Cultivating Collaborators: Concepts and Questions Emerging Interactively From An Evolving, Interdisciplinary Workshop

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Abstract

We report here on a series of interaction-intensive, interdisciplinary workshops to foster collaboration among those who teach, study, and engage with the public about scientific developments and social change—the New England Workshop on Science and Social Change. We include one line of thinking that fed into the workshops and present an analysis of how they contribute to participants developing their interest and skills in collaboration. Workshop evaluations suggest that people are moved to develop themselves as collaborators when they view an experience or training as transformative. Four R's–respect, risk, revelation, and re-engagement–point to the important conditions for interactions among researchers to be experienced as transformative. Three considerations lie behind the focus on the process side of the workshops, not the specific workshop topics: 1. How best to fill in for readers what they missed out on by not being there; 2. Workshops and meetings are a ubiquitous part of the culture of science and technology studies (STS) so it is valuable to examine this aspect of our own culture with a view to promoting positive changes; 3. In some scientific fields organized multi-person collaborative processes form a highly valorized aspect of the culture of science, so reflection on experiences of participation and collaboration in STS might inform our analyses of fields that emphasize collaboration and group processes. Indeed, the authors' own involvement in the workshops extends our own STS work on actor networks and "heterogeneous engineering," that is, the mobilization of a variety of resources by diverse agents spanning different realms of social action.

"Most workshops are dysfunctional—this one wasn't!" read one evaluation of a 2004 workshop that aimed to "foster collaboration among those who teach, study, and engage with the public about scientific developments and social change." Initiated with a seed grant from the U.S. National Science Foundation's Science and Society program these experimental, interaction-intensive, interdisciplinary workshops have continued annually under the umbrella of the New England Workshop on Science and Social Change (hereon: NewSSC) (NewSSC 2010). We report here on the workshop dynamics that evolved in NewSSC over its first five years, including some thinking that led to the workshops and presenting an analysis of how they contribute to participants developing their interest and skills in collaboration. We see this "Engagements" section of *Science as Culture*, which informs readers about interesting meetings, educational innovations, and other forms of public outreach, as an opportunity to stimulate others to build on (or against) our experience without waiting until some research publication can emerge.

Some preliminaries: Each NewSSC workshop had its own specific theme that spanned science and technology studies (STS), science, and educational innovation: social shaping of the use of genetic knowledge; complexities of genes-environment-development; social implications of ecological restoration; collaborative generation of environmental knowledge and inquiry; and teaching and public engagement beyond disciplinary boundaries (NewSSC 2010). The report does not, however, review the topics of the workshops; we focus primarily on the process side for three reasons: First, if the report is to fill in for readers what they missed out on by not being at NewSSC, we decided that the workshop dynamics were most important to convey. Second, workshops and meetings are a ubiquitous part of the culture of STS so, unless one is resigned to dysfunctional workshops, it is valuable to examine this aspect of our own culture with a view to promoting positive changes. (Our discussion also has implications for interdisciplinary pedagogy, another part of STS culture.) Third, in some fields organized multi-person collaborative processes form a highly valorized aspect of the culture of science, so reflection on experiences of participation and collaboration in STS might inform our analyses of fields that emphasize collaboration and group processes.

Indeed, our involvement in NewSSC extends our own STS work on actor networks and "heterogeneous engineering," that is, the mobilization of a variety of resources by diverse agents spanning different realms of social action (Law 1987; Taylor 2005, 93ff). We have studied

environmental planning and management and environmental research with special attention to what we see as self-conscious heterogeneous network-building (Taylor 2005). Although it is beyond the scope of a contribution to "Engagements" to review the STS and other literature on collaboration and participation (see, e.g., recent collections by Leach et al. 2005, Schuman 2006, Strathern 2004), it seems appropriate to build on our own position in relation to STS and environmental research. We lead off with some discussion of workshops and other organized multi-person collaborative processes in environmental research; this entry point allows us to motivate a question about cultivating collaborators that is more general (not confined to environmental research) and around which we organize our review of the dynamics of the NewSSC workshops.

Initial Thinking: Why emphasize collaboration in environmental research?

