Crafts(wo)men and Guilds: Expertise Development among Science Education Researchers

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In the beginning, this was going to be a story about a renegade working conference for science educators. Then it became a narrative about young scholars seeking to deepen their craft. Now, we find ourselves involved in an ongoing disquisition about revival and relief, about care and critique, and listening and laughing. However, we are ahead of ourselves. We should begin by examining expertise development.

Much has been written about the production of new researchers. We often refer to David Labaree (2003) and his views about the peculiarly problematic process by which new education researchers are prepared. He described the struggles he witnessed teachers undergoing as they attempted to navigate their ways into the academy. Among the legion of difficulties, he highlights the shift from personal to intellectual perspectives about education, the push to extend beyond the particular to consider the universal, and the need to avoid privileging the experiential over the theoretical. For as strongly as these resonate with our own transitions and those who we supervise, the emphasis is on bridging the various divides during doctoral studies — but not beyond those times.

Even with the many resources about mentoring doctoral students (e.g., Eisenhart & DeHaan, 2005; Pallas, 2001; Weiland, 2008), there is a distinct lack of similar assistance for those who are in the post-dissertation and pre-tenure phase of their careers. We feel this a critical juncture in each academician professional trajectory. Given the substantial investment in the recently-minted PhD (by the individual, by the family, by the faculty) it seems negligent to leave individuals to navigate new careers, most often in unknown environments. As an assistant professor beginning a career at a new institution, very few of the supports contributing to a successful dissertation defense are still available. While this situation parallels concerns about teacher induction (Allen, 2003; Wang, Odell, & Schwille, 2008), we assert that becoming a professor is considerably more stressful given the ambiguous expectations as well as the lack of oversight. At the core of this study is the concept of professional development, particularly with educational researchers and especially with those in science education. In short, acquiring expertise as a science education researchers is equivalent to developing as a craftsperson. It felt as if there were similarities in the advancement from novice to apprentice to journeyman. Engaging in a sociological consideration of professional development necessitates drawing upon sources outside the mainstream educational research literature. We selected Richard Sennett's 2008 book *The Craftsman* as our guide.

CRAFT AND GUILDS

The work of a science education researcher combines knowing, acting and discerning in a manner that blends technical skill with intellectual ingenuity. For example, someone practicing the craft of science education research must grasp research methods, demonstrate analytic skills, acknowledge related lines of inquiry, and apply theory-laden perspectives of science teaching and learning. While we typically associate the iterative relationship between thinking and doing as a clear indication of pragmatism (Dewey, 1938; Dickstein, 1998; Menand, 2001) when Sennett (2008) describes craftsmanship, his words resonate with a view of our profession while it is being performed well:

> Craftsmanship names an enduring, basic human impulse: the desire to do a job well for its own sake. … Every good craftsman conducts a dialogue between concrete practices and thinking: this dialogue evolves into sustaining habits, and these habits establish a rhythm between problem solving and problem finding. The relation between hand and head appears in domains seemingly as different as bricklaying, cooking, designing a playground or playing a cello. (p. 9)

We wish to add "science education researching" to Sennett's list of domains because those who practice this craft develop sustained habits in which the hands and head work in concert with one another. Included within such craft are the processes associated with writing and composition: writing up research (Wolcott, 2008), writing as a way to learn (Murray, 2002), and even rewriting (Flick & Lederman, 2004). These are extremely demanding yet capricious endeavors and there is no consensus about what is required in order to become a quality writer of educational research (cf. Karmler & Thomson, 2008). And this does not even begin to breach the challenges of conceptualizing and designing research. Becoming a successful academic in science education requires much more than producing research; there are many challenges against which an individual must persist. (Hurtado, Eagan, Cabrera, Lin, Park & Lopez, 2008). This is all to argue that becoming recognized as a craftsperson is incredibly challenging. Gladwell (2008) claims that the time requirements for developing true expertise adheres to the ten thousand hour rule. In brief, experts require ten thousand hours of practicing and perfecting their craft in order to become an elite within their field. Since doing educational research is not within the normal purview of classroom teachers (Labaree, 2003) the clock that counts down from ten thousand hours begins at the start of doctoral studies but would not reach its conclusion until an individual is at least halfway through their assistant professorship — well on the way toward a tenure decision.

