT for teachers to successfully adapt the units (CTGV, in press). Indeed, when we initially attempted to re-focus professional development around student understanding in content areas we found that many of the SFT teachers had not made a shift from defining content understanding as the execution of procedures and skills and the accumulation of facts toward underlying concepts and principles in the content area.

Meanwhile, a 5-year federal grant in partnership with the local school district required the SFT project to expand from 30 to 125 teachers, increase the participating grades to kindergarten through Grade 8, and build toward sustainability in the district after the funding had ended. This convergence of events and evidence led us to reconsider our model of professional development. Based on extensive analysis of our own experiences and wide reading of the literature on teacher learning and organizational change, the CBCI model emerged. It reflects a view of teachers’ professional learning consistent with knowledge of practice (Cochran-Smith & Lytle, 1999): In CBCI, teachers engage in inquiry and construct their own knowledge by focusing on student understanding in specific content areas. The knowledge they build is of content, pedagogical content, and general pedagogy (Shulman, 1986) that supports learning content with understanding.

Our emphasis on student understanding and the development of communities of collaborative inquiry is consistent with other research on teacher learning in the past decade. Research on teachers’ learning about student understanding shows that a focus on student responses and what they indicate about student understanding deepens teachers’ own understanding in content domains (e.g., Cobb, Wood, & Yackel, 1990; Franke, Fennema, & Carpenter, 1997; Pennell & Firestone, 1996; Rosebery & Warren, 1998; Schifter & Fosnot, 1993). Furthermore, research on teacher learning communities has shown that they foster collaboration, inquiry, and change in teaching practices and provide a vehicle for teachers to continue to learn (e.g., Cochran-Smith & Lytle, 1999; Lieberman, 1996; Little, 1993; McLaughlin, 1993). Establishing learning communities, however, requires that teachers learn new ways to talk about content, student thinking, and their own knowledge of content and pedagogy (Anders & Richardson, 1994; Ball & Cohen, in press; Rosebery & Warren, 1998; Wilson, Lubienski, & Mattson, 1996). Most recently, the literature on educational reform has begun to address the role played by specific orientations toward knowledge and knowing (Bruner, 1996; Gause-Vega, 1999; McLaughlin & Stokes, 1998) in sustaining learning with understanding and communities of collaborative inquiry. The assertion is that both require a view of knowledge as socially constructed within a particular sociohistorical context and content domain; knowledge claims as supported by the analytical use of evidence; and “coming to know” as a process entailing the consideration of multiple perspectives.

CONTENT-BASED COLLABORATIVE INQUIRY: CONCEPTS AND ENACTMENT

The essential concept of the CBCI model is that student understanding in content areas serves as the focus of collaborative inquiry. Professional development involves teachers reflecting on observations of students in their classrooms, engaging in dialogue with each other as they attempt to make sense of their observations, and developing awareness of their own learning processes as a professional community. Collaborative inquiry occurs in three contexts: (a) the classroom, where teachers collaborate with facilitators; (b) the school community, where teachers collaborate with other teachers and administrators at their school; and (c) in SFT teacher communities, where teachers engaged in the SFT reform collaboratively inquire with each other (see Figure 1). The patterns of learning and thinking about student content understanding that repeat in these three
contexts lead to the development and sustainability of communities of collaborative inquiry.

IMPLEMENTATION AND ORGANIZATION

At the classroom level, facilitators guide the inquiry process into student understanding in specific content domains. At the community level, teachers inquire together by sharing inquiry they are engaged in at the individual classroom level. Facilitators emphasize reflection on the learning and the norms and processes by which the learning is occurring. This makes explicit important processes of learning that teachers can build on to further their learning as a community and the learning of their students.

SFT professional development occurs in two phases: preimplementation and implementation. The preimplementation phase consists of six, 2-hr after-school sessions in the spring and culminates in a 2-week institute in the summer. During this phase, we begin the processes of engaging in inquiry focused on student understanding in specific content domains and building norms for learning together. The purposes of our collaboration during the preimplementation phase are to (a) help teachers build their knowledge base in specific content areas and of student understanding in those areas, and ways of talking about both; (b) figure out what inquiry in classrooms look like (what serves as evidence and how to use this evidence to learn); and (c) reflect on the learning process and our evolving norms for learning together. These experiences prepare teachers to look at their classrooms as places to conduct inquiry about student thinking and to actually engage in doing this inquiry. Each teacher focuses on two of the content areas they teach.