Since the 1990s collaboration has become a dominant concern in environmental planning and management (Margerum 2008), but the need to organize collaborative environmental *research* can be traced back at least as far as the tropical rainforest ecosystem projects led by H.T. Odum in the 1950s and 60s (Odum and Pigeon 1970). This emphasis ran through the International Biological Program (1964-74) and the Long-Term Ecological Research projects that began in 1980. Yet what exactly is it about developing *environmental* knowledge that calls for collaboration? A number of different ways to think about collaboration in environmental research can be readily identified (Taylor 2001). We divide this list into two categories: the first reflecting the simple idea that collaboration aims for a sum of multiple parts; the second, the hope that something greater than the sum of those parts will emerge through their interaction (Box 1).

Box 1. Why emphasize collaboration in <u>environmental</u> research?

A. Sum of the Parts

Combining multiple perspectives

• When research is tied together with planning and management that involves meetings and networks of representatives of established and emerging stakeholder groups, the knowledge and questions from the different groups and kinds of research needs to inform the research projects (Margerum 2008, Wondolleck and Yaffee 2000).

• When researchers are concerned about social justice, they can shape their inquiries through ongoing work with and empowerment of people whose lives stand to be most affected by some change in social policy or technological development, such as digging of deep wells for irrigation (Greenwood and Levin 1998).

• When the knowledge and research skills of more than one person/specialty are needed, multi-disciplinary research teams are established.

• When the labor of research, especially in data collection, is beyond any research group, amateurs—"citizen scientists"—can be sought as collaborators (Wikipedia n.d., Barrow 2000).

• Workshops and other organized multi-person collaborative processes in environmental research constitute a self-conscious example of what sociologists of science and technology have called "heterogeneous engineering" (i.e., the mobilization of a variety of resources by diverse agents spanning different realms of social action) (Taylor 2005, 93ff).

Extending over time

• The nature of environmental complexity means that ongoing assessment (as against a one-time analysis) is needed, so an ongoing organization or group is formed to conduct the assessment. (The need for ongoing assessment is recognized in the field of Adaptive Environmental Assessment and Management; Resilience Alliance n.d., Gunderson et al. 1995.)

Spanning distance

• Researchers in separate projects and disparate locations use the tools of eco-informatics to combine their data and thereby generate a larger picture (Halpern et al. 2008).

B. Greater than the Sum of the Parts (i.e., outcomes over and above A.)

Generating new perspectives

• Knowledge and further research questions can be generated that the collaborators (individually or in sum) did not have when they came in (Olsen and Eoyang, 2001).

Durable

• Guided by skillful facilitators, collaborators can become invested in the plans, policy, and ongoing collaborations that emerge from the research (Stanfield 2002, 17ff).

Developing capacities

• Collaborators develop skills and dispositions for collaboration in various settings, as warranted by the rise of citizen participation and of new institutions of "civil society" (Burbidge 1997, Taylor 2005, 204ff).

We have expressed the items in the second, "greater than the sum of the parts" category in more generic terms, but we see them as grounded in many of the more concrete objectives of the first category. At the same time, we recognized that the objectives in the second category raised questions about the theory and practice of collaboration that need not be specific to environmental research: Why do well-facilitated group processes result in collaborators' investment in the product of the processes? How can collaborators (or facilitators of collaboration) ensure that knowledge generated is greater than any single collaborator or sum of collaborators came in with? How does a person become skilled and effective in contributing to such outcomes?

There is an obvious flip side to these questions. What can we learn from interdisciplinary workshops and collaborations that *fail*, for the most part, to generate new knowledge and investment in the product; that do not enhance participants' ability to contribute to effective collaborations in the future? Each of us had seen time, energy, funds (and associated carbon footprint) poured into workshops in which the parts competed more than added up to any sum. Where the pressure for products was allowed to squelch generative processes so that participants perpetuated familiar patterns of defending territory and speaking at cross-purposes. Where we headed home without being enriched by perspectives and frameworks from other disciplines—and, in many cases, without any products emerging. Yet, grouching about such frustrating experiences (which seem far from rare) is not productive; the question is how can we do better?

