What Is Inquiry and How Might One Measure It?[1]

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In this narrative I pose two questions related to the field of collaborative teacher inquiry that our research team that seeks to address[2]. We wonder to what degree these questions are also questions of others and look forward to the opportunity for discussion at the upcoming STRIDE conference.

Is There Consensus in the Field About What Inquiry Is?

In our readings, we have found that the term *inquiry* is used in many ways and has multiple meanings; so many in fact that in a recent conversation a visiting professor suggested we refrain from using the term at all given the lack of consensus in the field about what inquiry is. We are not yet ready to give up our use of the term, but we recognize that we borrow *some* but not necessarily *all* of others' features of inquiry to help us make sense of our work. Below we share our emerging perspective on inquiry—incomplete as it is—to begin to make explicit the features of inquiry to which we refer in our work and to offer others an opportunity to compare perspectives on inquiry. In particular, we draw from Cochran-Smith and Lytle (1999, 2001, 2009), Wells (1999), and

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[2] Unless otherwise noted, the use of *we* and *our* in this paper refers to the research team members on the Studying Teachers' Evolving Perspectives project: Randy Philipp, Vicki Jacobs, Lisa Lamb, Jessica Pierson, Bonnie Schappelle, and John Siegfried.

MacKenzie (2001) in considering the notion of teachers' stances of inquiry. In their most recent book, Cochran-Smith and Lytle (2009) refer to a *stance of inquiry* as a "worldview, a critical habit of mind, a dynamic and fluid way of knowing and being in the world of educational practice that carries across professional careers and educational settings" (p. 120). They distinguish *inquiry as stance* from inquiry that is sometimes thought of as a "time- and place-bounded classroom research project…" or "as a sequence of steps or a method employed in the process of training experienced teachers to solve classroom or school problems" (p.120). We also build from the work of Wells (1999) and MacKenzie (2001) in acknowledging the role that wonder and curiosity play in the having of an inquiry stance. Wells wrote that an inquiry stance indicates "a willingness to wonder, to ask questions, and to seek to understand by collaborating with others in the attempt to make answers to them" (p.121), whereas MacKenzie (2001) described the teacher in her study as having "a stance toward her teaching and students' learning" that conveyed "puzzlement, uncertainty, wonder, and possibilities (as described in Bruner, 1986)" (p.145). For us, one of the most salient features of having an inquiry stance is a genuine curiosity about children's mathematical thinking—for example, teachers' asking themselves the questions: "How is my student thinking about that problem? How can I better understand the strategy that my student used? How might I use that strategy to determine my next move with that child?" These questions are specific to the teacher's practice and are associated with a certain degree of uncertainty given that a teacher cannot plan how to respond to a child who has not yet shared a strategy—a teacher has to be willing to first attend to, make sense of, and then make decisions, in-the-moment, about how to respond.

Further, we agree with Franke et al. (2001) that the development of an inquiry stance provides teachers with an opportunity for generative growth (Franke, Carpenter, Levi, & Fennema, 2001; Franke, Kazemi, Shih, Biagetti, & Battey, 2005)—a stance toward their own learning that enables them to take ownership of their knowledge; pose questions of interest to their local circumstances related to teaching and learning; generate answers to their own questions; use their classrooms, students, and colleagues as sites for learning; and realize that they can "construct knowledge through their own activity" (2001, p.656). In earlier work (Lamb, Philipp, Jacobs, & Schappelle, 2009), we wrote, "It is the development of genuine curiosity about their own teaching and their own students coupled with the development of lenses for answering those questions about which they are curious that makes the development of an inquiry stance powerful" (p.17).

Our goals in coming to understand inquiry, and in particular, inquiry as stance, were designed to help us understand whether teachers' stances of inquiry (those *habits of mind*) are born or developed, to what degree sustained professional development focused on children's mathematical thinking supports a stance of inquiry, and how stances of inquiry might be generative for teachers. These goals require tools and methods for analyzing teachers' stances of inquiry, and in the next section we raise methodological questions about measuring teachers' stances of inquiry.

What Methods Might Researchers Adopt for Measuring Teachers' Stances of Inquiry?

In our work we are mapping a learning trajectory for grades K–3 teachers engaged in sustained professional development focused on children's mathematical thinking. Through a cross-sectional design, we have studied the knowledge, beliefs, and practices

of four groups of participants (with more than 30 participants per group)—one group of prospective teachers and three groups of practicing teachers who differed in the extent of their engagement in professional development focused on children's mathematical thinking—0, 2, or 4 or more years. All three teacher groups averaged 14–16 years of teaching experience, and every teacher in the study had taught for at least 4 years.