Craftsmen and craftswomen rarely hone their skills in isolation. A lone artisan working by himself runs counter to Sennett's description of a craftsman. Instead, there usually is a guild in which individuals refine their skills in association with

others at varying stages toward mastering the craft. The guild structure emerged in the tenth century and continued until the twentieth century when replaced by trade schools (Emms, 2005). One substantial difference between guilds and schools is that in the latter, the training tends to occur as the expert teacher works with cohorts of people at the same skill level. In contrast, a guild would draw upon varying levels of expertise and this variety would give all who were involved the opportunity to refine their understanding, even as they share knowledge with new entrants to the guild. The guild has a hierarchy of expertise that has at its lower level the novices then apprentices followed by journeymen and ultimately, the master. It would be a mistake to dismiss guilds as artifacts of a long ended era because we may inhabit guilds ourselves.

Krause (1996) asserts that the university may be the last vestige of guilds. Expertise is contained within and monitored by its members as opposed to being controlled by an outside group. Specialized knowledge is handed down during apprenticeships, and the governance of the guild (including its interactions with other entities) is part and parcel the guild's legitimate domain. A guild provides support within its organizational structure so that individuals acquire essential skills, ideally over a sufficient among of time that the individual becomes an expert. Within guilds, there is a strengthening of everyone's expertise within the "training" process. Dewey (1916/1944) describes this joint learning between teacher and learner in this way:

> To be a recipient of a communication is to have an enlarged and changed experience. One shares in what another has thought and felt and in so far, meagerly or amply, has his own attitude modified. Nor is the one who communicates left unaffected. Try the experiment of communicating, with fullness and accuracy, some experience to another, especially if it be somewhat complicated, and you will find your own attitude toward your experience changing. … The experience has to be formulated in order to be communicated. To formulate requires getting outside of it, seeing it as another would see it, considering what points of contact it has with the life of another so that it may be got into such form that he can appreciate its meaning. (pp. 5-6)

Representing the "care and feeding" of education researchers as a socialization into the profession is not a unique idea (e.g., Lieberman, 1992). And yet using communities of practice to frame growth in expertise (Lave & Wenger, 1991) and the widespread endorsement of sociocultural perspectives to describe learning are noticeably absent from what passes as professional development for science education researchers. One problem this creates occurs because of the mistaken belief that future scholars in science education can be developed via one-on-one relationships between advisor and advisee. The other shortcoming is the erroneous idea that expertise can be achieved during doctoral studies. Furthermore, leaving to chance the ongoing professional development of freshly-minted PhDs in science education has

a tint of abandoning the individual. When imagined as a process of developing a craftsperson (with Seneett's work as inspiration and guide) the refinement of science education researcher expertise would appropriately occur within a guild-like arrangement. The work reported here describes efforts to provide ongoing professional development to science education researchers. It was in the midst of these endeavors that the notion of craftsman and guilds appeared to be a fruitful view to consider the processes of professional development.

STUDY DESIGN

The conceptual framework for this study hypothesized that the experiences of the participants were shaped by three factors: critical review, joint responsibility and practice community. We described this elsewhere so here we give the briefest of explanation (Johnston & Settlage, 2008). Critical review describes the feedback given by the professional developers to the participants in advance of the actual event. Joint responsibility denotes the mutually supportive attitude exhibited by participants which is distinctive in this setting since there is no hierarchy: all participants, including the organizers, play similar roles throughout the gathering. And practice community describes the shared yet somewhat independent purposes toward which participants apply themselves. Unlike a community of practice which results in a common product, the commonality in a practice community is the suite of actions and attitudes.
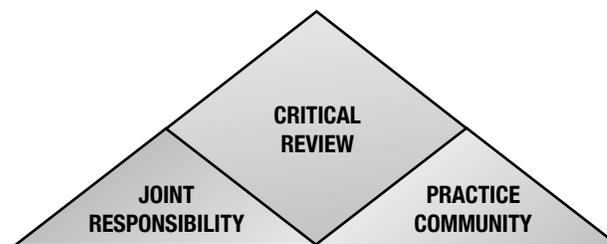
The professional development takes the form of an annual working conference that is nearing the conclusion of its first five-year cycle. For the first two years it was funded by the participants' registrations fees and the second two years it was underwritten by an NSF grant. This innovative approach to conferencing is based in the premise that typical conferences overemphasize the showcasing of completed work and creates an atmosphere of competitiveness and one-upmanship. In our minds, a more generative approach would allow participants to interact in a collaborative fashion and with an emphasis upon genuine problems and future projects. Participants rely upon the "Vexation and Venture" format to organize their paper. This format highlights a problem juxtaposed with a strategy the author may implement in order to resolve the difficulty. This document becomes the basis for the actual presentation and the catalyst for the subsequent conversation within the Incubator session. The desire to redirect our efforts as a science education community, which included the desire to re-imagine professional development for those in the early stages

of their academic careers, prompted us to name this annual conferences *Science Education at the Crossroads*.