It is during the “implementation” phase that we work with teachers in the three contexts of collaborative inquiry: classroom, SFT community, and school level. Fundamental to the potential sustainability of the reform effort is that the teachers’ learning across contexts is intended to be synergistic. Changes in norms and patterns of interactions in each context, and the underlying orientations toward knowledge and knowing, build on and reinforce the others. In the next section, we provide three illustrative cases of the implementation of the CBCI model in each of these contexts. The case descriptions are based on field notes and transcripts of audio- and videotapes of the sessions.

ILLUSTRATIVE CASES OF TEACHER LEARNING IN MULTIPLE CONTEXTS

Classroom-Based Inquiry

In the classroom context, facilitators visit each teacher’s classroom once or twice a month. Classroom-based inquiry supports the development of each teacher’s understanding of a content domain and provides individual experience with exploring students’ understanding. It also forms the foundation for teachers’ collaborative inquiry with colleagues. During classroom visits, facilitators help the teachers conduct inquiry in their classrooms by focusing together on a question about student understanding, collecting evidence relevant to it, and analyzing this evidence. Through this process, teachers develop new ways of thinking and talking about their students’ learning. The first case describes an interaction between a math facilitator and a second-grade teacher in her classroom in which the teacher began to question her own assumptions about students’ mathematical understanding.

Early in the school year, Deidre, a second-grade teacher, decided to focus on the learning question, “How do my students develop an understanding of place value?” During one of the early classroom visits, the teacher and facilitator analyzed student work as a way to help them learn about understanding place value. In the first conversation, the teacher initially defined understanding place value as the behavior asked for by the district’s Math Improvement Program (MIP) test.

3Teachers’ names and the school name used in all cases are pseudonyms.
Deidre: My students don’t understand place value very well. On the MIP test [standardized curriculum test mandated by district], most of them did poorly.

In responding to the facilitator’s question about what the test measured, the teacher began to question whether this test behavior really assessed understanding.

F: What sorts of questions were on the test?
Deidre: Well, some of them asked the student to name the digit that was in a certain place, like the hundred’s place…. You know, I don’t think that questions like that really test their understanding of place value.

In the process of verbalizing the content of the test item, Deidre realized that she did not agree with the MIP definition. The test defined understanding place value as simply the student naming the digit in a particular place in a number. Thus, her original evidence, performance on the MIP, did not really tell much about her students’ understanding of place value. As the conversation continued, the facilitator probed further and Deidre began to articulate her thinking.

F: Why not?
Deidre: Because even though the student can tell me what digit is in the hundred’s place, it doesn’t mean that he understands the value of the number.

At this point in the conversation, the facilitator offered an analysis of what students might need to understand in an effort to provide an alternative conception for the teacher to consider.

F: That’s a good point. Students do need to see the 2 in 23 both as 2 tens and also as 20. If students can break numbers apart in different ways they might develop some flexibility in thinking about numbers that can help them in understanding place value. When students add and subtract in ways that make sense to them, students often break numbers apart. For example, when students add 23 + 17, they often add 20 and 10 first and then 3 + 7. The students are thinking of 23 as 20 + 3. This is an important idea in developing an understanding of place value.
Deidre: Hmmmm. That makes sense.

The teacher decided to build on what the facilitator had suggested and used the idea in class to collect a different kind of evidence from her students, evidence that would help her determine how her students were thinking about numbers.

Deidre: Some of them knew it was 20 but most of them didn’t.
F: Why do you think that some of your students don’t think of the 2 in 23 as 20?
Deidre: Because I don’t think that they realize they can break numbers apart. But I don’t think it will do any good to just tell them this.

With a more differentiated idea of what it means to understand place value and the realization that telling would not lead to understanding, the teacher and facilitator worked together to try to identify a learning task that might help develop student understanding. In the following conversation, the facilitator helped the teacher see how a learning activity she had previously used may be changed to help students develop some understanding needed for place value.

