

Melissa Braaten

University of Washington

VEXATION

My current vexation surfaced during a recent conversation with Scott McDonald about working to support science teachers' development of their classroom practices. In our discussion about teacher learning and teacher practice, we were torn between focusing on knowledge and focusing on practice. Two questions have been keeping me awake at night since that conversation: 1) What is the relationship between a teacher's knowledge and classroom practices? 2) What are the relationships between teachers' knowledge and their practices as members of learning communities?

Cochran-Smith and Lytle (1999) posed these questions a decade ago. Yet the puzzles remain ever-present as I work to understand how teachers learn to advance their teaching practices and their practices as members of collaborative inquiry groups. My vexation becomes even more acute as I struggle to support teachers who do not appear to be making advances in their practices. My project for this conference, and probably for my career in science education, is to gain clarity about my understanding of the relationships between teachers' knowledge and their practices. Cochran-Smith and Lytle offer three ways to conceptualize teachers' knowledge and practice:

1. *Knowledge-for-practice* – This view of teacher learning assumes a “distinctive knowledge base” for teaching that exists primarily within the university teacher education community and is delivered to prospective teachers during their teacher education programs. Teachers, whether pre-service or in-service, are consumers – not producers – of knowledge.
2. *Knowledge-in-practice* – This view of teacher learning assumes that much of the expertise for teaching lies within the artistry spontaneously occurring in the moment-to-moment life of classrooms. Artisan teachers – those who have mastered the craft of teaching – have developed a portfolio of knowledge about classroom practice. Teacher learning hinges on reflection and analysis of one's teaching practices to develop deeper awareness of decision-making underlying the craft of teaching.
3. *Knowledge-of-practice* – This view of teacher learning hinges on an assumption that the knowledge needed for teaching is co-constructed by groups of teachers as they systematically conduct inquiries into issues of teaching and learning, issues of subject matter and curriculum, and issues of schools and society. Teachers' practice extends beyond the practices occurring within their classrooms and includes the practice of collaborative inquiry for professional growth.

Cochran-Smith and Lytle label this third conceptualization an *inquiry* stance, and it is this knowledge-practice framework that underpins my work with teachers. The source of my vexation is not from deciding which conception is best, because I see evidence of all three operating at various times throughout teachers' trajectories. Instead my vexation arises from my inability to determine what, exactly, teachers' knowledge is as well as being unsure about how to go about recognizing the relationships between teachers' knowledge and their practice. Another idea worth considering stems from my observations of teachers interacting with each other and with students and from my observations of how these interactions have developed over time. This fourth idea overlaps with the *knowledge-of-practice* idea, but perhaps also offers insight into how teachers make knowledge.

4. *Knowledge-as-practice* – Knorr-Cetina (1999) studied scientists and characterized their knowledge as practice, a characterization which shifts focus away from ideas inside scientists' minds to practices that are cultural and deeply contextualized within fields of science. She suggests that people working together can be examined as epistemic cultures whose collective knowledge exists as practice.

Teaching is also a cultural practice and deeply contextualized. Could this knowledge-as-practice idea be useful for examining teachers' knowledge and practices and for designing teacher education projects to support teacher learning? The relationship between teachers' knowledge and their classroom practice is consequential when teacher educators work to support teacher learning and the development of classroom practice with pre-service and in-service teachers. There is also the question of the teachers' practices within teacher groups. Are these practices “knowledge practices” as Knorr-Cetina suggests? It is as if there are multiple planes of practice, multiple

communities of actors, and multiple dimensions of knowledge. While I am attracted to the complexity of trying to make sense of all four (and probably more) representations of teachers' knowledge and practices, I find it overwhelming — and certainly vexing. Diving into the relationship between knowledge and practice has also brought to the surface some major questions that I am still exploring:

- 1) What and how do teachers learn as members of professional teacher groups and as members of their classroom & school communities?
- 2) Why do some teachers rapidly modify their practices and others make modifications more slowly — while others make no modifications at all?

Included within Knorr-Cetina's conception of epistemic cultures is the idea about collective knowledge being more public than individual knowledge. When we think of knowledge as practice, rather than as ideas held by individual experts or artistry performed by individual artisans, we are able to reconceptualize knowledge and knowing as a collective enterprise distributed across people and among artifacts. The public nature of collective knowledge leads to "everyone having the possibility to know and assess for themselves what needs to be done" and this knowledge "is also a moral force" guiding the collective enterprise (p. 179). This powerful concept of collective, public knowledge practiced within communities of teachers who engage with one another as intellectuals and who engage students as intellectuals is why I believe that my projects are, ultimately, social capital ventures.

VENTURE

My venture stems from two projects in which I work closely with groups of teachers to foster a culture of inquiry into student thinking in science. In these projects, I find myself at a crossroads both in terms of how I could proceed with the research and how I could help extend the teacher networks that have been built so far.

Research Crossroads

I have just completed a year-long study of a science teacher video club and three individual teachers from the video club. I am ready to start making sense of the data in order to understand teachers and teacher learning. As I look at the way that the teachers engaged in collaborative inquiry practices during their monthly video clubs, I start to see how their knowledge unfolds through their participation as learners, colleagues, and teachers. When I look at the classroom practices of the three teachers who I followed regularly I am less confident about my ability to interpret what I am seeing. Knorr-Cetina suggests analyzing groups by viewing them as epistemic cultures in order "to make visible the complex texture of knowledge as practiced in the deep social spaces of modern institutions" (p. 2). I feel like I can see the 'knowledge as practiced' during the video club meetings, but can I see 'knowledge as practiced' in teachers' classrooms? If so, what can I learn about teachers' knowledge and practice by using such a lens? Selecting a lens for interpreting data is such an important part of educational research, and I see this as a great venture for my future as a researcher.

Teacher Networking Crossroads

Over the past 4 years my University of Washington colleagues and I have been designing and facilitating teacher inquiry groups using analyses of records of practice (i.e., samples of student work, classroom video) to help teachers generate knowledge and advance their classroom teaching practices. Our work builds an epistemic culture of science teaching where teachers are co-constructors of knowledge and practices for science teaching. As we add cadres of teachers, our network has grown to include participants from a dozen different school districts. Participants include groups of pre-service teachers as well as groups of in-service teachers. Some participants are in their first year of teaching, and some are in their 22nd year of teaching. This year one group also included four district-level science instructional coaches. Our upcoming project will incorporate 19 pre-service teachers and their cooperating teachers into this network. This venture feels like a grassroots social movement. By building an epistemic culture of science teaching, we hope to spur a local frameshift in science education. However, it is an incredible challenge to sustain multiple teacher inquiry groups with only two or three of us serving as university facilitators. Is it possible for this kind of work to become self-sustaining? Is it desirable? Would these groups still focus on creating epistemic cultures of science teaching or would they change direction?