Crossroads is an interesting phenomenon, not only to those who initiated it but also the myriad individual who have participated. We have reported a few by-products including scholar activism, pragmatist theory, and orchestrated actions (Johnston, Moss, Settlage & Carlone, 2008). However, at this point the focus is upon the development of expertise of science educators, especially those who we consider "rising stars" in the field but also more veteran academics who report being at a turning point in their careers. There was a total of 15 individuals who attended the 2008 Crossroads conference who agreed to participate in interviews: seven had already earned tenure at the time of this study and the other eight were in tenure-line positions at research universities. None of the assistant professors had previously attended Crossroads. Among the tenured faculty, five were first-time attendees of Crossroads in 2008. Thus, we have three categories of participants in this study: newcomer junior faculty, newcomer senior faculty, veteran senior faculty.

The original design was to interview participants before and after the Crossroads meeting. However, due to scheduling challenges, 6 of the 15 were only interviewed following Crossroads. The interview protocols appear in the Appendix and took the form of audio-recorded telephone interviews of 30 to 60 minutes in duration. Interviewing responsibilities were distributed across the three co-authors and the audio files were uploaded to a secure website so they could be shared. Transcripts of the interviews were also posted to the website. Other data sources included a post-conference questionnaire along with the participants' contributions to the proceedings.

FInally, the research questions correspond with the conceptual framework, namely:

RQ1. What is the utility and significance of critical review in terms of the professional development's impact upon the participants?

RQ2. To what extent is joint responsibility a key feature of the professional development experience for the participants?

RQ3. How accurately do the participants feel that the notion of practice community describes their experiences during the professional development?

FINDINGS

The Hopes and The Unexpected

All of the respondents expressed the hope that they would be able to connect with others about vital issues. Commonly expressed hopes included terms such as "sharing" and "meaningful conversations" and "willingness to struggle with ideas." There was a clear desire to enter into a space in which it would not only feel safe but also where wrestling with difficult ideas could occur without the guardedness typical within other conferences. One associate professor who attended for the first time reported that her hopes were based upon what she had heard from others who had been to Crossroads in previous years. She was expecting to be involved in conversations that addressed significant issues:

> Issues include questions such as "is our research really making a difference for urban youth, are the things we are doing making an actual difference or are we just spinning our wheels. Are we meaning well and not really doing anything." Also issues about how do we define our career and how is it working for us personally. *Rosalyn*

During post-conference interviews, a few individuals indicated that they were not entirely sure what they were hoping for beyond the chance to be with others who were prepared to engage in honest conversations about various aspects of the profession. To a person, these hopes were realized during the conference.

Participants were also asked to identify what they received that had been unexpected. Perhaps the most common response was the unanticipated intensity of the sessions. This intensity was described as a mutual engagement in the issues each presenter brought before the group. Further, it was more than the intensity of the topics — it was also the fervor with which others engaged with the presenters' issues. The reports of intensity were often wrapped up with the sense of collegiality along with an aura of caring and belonging. Kevin (an assistant professor) expressed his unexpectedness in this way:

> There was a much stronger sense of community than I had anticipated. And this was true even among people who did not know each other before this meeting. This was very important because it allowed us to let down some of our professional guardedness.

In addition, there were participants who extracted unexpected insights about their professional identities. Paula was a veteran Crossroads attendee and soon-to-be tenured so she was noting others' unexpected tussles with their professional lives:

> There seemed to be more sharing with regard to personal reflection in relation to professional trajectory. Not about achievements but about meaningfulness: "Is what I'm doing is what I actually want to be doing and is it making the kind of impact I desire to make." Some people having that conversation had just received tenure and they were asking, "now that I have achieved it, it really doesn't mean that much to me."

Dorothy may have been one with whom Paula had a conversation as she was faced challenges balancing a tenure-track assistant professorship with being a mother:

> What came out of this experience that I didn't think I would was that the things that cause me concern about myself as a science educator or a parent – were not just mine. There were universal "truths" that have unique characteristics because of a professor's work situation

and campus settings. But still there were commonalities. Suddenly, the difficulties I perceive about my job, some of those were just the job. … it wasn't that I was ill prepared for the profession. Or not smart enough or personally lacking in some sort of way. … At Crossroads I found out it was okay to put a personal spin on my work and talk with others about what I was feeling about the work I am trying to do. It seemed clear to me that it is okay to make our work manifestations of our hearts.