F: Can you think of a task that would help students begin to think about breaking numbers apart?
Deidre: No, but I’ll try to look through my books and see if I can find one.
F: Do you remember that task you had students do to help them develop an understanding of single digit numbers as well as learn their addition facts?
Deidre: Oh, the one where they used their junk boxes to make numbers in as many ways as they could?
F: Yes. Well, what if you made a task similar to that? For example, what if you gave your students the number 23 and asked them to build different sets that totaled 23? Some students might make two groups of 10 and a group of 3. Others might make 4 groups of 5 and a group of 3. Then students could share some of the ways they made 23.
Deidre: And I could ask them which sets were easier to count based on the number that was in each set. I think I will try that with my students. I can’t wait to see how they try to solve the problem and what they talk about as they make different sets.

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In this illustrative case, we have shown the iterative process of analyzing student work. Collaborative inquiry at the classroom level helps teachers develop understanding in content areas through a focus on student understanding. Coming to view content domain understanding in this way involves inquiry processes such as questioning assumptions, collecting and providing evidence for knowledge claims, viewing evidence from multiple perspectives, and reflecting on the evolution of knowledge over time. The questioning leads to new insights about what may constitute evidence of student understanding. The rethinking of instructional practices is then grounded in teachers’ evolving knowledge of understanding in a content domain. Changes in practices, in turn, lead to the generation of new evidence. The new evidence helps teachers and facilitators continue to learn about understanding and how to help students develop this understand-
Inquiry in the SFT Community

The second context of support is the SFT community across schools. There are three, all-day professional development in-service days to which all SFT teachers are invited and there are once-per-month after-school meetings. Community-level inquiry allows teachers to discuss their classroom and school inquiry with colleagues from other schools and across multiple grade levels. They also share their experiences and multiple perspectives on content and student understanding, with the facilitator guiding this process as needed. As the second case illustrates, these interactions can have powerful effects on teachers’ concepts of content and process.

The case we present is drawn from one of the 2-hr after-school meetings of the elementary teachers. The composition of the group in these after-school sessions fluctuates and this was the first time these particular teachers had met as a group. The case shows the multiple points of view teachers bring to the group and their learning through the dialogue with one another.

The elementary teachers participating in this after-school session were discussing students’ mathematical understanding to address the learning question they had previously identified: “How do we structure learning tasks to support the development of student understanding?” The group was composed of one kindergarten teacher (Cara), one first-grade teacher (Beth), two second-grade teachers (Sally, Catherine), and a fourth-grade teacher (Dorothy).

In the initial part of the session, we reviewed our norms and expectations of each other as a group of learners. Due to the fact that we identified the need to voice and value different points of view, we each introduced ourselves and the various expertise we brought to the discussion. Thus, we made explicit our multiple perspectives and our intent to learn from each other. We also agreed to center our discussion of students’ thinking in math in the evidence each of us brought to the group.

To get the conversation started, Cara had shared examples of how her kindergarten students communicated their solutions to a mathematical dilemma: “How many cookies would remain after each person in the class took one?” In considering what the students’ work demonstrated about their understanding in math, the other teachers noted that although students made sense of the problem differently, each had communicated some good understanding about number. A second teacher (Beth) then shared a subtraction worksheet on missing addends that she had given her first graders. Problems were set up as equations (e.g., Quantity 1 – _____ = Quantity 2) but the quantities were depicted with pictures (e.g., four balloons for Quantity 1 and two balloons for Quantity 2). With her peers, Beth discussed the worksheet and her frustrations concerning students’ inability to complete the task, which the district curriculum indicated they should have mastered. Cara then realized it may be better if students could write down their thinking as they attempted to solve the problem rather than merely try to write a number in the blank. Cara: It seems like what if you did try something like if they just wrote it down instead of doing that [worksheet]. That’s part of it, sort of coming to a consensus of a formal representation and that [worksheet] is formal. Even though that’s not 4 – 2, it’s still formal.

Beth: I’m concerned that it’s the end of the six weeks and they are supposed to be tested on this … Sally: Really you’re teaching them missing addends so that’s like what she [Cara] said. Just have them write how they know … how many are in there. Just have them write it. What I’ve done with my kids is then think about what is here [left side of the equation] and what is here [right side of the equation], and then they come up with their own math problem.

Sally’s comment described how she helped students begin from their own writing about their problem solutions to more conventional ways of expressing their thinking, an idea that she, as well as Cara and Catherine, had previously discussed in individual meetings with the math facilitator. However, they had never discussed what Cara highlighted in the following statement: invention as a developmental precursor to conventional forms of representation.