Current Direction of Inquiry: Becoming skilled and effective in contributing to collaborations

Let us pick up the last question that flowed from the "greater than the sum of the parts" objectives: How does a person become skilled and effective in contributing to collaborations? The default answer would be "just do it"—everyone can learn collaboration skills and dispositions through practice. This answer seems less than satisfactory given the number of unproductive meetings and collaborations most of us have experienced. The obvious fallback answer—"take classes in it"—has merit (e.g., Senge et al. 1994, Stanfield 2002, and Schuman

2006 provide valuable resources for instructors). However, as the following experience of a colleague in forestry reminds us, the answer also is not sufficient.

The colleague in question was recruited to run professional development programs and found his mid-career students very appreciative of learning about collaboration. It spoke to their day-to-day experience working with diverse stakeholders in the use of forests and public lands. Indeed, they asked "Why weren't we taught this as undergraduates?", which inspired the colleague to introduce similar material to his undergraduates. Many of these younger students resisted; they wanted him to focus on the facts—the science—that they needed to know to qualify as professional foresters. He told them about the reactions of the mid-career foresters, but this did not convince all the undergraduate foresters-in-training that it was worthwhile to learn about collaboration.

Teachers can, of course, insist that students study assigned topics, but, when the topic is collaboration, insistence cannot suffice. There is necessarily an experiential side to learning collaboration. Any reluctance on the students' part to "collaborate" in being taught skills and processes of collaboration detracts from the group process in question; the resulting experience is poorer and can fall short of convincing students that collaboration is worthwhile. (Of course, students are not the only people to resist learning about collaboration. We encounter colleagues who want us to prove the value of group processes before they take part, watch more than engage if they do take part, or, worse still, try to derail the group process in question.)

If "just do it" or "take classes in it" do not suffice as answers to our question about becoming skilled and effective in contributing to collaborations, let us then refine the question. To develop skills and dispositions of collaboration requires researchers (and researchers-in-training) to make opportunities for practicing what they have been introduced to and not to give up when they encounter resistance. What moves them to pursue such development? The NewSSC workshops have provided an opportunity to address this question.

Materials and methods

The NewSSC workshops have been small—eleven to fifteen participants—international (people from three to eight nationalities), of mixed "rank" (students, postdocs, untenured and tenured professors, and independent scholars), and interdisciplinary (sociologists, historians, philosophers, and ethicists of science; science educators; and scientists interested in the

preceding interdisciplinary fields; as well as an ecological artist, a labor educator, and a reference librarian). Under the overarching theme of engaging with science and social change, each NewSSC workshop has its own specific theme (as mentioned in the introduction; see NewSSC 2010 for more details of all the workshops).

Although the themes changed each year, the workshops have had four objectives in common (given in Box 2). The workshops last for four days and move through four broad, overlapping phases (Box 3). There is no delivery of papers; instead participants lead each other in activities, designed before or created during the workshops, that can be adapted to college classrooms and other contexts (Box 4) and participate in group processes that are regular features of the workshops (Box 5). These group processes are also offered as models or tools to be adapted or adopted in other contexts. The informal and guided opportunities to reflect on hopes and experiences during the workshop produce feedback that shapes the days ahead as well as changes to the design of subsequent workshops. The ongoing evolution of the workshops is stimulated not only by the evaluations, but also by an extended debriefing immediately following each workshop and advisory group discussions, such as the one out of which the analysis in the next section emerged.

Box 2. Objectives of NewSSC

1. To promote the social contextualization of science in education and other activities beyond the participants' current disciplinary and academic boundaries.
2. To use innovative workshop processes that facilitate participants connecting theoretical, pedagogical, practical, political, and personal aspects of the issue at hand in constructive ways.
3. To train novice and experienced scholars in process/participation skills valuable in activity-centered teaching, workshops, and collaboration.
4. To provide a workshop model that can be repeated, evolve in response to evaluations, and be adapted by participants.