Another frequent source of surprise was the impact of the poetry. Briefly, a professional poet has typically given a reading on the last evening of the conference. More recently, we have included a "Favorite Poetry" reading by volunteers during the opening evening. In a sense, poetry bookends to the conference. Winston, an assistant professor and first time Crossroads attendee, explained the poetry's effects on him:

> I'm working on this big project where I'm bringing people like artists, poets, writers—anybody that's doing that kind of creative work, kind of brining them together. Crossroads got me thinking: "Wow, if you actually take that world and merge it with the work that you're doing that's usually valued by the science community and the academic community then what comes out of that is really powerful stuff." I came back and started doing poetry in my classes with my students.

Rita, another new attendee and assistant professor, was similarly moved by the poetry:

> What I didn't expect was to come back fired up. I mean I really was fired up when I came back. I sort of hit the ground running. … I think the other thing I didn't expect was the way it tapped into my creative side. So I found myself picking up my guitar and dusting off some poetry, working on stuff like that.

In the beginning, having a poetry reading was not imagined to have such profound effects. Instead, poetry was seen as a potentially welcome contrast to the intense academic discourse during the daylight hours. What has unexpectedly emerged is that poetry provided a significant contribution to the overall climate of the conference. As a result, the caring, community feel of the conference was bound up in everything that took place. A couple of respondents even suggested that the isolation of the site (a ski resort in the off-season) strengthened the community by eating meals together. Professional development offering in the form of a working conference not only fulfilled the participants' hopes but they were recipients of feeling welcomed, valued and important. In the next section, we describe how the participants perceived the overall conference through a selection of photographs that were taken during the conference.

Images that Were Representative

Using photographs to elicit ideas from research participants falls within the purview of visual anthropology (Collier, 1967)

and we have used this technique in other settings (e.g., Settlage, 2004). For this part of the study, we posted to a secure website photographs taken during the conference and asked the participants to select three they felt were representative of their impressions of Crossroads. We recognized that a photo elicitation interview might come across as a contrivance. However, it is a methodology that is not infrequently used by qualitative researchers (e.g., Epstein, Stevens, McKeever, & Baruchel, 2006). Happily, we report that participants took to this task with enthusiasm and their comments were quite informative.

Shortly after the 2008 conference, we posted 119 photographs to the project website and the link to these images was sent to all attendees. For the interview, we culled the images down to a manageable 36. What we had not anticipated was that certain images would be repeatedly selected. However, the choice of those photographs was not because they were especially well-composed but because they elicited common themes. The most frequently selected pictured showed three individuals: a woman speaking and gesturing, with two men seated to her left. Here is how the interviewees interpreted this image:

> You can tell from the expression on the men's faces. They're really thinking about what she's saying – and they're critically analyzing what she's saying. *Paula*

> You can tell they are completely focused upon what she was talking about. Intense engagement with others' ideas. *Gregory*

> I've got a white woman, a white man and a black man sitting next to each other at a table and just see they are engaged in the work. To be at a place like Crossroads when I did look around the room I did see diversity in perspectives, diversity in race, diversity in gender, and just a lot of diversity represented and I think that makes the conversations much richer and much more important. When I'm sitting there with people who seem nothing like me who have entirely different experiences, seeing the world from an entirely different perspective, it pushed my work in a different perspective and that was really important for me. That's what I saw in this picture and that's why I picked it. *Winston*

Very often participants described the intensity and focus. This particular photograph seemed to capture the level of engagement by everyone attending the sessions. The high level of interest and the attentiveness to individuals and their ideas were consistently identified as key to the event.

A second photograph selected by many participants was of two women seated next to each other during a session who are smiling even as they discussed the topic at hand. Here is why interviewees chose this picture:

> I think this picture also shows the sense of community. I think it captures the fact that these are two professionals that have an opportunity to share. But

they are people, too. This sounds hokey. You can see they're holding pens and notebooks and the program so there's clearly professionalism that underlies this. *Kevin*

Even though we are seriously looking at some issues and talking about some topics, we also have the comfortableness with each other. Just the space, being very safe, that we can enjoy it as well. There's not the need to try reinvent yourself or project a portion of yourself in order to receive approval. *Paula*

The fact that they are laughing actually tells you that they are engaged. At other conferences, people are looking at their watch or flipping through their program trying to decide where they are going to go next: no one is ever laughing. *Rory*

In these comments the participants are drawing attention to the comfortableness of the conference and that this allowed people to feel safe even as challenging issues were discussed. In addition, the intense levels of engagement by participants was also revealed in this picture. Another common impression that was noted in the preceding picture, along with a few other photos the interviewees selected, was the laughter and humor. In fact, one participant complained that too many of the photos depicted serious expressions and not enough captured the light-hearted dimension of the conference.