Cara: The step [that is missing] from the one task [Beth’s] is invention into convention. After they’ve invented for awhile and feel comfortable say …, “How do all these [multiple students’ representations] show the same thing? What is the conventional way of communicating? How can we all say it alike?”

What is particularly interesting about Cara’s contribution is that the invention-to-convention sequence was one that Cara had focused on in literacy and was actively using in her language instruction. We take this as evidence of the kind of “transfer” that can occur across content areas, although we have not yet seen many instances of it.

As the conversation continued, other teachers began to analyze the thinking students needed to do to complete the worksheet.

Catherine: So when you give them that [the worksheet], it’s really a whole bunch of more steps.

Beth: Yeah, it really is and I realize it is but I have to have them know this.

Catherine: Don’t push them and skip those steps of invention.
Cara: That’s probably what’s the problem with those fourth-grade students, they’ve missed the steps of invention.
Beth: Yes, that’s true.
Dorothy: Yeah, they just say, “Just tell me if it is take-away or what and I’ll do it.”
Cara: They just learned formulas.
Dorothy: They need to be really secure in the invention before they go to the convention.
F: I think invention helps them develop meaning because they are not focusing all their attention on how they are writing it but on what it is they are trying to communicate and after they’ve done that then they can move into the convention and have meaning.

Finally, this conversation provided an opportunity for the group to recognize a developmental relation between student understanding in early grades and their performance in later grades. In the preceding segment, Cara raised the issue of understanding in early grades and their performance in later grades. In the preceding segment, Cara raised the issue of fourth graders’ “problems” and the facilitator explicitly discussed the close relation between invention and meaning making. Following the facilitator’s comment, Dorothy elaborated and expanded on this point.

Dorothy: In fourth grade we are dealing with the same thing. They’ve been taught convention before invention and I think there’s no basis of understanding for the majority of my class…. I’ve seen it in fifth and sixth grade…. I thought, well, they don’t know their facts, but there’s a lot more to it than not knowing facts.

Whereas Cara, Catherine, and Dorothy all began to affirm the importance of moving through invention to convention, a new learning for them, Beth questioned the ideas they expressed. As suggested in this case, the exposure to multiple perspectives affords an opportunity for teachers to challenge their own and others’ assumptions, identifying concepts important to developing students’ understanding.

Furthermore, this discussion provided a basis for teachers to consider the development of student understanding in mathematics beyond just the 1 year they teach. We have seen a number of instances of SFT multigrade teacher communities in which teachers have moved from blaming last year’s teacher for this year’s problems. As in the case described, they begin to see the problem in terms of a broader picture of the development of student understanding in mathematics and the need to rethink assumptions about it.

Collaborative Inquiry in the School Context

The third context of collaborative inquiry is school-level meetings that occur at least once a month and more, if requested by teachers. SFT teachers, administrators, and other interested school personnel engage in collaborative inquiry around a coconstructed learning question, drawing on evidence from teachers’ inquiry in their own classrooms. A facilitator guides this process and helps the group reflect on how they are learning together. Our third case provides an example of the development over time of a school-based collaborative inquiry community. The learning community at Oak Street Elementary illustrates the potential for the sustainability of SFT beyond grant-supported professional development. Over 2 years the group’s collaborative inquiry developed in the following areas: (a) growing reliance on collective analysis of evidence of student understanding, (b) challenging assumptions underlying practice, (c) reflecting on pedagogy grounded in growing knowledge of content and students’ understanding, and (d) increasing responsibility for monitoring their own learning processes to better support the group’s inquiry.

Year 1 of implementation. During the 1st year of implementation, the learning community consisted of five teachers (kindergarten–Grade 2), the principal, and the university facilitator. The group met twice a month from September through April. In this time, the focus for learning moved from grappling with their struggles in trying to “do” SFT to beginning to explore content knowledge and how to engage other colleagues in the group’s inquiry.

At the first meeting in September, the teachers and facilitator began by discussing norms for learning together and defining roles and responsibilities. Of utmost importance to the teachers was the desire to feel safe talking about the risks they were taking—the challenges and mistakes inherent in making changes. Initially, the teachers wanted to talk about their trials in managing students’ behavior as they attempted to do SFT. This discussion led to descriptions of changes in the patterns of communication they were observing in their classrooms.