We hypothesized that stances of inquiry develop over time while teachers become attentive to the details in children's mathematical thinking, develop hypotheses about the understandings one might infer from particular strategies, and make decisions about next steps—those in-the-moment decisions about supporting and extending children's thinking that teachers face daily. We compared this kind of attentiveness to the challenges of teaching in an era of high-stakes accountability and pressure to conform that we suspected might actually thwart teachers' development of stances of inquiry.

In studying prospective and practicing teachers' stances of inquiry, our questions necessitated that we develop a way to measure them, both in participants' written responses to tasks and their interactions in groups of 4–6 when they discussed questions about classroom artifacts. We have analyzed the former and are currently analyzing the latter. Below we share our coding schemes for studying teachers' stances of inquiry, and raise questions about future analyses.

Development of an Inquiry Stance

We asked 95 grades K–3 teachers and 36 prospective teachers to respond to questions about three samples of Grade 2 students' written work for solving a multiplication problem (*Todd has 6 bags of M&Ms. Each bag has 43 M&Ms. How many M&Ms does Todd have?)* and to a video of a Grades 1–2 classroom wherein 3 strategies

were shared in response to a single problem (*There are 19 kids in class today. 7 have hot lunch. How many brought cold lunch?).* The written responses were analyzed for, among other purposes, indications of an inquiry stance. In particular, we identified three categories of responses—those that provided evidence of a robust stance of inquiry, those that provided evidence of a limited stance of inquiry, and those that provided a lack of evidence of a stance of inquiry. In identifying instances of an inquiry stance, we looked for one or more of the following: (a) "wondering" language that may come in the form of posing questions about students' strategies or sentences that began, "I wonder whether," or "I am curious about …"; (b) tentative language to capture the notion that alternative explanations may exist for a set of student work; and (c) hypotheses about how students might solve future problems as both an indication of their curiosity about students' future work and their weighing of multiple alternatives. The results are provided in Table 1.

Table 1.

Depth of an Inquiry Stance

	Prospective Teachers (n = 36)	Initial Participants (n = 31)	Advancing Participants (n = 31)	Emerging Teacher Leaders (n = 33)
Robust Evidence	0%	0%	19%	58%
Limited Evidence	17%	23%	55%	39%
Lack of Evidence of an Inquiry Stance	83%	77%	26%	3%

Note. Initial Participants were experienced teachers about to engage in professional development focused on children's mathematical thinking, Advancing Participants had engaged for 2 years, and Emerging Teacher Leaders had engaged for 4 or more years and

had begun to engage informally in leadership activities. All three groups of practicing teachers had a mean of 14–16 years of teaching experience.

We consider several findings noteworthy. First, there is a monotonic increasing trend such that when the number of years of sustained professional development focused on children's thinking increased, so did the percentage of participants who provided evidence of an inquiry stance. However, stances of inquiry evolved over time, and although some changes took place within the first 2 years, more robust changes required engagement in more than 2 years of sustained professional development. In their work with and study of teachers who, over a period of years, transformed their mathematics teaching practice, Franke et al. (2005) similarly found that teachers at one school did not develop an inquiry stance in a single instance nor did all teachers develop an inquiry stance to the same degree. Taken together, our findings and those of Franke et al. (2005) show that teachers' inquiry stances are developed, not born, and that one way to support the development of an inquiry stance is through providing learning opportunities that focus on children's thinking.

Methodological questions remain however. For example, the data shared above were analyzed somewhat indirectly (using means a colleague once called "surreptitious and serendipitous") in that specific questions related to having an inquiry stance were never posed; teachers' stances were inferred, and although one might reasonably conclude that those who provided evidence of a robust stance of inquiry likely held a robust stance, those who did not provide evidence *may or may not* have held one; the limitation of attempting to measure inquiry as stance in this indirect manner thus becomes evident. How do we in the field continue to study teachers' stances of inquiry

once we extend beyond individual case studies in which a researcher can amass an accumulation of evidence for one teacher across many interactions? Are there other, more direct, ways to measure teachers' stances of inquiry that are relatively efficient and can be used across a large numbers of teachers?

Our current work is focused on analyzing the degree to which teachers exhibit stances of inquiry in focus-group conversations centered on classroom artifacts. Although we posed increasingly specific questions about aspects of written student work and classroom and interview video, none of the questions were specifically designed to measure or understand teachers' stances of inquiry. Once again, our task is to infer the degree to which teachers provide evidence of an inquiry stance. We are left wondering whether there are other questions we might have posed or other tasks we could have given to make sense of teachers' stances—their habits of mind—that seem to have such promise in transforming teaching?

These are two of the questions we are pondering and hope to discuss at the upcoming conference.

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