Intensity wasn't all about intellectual thoughts. Reminding one another that there is a lot of joy in the work that we do. *Gregory*

There were a lot of times where people were enjoying the process. Lots of opportunity for laughing: sometimes you were lamenting a situation and others were sharing the same feelings. Other times, it was just a funny moment and people laughed. The lighthearted moments are representative. *Rosalyn*

One of the things that make Crossroads is that you only take the things that need to be taken seriously, seriously. But I feel all the rest of your focus is to making light of yourselves and your profession. So making light of science, science teaching, science education and even science education research. And it's more towards the end of saying, "Hey, can we just look at ourselves." It's like: "Who are we kidding; we sort of have our priorities sort of messed up. And we should be focusing our energies on things that really vex us in life and we should try to understand them but then we really need to move to action." *Rita*

By asking people to select photos they felt were representative, they were able to articulate key features of their experience. Most notably was the intensity of the session but balanced against a lightheartedness that reflected the comfort and supportive climate of the event.

Varying Interpretations of Practice

Etienne Wenger's (1999) characterization of a "community of practice" once offered a potential way to capture what occurs during this professional development experience that we call Crossroads. However, in a previous study (Settlage & Johnston, 2008) we found that even though there was a tangible "group-ness" to the conference, it lacked the unified creation of products that Wenger ascribes to his construct. However, we were not quite ready to abandon the idea of a practice as somehow unifying the group. In other words, through our own observations and the testimonials by conference attendees, work was taking place and the gathering was not merely a social function. Consequently, we interrogated the idea of practice by asking our participants whether either of these two definitions of practice aligned with their Crossroads experiences: (a) Practice as rehearsing new possibilities in your professional life, and/or (b) Practice as performing the best from our professional selves. The distinction between these two forms of practice are in that the former describes using the working conference as a training facility while the latter describes demonstrating a better self while participating.

Rita, an early career, first-time Crossroads attendee, took practice in an unanticipated direction:

At the end of the day I got to practice more of me. … I went to the dictionary and there was this one definition of practice that I thought was really cool and it was "to pursue a profession actively." I feel like I got to pursue a profession but to me it was this broader sense of profession. That I'm pushing on the borders on how I traditionally pursue my profession and more of who I really am can be a part of defining that profession. So it shifts the emphasis from the way the profession defines me as a scholar and an activist as to how I want to define the profession. And not just as a scholar and an activist but as an artist, a humanist, a feminist. I just feel like it brings out all these other parts of me and it's an embodied process like a whole body thing. *Rita*

To a certain extent, Rita combined the two forms of practice we placed before her. On the one hand, she used the professional development experience as a venue to explore a new way of being within her profession. By that measure, she was using "practice" as a rehearsal. In addition, she described the enactment of a modified orientation toward her professional life. However, she was working to re-invent the profession and her role within it. There suggest that prior to this professional development activity, Rita was struggling to resolve her personal outlook toward education and her interpretations about what is required to remain in the academy. By describing a "whole body" orientation to her work, she expects that her practices as a researcher and instructor to become more coordinated — her approaches to work will be much less detached from her inner drive to be an activist.

Winston, who was at a similar stage in his career as Rita, offered a very similar response to our inquiry about practice:

> Whether it's taking what I've learned at Crossroads and continuing to work it until I get it right, to keep rehearsing until I get it right or just discovering new ways to do the work that I'm doing and to practice differently in the academy, I think both are relevant, I don't think any of that happened until I got time to spend away from Crossroads. I had to step away from Crossroads as an experience to realize these things. I had to be back in the traditional academy to realize that I could do things differently and still be successful. *Winston*

The time to engage in deep discussions about his work as well as engaging in conversations with others about their work have offered Winston a new way to engage in the practices of his profession. Like Rita, there are indications of a wholeness to this orientation. He also combined the two versions of practice into his ongoing efforts to forge a path in his professional life:

> I'm rehearsing the stuff that I learned at Crossroads about the way to do work in the community. … It also changed the way that I practiced my profession at the academy in that I understand now that there are different ways of doing things; there are different conferences and every conference doesn't need to look like NARST or AERA. And so I can apply that to my own work and say that every professor doesn't need to look the same, every road to tenure doesn't need to look the same. And so I'm trying to figure out ways to really embrace that idea in my own work. *Winston*