In subsequent meetings, the facilitator continued to probe for clarification and request evidence for teachers’ conclusions, intentionally attempting to create further experience with inquiry, and modeling consideration of evidence from multiple perspectives. For example, when the teachers talked about communication changing in their classrooms, the facilitator asked them to provide details of how those changes looked and sounded and to suggest explanations for these changes. One of the teachers eventually suggested bringing in videotapes of classes in which their kindergarten, first-grade, and second-grade students were questioning each other about their answers in math and literacy. The videotaped evidence of what they were observing set up further examination of the

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4The description of interactions from the 1st year of implementation are taken from field notes. During the 2nd year of implementation the teachers agreed to audiotape meetings as part of a broader SFT research initiative. Dialogue from these meetings is used to illustrate the development of the community’s inquiry.
communication patterns, and led to consideration of other sources of information to help them understand what they were observing.

In late spring, the teachers proposed looking at what research says about understanding in math by rereading a research article they had received during professional development. The discussion about the article led to comparisons and contrasts with their own observations of students’ understanding across grade levels. This discussion eventually led to a specific focus on patterns in students’ developing understanding of math and teachers’ speculations about changes in their pedagogy.

**Year 2 of implementation.** During the 2nd year of implementation, the teachers assumed greater responsibility for facilitating the group’s learning and began to explore assumptions underlying differences in their practices. Continuing to use diverse sources of evidence and information, inquiry focused on analyzing students’ understanding and constructing their own knowledge of content.

The teachers’ understanding of the development of a professional learning community was evidenced in their approach to two new challenges. The first arose as other faculty members who had not participated in SFT professional development asked to join the meetings. The original group wanted to sustain the learning community that had evolved, but were also well aware of the active role they played in its development. With the intention of recreating this experience for their colleagues, they decided to bring these new members into the conversations by jointly determining the norms for their newly configured learning community. The second challenge was to determine a new focus for inquiry of interest to everyone. The group decided to invite the new members to collaborate in determining a new shared focus for their inquiry.

When Nina expressed her frustrations with teaching writing, a lengthy series of conversations about the nature of writing ensued. The following sequence of excerpts depicts the evolution of the group’s year-long inquiry that emerged from Nina’s concerns and the differing perspectives about the nature of her struggle. When Deidre determined after two meetings, “We still don’t know what writing is,” she was making reference to these underlying differences. The questioning of each other’s assumptions, exemplified when she further questioned Kris’s assertion that writing is communication, led to suggested questions for further inquiry.

Deidre: We still don’t know what writing is.
F: We still don’t, I agree.
Kris: We do. Writing is communication.
Deidre: That’s one part of it. Do you think that’s the totality of it?
Paul: Writing is communication beyond the current moment.

During this discussion, the university facilitator reminded the group of a suggestion that they had made at an earlier meeting to examine students’ work as evidence of the students’ understanding.

F: Okay, here’s a question: What if we took—because we talked about this earlier, and we haven’t done it yet—what if the next time you all brought samples of your students’ writing, of a student that you think is a low, struggling writer, an average writer, and a high writer, and we look across grade levels and we look and see what do we think they think writing is based on how they’re writing and what they’re writing. Would that be interesting? … Do you think that would get at your question, Deirdre?
Deidre: I don’t know.

After a detailed discussion of how to collect the writing samples, the facilitator attempted to clarify the shared purpose of examining the students’ writing. The now ingrained pattern of posing a shared question and examining evidence pertinent to the question is illustrated in the Deidre’s reference to the questions the group generated earlier in the fall.

F: So just to make sure I understand, the purpose of bringing these writing samples is to try and figure out what the kids think writing is from their own writing. Is that it?
Linda: Yeah, or just try to—maybe if we actually have something to look at it might bring up more questions or we might realize when we’re looking at things that we have more in common.
Deidre: Are we going to attempt to answer the questions?

Using the students’ writing as evidence, the teachers attempted to make sense of the students’ understanding of writing, and began to develop a deeper understanding of content knowledge as well. They began in January by examining kindergarten writing samples.

Linda: He’s got good initial sounds.
F: He does, doesn’t he?
Paul: And he has final sounds, too, though. Look at “bad” and “trouble,” and he’s got two syllables for trouble. He’s got two vowel sounds in it.