Box 3. Phases of the four-day workshop*

Phase 1. Exposing Diverse Points of Potential Interaction

Phase 2a. Focus on Detailed Case Study and b. Outdoors Excursion for Informal Conversations

Phase 3. Activities to Engage each Other in our Projects. (Some activities prepared in advance of the workshop; some generated in small groups during the workshop)
Phase 4. Taking Stock of the Experience

* The phases correspond only approximately to the days, e.g., Day 1 also includes one activity (Phase 3), activities continue into Day 4, and "Taking Stock" occurs every day.

Box 4. Examples of activities specific to a given workshop*

Scenarios for Teaching that Relate to Collaboration in Environmental Inquiry. An activity working on two levels: a) developing the ability of the activity leader(s) to coach/coax colleagues into adding new approaches in their teaching, namely, writing scenarios for problem-based learning (PBL); and b) creating a pool of scenarios that could be used in teaching (especially PBL) concerning the diverse dimensions of promoting collaborations in generating environmental knowledge and inquiry.

An Introduction to Participatory or Forum Theater as a Resource for Education and Outreach. Many participatory and educational activities involving science, technology, environmental or health issues are based on the assumption that "lay" persons suffer from a "deficit" of knowledge or information on the issues under debate. An alternative approach, Forum Theatre (Boal 2002), begins with "a scene or a play that must necessarily show a situation of oppression that the Protagonist does not know how to fight against, and fails. The spect-actors are invited to replace this Protagonist, and act out... all possible solutions, ideas, strategies."

* These activities are documented in links to the programs on the webpages for each workshop (NewSSC 2010).

Box 5. Examples of group processes common to most workshops*

Guided Freewriting (early on Day 1): 7-10 minutes non-stop writing on "issues that concern me, including ones that I haven't raised or addressed well in previous gatherings." This exercise is designed to clear mental and/or emotional space and to allow ideas about an issue to begin to come to the surface.

Autobiographical Introductions (Day 1): 15 minutes each for participants to describe their paths in narrative depth and provide background on their current and emerging work. Listeners are encouraged to take notes on points of intersection, interest, and curiosity.

Structured discussion of an in-depth case study or key article (Day 2): After the author provides a brief introduction, other participants take time to reflect aloud on commonalities and differences with their own work. Author responds only after everyone else has spoken.

Go-arounds, e.g., at start of Day 3, "I didn't expect to be thinking about…"

Office Hours (Day 3): An hour divided into three time slots in which participants sign up to consult one-on-one with another participant.

Dialogue Process: An opportunity to listen to what participants say about their thinking, and, in response to what participants hear, to "listen" to their own thoughts and feelings that had been below the surface of their attention.

* Instructions for the group processes are linked to the programs on the webpages for each workshop (NewSSC 2010).

Results and Analysis

"I feel I now know 13 other people I can go to for advice, encouragement, teaching help, ideas, collaboration, anything," one participant in the 2008 workshop wrote in her evaluation. Another emailed afterwards that: "Many of the strategies…employed to bring our little company together so deeply, so quickly, could well be applied in the classroom to build a community of trust and support from its earliest days." Yet, how did the workshop dynamics produce such outcomes? This is not easy to pin down or to convey. As the preceding participant commented in her evaluation: "the benefit of [the workshop] is to be discovered not in something one can express in a paragraph of evaluation… [T]he benefit is to be lived into reality, a PROCESS through which one must personally pass, to understand its method, function, benefits..." In this report we cannot create for readers the experience of participating in one of the workshops. We hope, however, that our description of the workshops and the analysis to follow conveys enough to stimulate others to explore and examine how they *cultivate collaboration* in their own workshops and collaborative projects.

Clearly, the NewSSC workshops' activities and group processes require more active participation than listening to talks and taking notes. The evaluations affirm that the activities and processes introduce a "broad and very effective repertoire" of "knowledge, tools, approaches, and contacts," and participants intend to make use of this repertoire in their teaching and other work. Such intentions are a positive sign that participants are moved to continue developing as collaborators, yet the evaluations suggest that something deeper is involved. Consider, for example: "This workshop introduced me to a wonderful range of new techniques for facilitating deeply satisfying group processes, creating cohesion, mutual understanding, lasting bonds and *transformative* learning."