For both young scholars, there were indications that they were having difficulties with resolving identities in conflict. On the one hand, they exhibit activist tendencies that had been driving forces to move them into an academic life. On the other hand, their interpretations of what is required to be validated as legitimate members of the research community — but that suppressed their drive to affect change at the community level. While it was not an intended design feature, for many participants, involvement in Crossroads allowed them to resolve tensions they were feeling — tensions between what they really believed in and what they had been led to believe they ought to do. As an apprentice is trained to imitate the expert, these assistant professors were still copying "best practices." Creativity was being neglected. As for journeymen, to become a craftsman or craftswoman necessitates creating a unique way to do the craft, not through mimicry.

Community, Caring & Vulnerability

Participants were asked how accurately certain terms, that had come out of previous evaluation cycles, described their experiences at Crossroads. Included within this list were "community" and "caring" and "responsibility." Every participant invoked the notion of care (e.g., Noddings, 2001; Proweller & Mitchener, 2004) as a substantive and central feature and that the palpable sense of care helped create a community from the outset. Caring and community seemed inextricably linked for the participants. Byron, a tenured professor and Crossroads veteran, responded in this way:

> All those [caring, responsibility, accountability] are really good word choices. For me, it gets back to the idea of people willing to expose themselves and make themselves vulnerable and ask for help, and ask for advice, and ask for suggestions, ask for mentoring. People taking that very seriously. The caring comes through in how we try to give people advice. We should hold each other accountable for being willing to engage. Nobody is checked out at Crossroads — everyone is fully engaged. It seems to me that's the accountability piece. You're agreeing that you're going to come and give of yourself and give of your ideas and be accountable by being fully engaged. *Byron.*

For Byron, it was the risk-taking and the responsibility toward others that unified the group. Sabrina supported the idea of Crossroads as community by commenting upon the variation in backgrounds and worldviews held by those attending — and differentiates this collegiality from other professional gatherings where she does not feel she is within a caring community:

> I felt there was a sense of community but I imagine being a participant over time you see that community has core members who are coming regularly, that there are shifts as to how they are contributing. I did have that community feel. … When you think of community and participation and identity. I mean it was a really diverse group of folks. But the fact that we could come together around the spirit of Crossroads and really trying to help other people in that group with whatever it was they were struggling with, or with their Vexation, those are powerful things to gather a group around. I did think it had a real community feel in ways other groups, of which I am a member professionally, don't. *Sabrina.*

There were participants who bristled at "accountability" because it evoked standardized testing, program accreditation and other impositions upon professional judgment. Nevertheless, while the term made some squeamish, it was in their reporting of their preparations to participate where our interviewees revealed a clear sense of accountability to the others:

> When I showed up to Crossroads, I hadn't finished reading everything [in the Proceedings] and I remember staying up the night before to make sure I got everything read. Because I did not want to walk into anybody's [session] and feel like I was not prepared and I was not giving what I was asking for. So you do have a responsibility to this group, you have a responsibility to the individuals who make up the group. When I was at Crossroads for the first session, I got this real kind of feeling of responsibility. It's our group; it's our conference,

our conversations. We're doing this, we're pushing this forward. *Winston.*

Perhaps it was because accountability comes from external forces that some participants resisted that descriptor. Nevertheless Winston's advanced preparation, an activity which was also reported by Dorothy and Gregory, revealed the expectation that each person was to give back to others in equal measure to what they hoped to receive. That participants described a reciprocity toward others and their work demonstrates accountability, responsibility, and caring.

Vulnerability was often mentioned as a defining feature of the working conference. Several participants pointed to the willingness to be vulnerable and the associated safe climate that afforded such a disposition as contributing to the powerfulness of this experience. This is not to suggest that the exchanges were free of forceful opinions or that politeness overshadowed the need for honest conversations. However, the oppressive form of civility that Mayo (2002) has so eloquently denounced was absent as individuals freely gave and received critical input.