The group attempted to draw conclusions from their analysis of the writing after the university facilitator introduced the idea of generalizing across examples.

F: Okay, so this is what I wrote down for kindergarten. I think that a generalization … was that there’s a broad range of understanding of text. Both of you guys showed that, that they use a mix of capitals and lower
As these excerpts illustrate, the teachers' inquiry contributed to constructing a deeper understanding of written literacy—understanding grounded in evidence provided in their students' writing. Although considering development of understanding was something the facilitator had to scaffold, the teachers immediately began to draw connections based on their previous observations of students' writing. As they described the range of understanding in the kindergarten samples, they began to make connections between oral-language proficiency and speculated about the development of literacy across the grade levels.

The dialogue, as it continued in February, provides an example of teachers' reflections on their collaborative learning process and the examination of evidence in the evolution of their understanding about writing.

Betty: Do you want to actually start with letting me pass writing examples [around the table]? Because [today] we didn’t show you how second graders write. We discussed it but you didn’t see it.

Linda: The kindergarten ones that we looked at we could see them all at the same time. As you were explaining them, we could see what you were talking about. And I didn’t feel like that today, I felt like we were just kind of going like that. [She waves a piece of paper quickly around in front of people.]

Betty’s perception of the value of evidence was confirmed by a member of the group, Linda, who also questioned the efficacy of the process the group had used that day. Linda continued to reflect on the process the group had been going through and the role played by their dialogue across multiple perspectives.

Linda: I was going to say another thing: Where we’re going with this. We all came in and we all wanted to look at writing. And everybody had a completely different idea of what writing was and some of us were at very opposite ends. So I think this all at least brings us together to where we even if we don’t have to agree but we’re having the same conversation, basically. So that’s …

For the first time, Linda publicly acknowledged the differences the group had negotiated through examining and analyzing the students’ work. She pointed out that although these multiple perspectives may still exist, the group was now able to discuss them and begin to develop some shared understandings. Thus, tensions around differing assumptions provided the opportunity to deepen content knowledge.

Over the 2-year period that the Oak Street Elementary learning community has been working together, several norms have evolved. These include (a) providing evidence to support knowledge claims; (b) listening to, questioning, and analyzing each others’ perspectives; and (c) jointly constructing knowledge of students’ understanding and content. At the same time, the process of engaging in focused, ongoing inquiry and periodically stopping to reflect on their own learning processes contributed to the teachers’ increasing ability to support their own learning with decreasing guidance of an external facilitator.

Summary

In these three cases, we illustrated the enactment of several important dimensions of the CBCI model. First, we illustrated how content knowledge is developed through collaborative inquiry that originates in teachers’ own classrooms and extends to multiple contexts within the school community. We also illustrated how facilitators try to scaffold content understanding as well as the process of becoming a community engaged in “critical collegueship” (Lord, 1994)—teachers and facilitators engaging in dialogue from a platform of trust so that assumptions and evidence can be held up to critical examination. Finally, we illustrated how, in this process of developing knowledge of practice (Cochran-Smith & Lytle, 1999), teachers begin to see themselves as active constructors of their knowledge and discover how to create and sustain collaborative communities of inquiry within which to continue learning together.

As we have continued to develop and refine the CBCI model, we have wrestled with how epistemological orientations inform our goals of teachers’ learning about content and students’ understanding, as well as the development of self-sustaining communities of collaborative inquiry. Most recently, we have begun to grapple with how to intentionally scaffold learning experiences in professional development to support the evolution of the epistemological perspectives that support the achievement of these goals. Throughout the three cases we have pointed to evidence of what appear to be shifts
in teachers’ orientations toward knowledge and knowing: (a) a growing reliance on the examination of evidence in discerning students’ understanding of content; (b) seeking out, and learning from, multiple perspectives; and (c) viewing expertise as emerging from the group’s shared inquiry and conclusions. (For further discussion, see Belenky, Clinchy, Goldberger, & Tarule, 1985; Hofer & Pintrich, 1997; Perry, 1970.)

CHALLENGES AND CONTINUING ISSUES

Our experiences in implementing the CBCI model to help teachers sustain their learning have shown us the power of collaborative inquiry for deepening knowledge of content and learning processes. A focus on examining their students’ understanding in content domains serves as a catalyst for teachers’ critical reflection and examination of their own content knowledge and their practice. This reflection leads to self-initiated changes in how they support their students’ learning. We illustrated the power of this approach in the three illustrative cases presented. These cases notwithstanding, there are challenges and continuing issues related to the effectiveness of CBCI, teacher learning, sustainability of the SFT reform, and our own learning.

There is a clear need to document the effects of the CBCI model in ways that complement case studies of the type we reported in this article. We are in the process of collecting information that will allow us to evaluate the effectiveness of CBCI in terms of teachers’ approaches to the analysis of student understanding and to their classroom practices. For example, we have developed a teacher interview whose purpose is to capture changes in teachers’ thinking about student understanding and learning. We ask teachers to discuss examples of student work that are designed to reflect differing orientations to content understanding. To document changes in teaching practices, we developed a set of scales that attempt to capture classroom discourse participation patterns, teachers’ attempts to deepen students’ content understanding, and the opportunities that students have to reflect on their thinking and learning together. Finally, we developed student assessments that tap key principles in mathematics and literacy, such as number concept, cause–effect, and theme. Continuing to collect and analyze these data sets will help us develop a detailed picture of the impact that CBCI has at the individual student, teacher, and classroom level.

With respect to teacher learning, there are two important continuing issues. The first concerns teachers’ views of understanding in specific content domains. Often, they enter professional development with views of content understanding that are fact based and procedural. Tensions arise as our professional development challenges them to rethink content areas in terms of learning with understanding. The second issue concerns teachers’ expectations for the professional development process. Consistent with the majority of their prior experiences with professional development, teachers typically expect to be provided with materials and instructions on how to use them in their classrooms. Our efforts to engage them in collaborative inquiry focused on student understanding are not initially seen as relevant to their everyday practice or to doing SFT. To begin to engage them in the inquiry process, early in the professional development process we have teachers engage in activities that confront them with different conceptions of understanding in content domains. For many of the teachers, these confrontations eventually lead to their rethinking content domain understanding for their students.

As the teachers in our cases illustrated, this process is neither universal nor uniform across teachers. This variegated landscape makes the work of the facilitators challenging, frustrating, and rewarding all at the same time.

Conceptions of content understanding and of learning processes are also continuing issues for sustainability of the educational reform. Important to teacher’s inquiry into student understanding in their classrooms is the availability of information that assists them in constructing different orientations to the content area. In the CBCI model, facilitators provide that information. To be self-sustaining, teachers will need access to resources that substitute for the important role that the facilitators currently play. A similar issue concerns the sustainability of collaborative inquiry at the community level. One of the lasting impacts we anticipate from the CBCI model is the development of a core of teachers and administrators who understand how to build and sustain learning communities that conduct collaborative inquiry into student understanding. Despite evidence that such communities are indeed developing now, we do not yet know if the model will accomplish the goal of sustaining teacher learning. One teacher expressed her concern this way: “I don’t know if we’ll keep meeting when you [facilitator] are not here to arrange them. I’m afraid they’ll just fall by the wayside.” In the press of everyday demands, is an outside influence necessary to bring the community together to further inquire into content knowledge and student understanding?

Finally, a challenging yet rewarding aspect of our work on teacher professional development concerns the learning of our own group. Our facilitators’ group reflects expertise in a number of diverse areas. Some of us specialize in specific content areas (e.g., mathematics, literacy, social studies, and science), whereas others specialize in teacher learning, educational leadership, and organizational change. Still others are cognitive and developmental psychologists. Each of us recognizes the need for the perspectives contributed by the others if we are to have any hope of addressing issues of teacher learning in the context of educational reform. Yet, we have struggled to understand the multiple perspectives we bring together. This is a struggle that parallels the one in which the CBCI model asks teachers and administrators to engage. We have had to grapple with assumptions about learning in content areas and about what understanding in
math or science really means. We have tried to identify common characteristics of understanding in different content areas so that we could support teacher learning across content areas. We have had to learn how to communicate in ways that help us uncover our own assumptions about learning in different content areas, in individuals, and in groups. Thus, our own collaborative inquiry has helped us understand the complexity of the process in which we are engaging teachers and administrators. Reciprocally, reflecting on the learning processes of the professional communities of teachers and administrators has helped us understand the dynamics of our own learning community.

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