DISCUSSION

Looking over the body of data, we find that our original conceptual framework is in need of adjustment. First, we had conceived of critical review as referring to the pre-conference input by the hosts; what is now apparent is that this dimension is taken up by the participants in their exchanges with each other throughout their professional development experience. Thus, the answer to the first research question is that critical review did indeed play a significant and useful role within the participants' professional development — albeit with a wider distribution of those who administer critical feedback than we had previously been aware. Similarly, Research Question Two was verified in that the participants saw responsibility to one other as a dominant and distinguishing aspect of the professional development. What was unexpected was how tightly enmeshed the participants saw "caring" and "responsibility" within the professional development. The responsibility was less of an obligation but was instead more of a reciprocity among equals. The unifying tone came from within as an outgrowth of the working conference's climate as opposed to an imposed requirements or requests for people to be helpful to each other. Finally, the accuracy of "practice community" as a description of the group was challenged by some participants and reinforced by others. By and large, the sanctity of vulnerability created a family or community feel; but identifying the components of the "practice" varied greatly across the participants. In other words, although many participants expressed their sense that strong interpersonal bonds were formed, some of which continued long after the conference had ended, we are still unable to describe with specificity what it was that surrounded, penetrated and bound the group together.

An interesting discovery was the participants reporting that the professional development was unique in the healthful tensions that developed. These included: the suspension of immediate reactions to others' comments; the willingness to maintain intense, mindful intervals of silence; the reawakening of a deeper sense of purpose while still attending to one's professional productivity; and the juxtaposition of seriousness with humor. In describing their sense of the Crossroads experience by relying upon the photographs, several participants contrasted this conference with others — with the latter being far too somber but also less powerful. These contrasts provoke a consideration about the sometimes false distinctions between play and work. There was a playful spirit within the Incubator sessions even though the central purpose was to work on Vexations and Ventures. As we continue to rediscover, John Dewey long ago wrote what we just learned, in this case about the artistic features of doing enjoyable work:

> Psychologically, the defining characteristic of **play** is not amusement nor aimlessness. It is the fact that **the aim is thought of as more activity in the same line**, without defining continuity of action in reference to results produced. Activities as they grow more complicated gain added meaning by greater attention to specific results achieved. Thus they pass gradually into work. **Work** is psychologically simply an **activity which consciously includes regard for consequences as a part of itself**. Work which remains permeated with the play attitude is art —in quality if not in conventional designation. (Dewey, 1916, pp. 205-206, emphases added)

The playfulness of Crossroads and the evident interpersonal warmth displayed might be misconstrued as a sign that it fails to qualify as a legitimate professional development experience or to count as an important feature on the educational research landscape. To such skeptics we would reply that the showcasing and pomposity that is so prevalent in "real" conferences deserves to be brought into question given the powerfulness attendees ascribe to Crossroads.

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After seven years as an apprentice, the individual submits a product to demonstrate sufficient skill to advance to journeyman status. In turn, a journeyman would at some point have to also display a product that would allow him or her to attain the designation of master craftsman. This product was called the master-piece or master-work.

> The apprentice's presentation focused on imitation: learning as copying. The journeyman's presentation had a larger compass. He had to show managerial competence and give evidence of his trustworthiness as a future leader. The different between brute imitation of procedure and the larger understanding of how to use what one knows is a mark of all skill development. (Sennett, 2008, p. 58)

When viewed from Sennett's craftsman model, the professional development of skilled science education researchers is often too frail to sustain itself. Under the best of circumstances, a novice to academia develops his or her skills

during the apprenticeship that we otherwise label as doctoral studies. The dissertation is far from being a masterpiece but is instead demonstrates that the apprentice is ready to move forward into initial journeyman status; the dissertation is easily recognized as a particular writing genre and an imitation of most others that came before. And this is how it should be: learning the craft requires learning to replicate the skills of the masters. But the journeyman phase does not begin until the doctorate has been conferred. By providing professional development to many emerging scholars came the realization that assistant professors are early in their ten thousand hour journey toward becoming a master. Unfortunately, this skill development too often occurs in isolation and without the regular supervision by a master within one's own field. While we would not claim that Crossroads along call fill the void, the interview data reveals the niche it occupies within the nurturing of young scholars as they are supported in the development of a journeyman within the craft.

In conclusion, the evidence gathered from the Crossroads participants obliges us to modify our conceptual framework. Based upon our findings, we are moving forward with a modified three-part framework: caring, community and capacity. We perceive a certain dialectic between the needs of individual professionals and their engagement with a larger community. Consequently, the notion of social capital as advanced by Coleman, Bourdieu and Putnam (e.g.. Mincyte, 2008) may prove helpful as we continue to interrogate the fifth and final year of Crossroads — and as we re-imagine what it might become in its next generation. Along these lines, Esser (2008) offers a list of resources and associated benefits that individuals may extract as a result of engaging in interpersonal networks. His list describes outcomes of being a member of a community, and there are clear parallels to the participants' views about Crossroads:

> The distinction between the "individual" and the "collective" aspects of social capital becomes clearer when examining certain resources and benefits provided by relations and networks. At least six typical forms of social resources and benefits might be distinguished:
>
> - the access to information and a certain kind of social life through relationships;
> - the readiness of actors to become trustfully involved in risky ventures with other actors
> - the production of support, help, and solidarity;
> - the availability of social control and a certain level of attention to the fate and action of other members of an entire network (or a system of social relations), like in the family, among relatives, or in the neighborhood;
> - a climate of trust in the network, like among colleagues at a research institute;
> - the validity of norms, values, and morality within a group, organization, or society." (pp. 24-25)

In addition to incorporating social capital into our ongoing work, we are also entertaining the possibility that Homi

Bhabha's description of third space (2006) might also capture what takes place within Crossroads. One space we inhabit is our home in which we enact a certain set of identities, while a second space is our workplace where the identity we exhibit is somewhat different. But it is at Crossroads where participants displayed an in-between persona, one that that suggested a homelike comfort even though the focus of conversation was almost continuously about "the job" and our role and agency in relation to the workplace. Crossroads identities are a blend of two selves and yet were genuine and authentic despite the rarity with which those are on display. Bhabha labels this as a hybrid identity. The unique physical and temporal places where those are are reveal are what he calls third spaces:

> Private and public, past and present, the psyche and the social develop an interstitial intimacy. It is an intimacy that questions binary divisions through which such spheres of social experiences are often spatially opposed. These spheres of life are linked through an "in-between" temporality that takes the measure of dwelling at home, while producing an image of the world … [This] represents a hybridity, a difference "within", a subject inhabits the rim of an "in-between" reality. And the inscription of the borderline existence inhabits a stillness of time and a strangeness of framing that creates the discursive "image" at the crossroads … bridging the home and the world. (Bhabha, 2006, p. 19)

We have wondered whether the very act of attempting a careful and empirical examination of Crossroads might not disrupt the quality of the experiences as reported by the participants. And yet, we are driven by a curiosity about what is exactly taking place. Up until now, we have found that our efforts to peel back the layers have not been harmful. Indeed, the process has revealed things we had not expected and have push us to reflect more deeply about what it is that has made Crossroads such a powerful professional development experience for many young scholars in science education. We do not necessarily feel closer to the "truth" but we the information provided by the participants convinces us that this line of inquiry is deserving of continued pursuit.

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APPENDIX: Interview Protocols

Pre-Crossroads Interview

1. How did you find out about Crossroads?
2. What appeals to you about Crossroads? What are your expectations from Crossroads?
3. How do you decide which conferences/professional development events to attend? How does Crossroads compare with other professional development opportunities (e.g., other national conferences, etc.)?
4. What did you write about in your Crossroads proposal – did it relate to your teaching, your research, or some other aspect of your work? What factors motivated and/or informed your proposal?
5. Why do you feel Crossroads is an appropriate venue for voicing the issue you are preparing to share? (this question comes from our conversation about the personal/professional divide)
6. What were your impressions of writing (and revising) your proposal? (seems like there should be a follow up question) How does this process compare to other writing (conferences proposals, journal manuscripts, and so on)?
7. How would you describe the importance of Crossroads for:
    a. Clarifying your professional trajectory.
    b. Receiving input about an impending project.
    c. Broadening your professional network.
    d. Learning from others whose work aligns with yours.
    e. Seeking support for a personally meaningful venture.
    f. Improving the conditions of science education.
8. Is there anything else about Crossroads you would like to share?

Post-Crossroads Interview

1. In what ways did Crossroads provide you what you had hoped for — and what did you receive that was unexpected?
2. How were your preparations for Crossroads (from proposal preparation to your actual presentation) similar to and/or different from other professional conferences?
3. Take a visit to the pictures from the Alta Crossroads [secured site]. Select three pictures that you feel capture the essence of Crossroads. What about those pictures is representative of the Crossroads experience?
4. We think the idea of "practice" is central to Crossroads. Two ways to construe practice in relation to Crossroads are:
    - rehearsing new possibilities in your professional life.
    - performing the best from our professional selves.

    How accurately do these describe your experiences at the Alta meeting? Are there other ways you would describe practice in relation to your Crossroads experience?
5. Many participants describe Crossroads as a community. Did you feel that Crossroads had a sense of community? If so, how would you describe the community? How do you view this community intersecting with other communities of which you are a member?
6. Caring, accountability, and responsibility: how well do these describe the interactions among Crossroads participants? Did you personally experience any of these traits?
7. In what ways have events from Crossroads come to mind since we were gathered in Alta?