This last phrase prompted us to conjecture that people who see an experience or training in collaboration as "transformative" are more likely to pursue further their development as a collaborator. With this idea in mind we reviewed the 2006-8 evaluations in the mode of "appreciative inquiry" (Preskill and Coghlan, 2003). In that spirit, one does not look at what is wrong and seek to fix it, but at what is right and what that tells us about fostering "success, the life-giving force, the incidence of joy" (Watkins and Cooperrider 2000, p. 6). We came up with "4R's" that seem to underlie "transformative exchanges" (Olson and Eoyang, 2000) and move participants to develop as collaborators. What follows is a stylized narrative of these 4R's. (The Appendix provides quotes taken from the evaluations that illustrate the narrative.)

1. Respect. The small number and mixed composition of the workshop participants—mixed in terms of disciplines, rank, experience, and nationality—means that participants have repeated exchanges that are meaningful and generative with those who differ from them. Autobiographical stories at the start of the workshop, the dialogue process, and frequent go-arounds not only promote listening to others, but also provide the experience of being listened to. Participants remark on being pleasantly surprised by who asks during the one-on-one "Office Hours" to hear their ideas. The structured discussion of a case study also requires attentive listening as commonalities and differences are brought to light. Participation in the activities, including small group work to generate and co-lead activities during the workshop, emphasizes that each participant, regardless of background or previous experience has something valuable to contribute to the process and outcomes. In these and other ways, respect is not simply stated as a ground rule, but is enacted.

2. Risk. Respect creates a space with enough safety for participants to take risks of various kinds, such as, speaking personally during the autobiographical introductions, taking an interest in points of view distant in terms of discipline and experience, participating—sometimes quite playfully—during unfamiliar processes, and being open to surprises and spontaneous insights emerging from interactions among people who were strangers before the workshop. Most importantly, participants have to accept uncertainty and instability—"What exactly is going to happen? What should I be doing?"—as the workshop "self-organizes." In terms of Stacey's schema of management of organizations (Zimmerman 2001), the workshops are not *un*organized; there is a roadmap (see Box 3) and the group processes are facilitated by participants. Yet, the workshops unfold without an explicit agreement on where they are headed and without certainty about how to achieve desired outcomes. So participants take risks in staying in there when the process seems rough—not stepping back into the role of critic. In all these aspects of risk-taking, recent workshops have benefited from the participation of "veterans" who have attended one or more previous NewSSC workshops.

3. Revelation. On the principle that "we know more than we are, at first, prepared to acknowledge" (Taylor 2008), a space is created by respect and risk in which participants bring thoughts and feelings to the surface that articulate, clarify and complicate their ideas, relationships, and aspirations—in short, their identities. Identities may be thought of as the ongoing, recursive relationships of how we understand ourselves, others, and the world, together with the understandings and expectations—some welcome, some not—that are pressed back upon us (Britzman, 1992, Danielewicz, 2001). Revelation is not just uncovering who we are, but about "re-marking" the various ways we might understand and perform our identities and what we know. The opportunity to reveal and remark upon oneself is explicit in some of the workshops' group processes, e.g., guided freewriting, dialogue process, and go-arounds on "I didn't expect to be thinking about…" (Box 5).

The transformative potential of revelation for collaborative knowledge generation is greatest when we are actively implicated in one another's revelations. As the first quote in the Appendix about revelation suggests, our own self-understandings are extended when we are respectful partners with others in the risky business of self-exploration. Activities that bring people into revelatory relationships generate new possibilities for knowing and being. One

repeated comment in the evaluations, namely, that participants needed more time to reflect on and digest their experiences, accentuates the importance of revelation in the workshop dynamics.

4. Re-engagement. Respect, risk, and revelation combine so that, to use a machine metaphor, participants' gears are re-engaged, allowing them to sustain quite a high level of energy during the workshop all day and into the evenings. The participants clearly engage actively with others, and, equally importantly, are reminded of their aspirations to work in supportive communities. In this last sense, re-engagement goes beyond an individual's enhanced enthusiasm. It is a collective or emergent result of the activities that, in Olsen and Eoyang's (2001) terms, bring people who have generative differences into meaningful interactions that can catalyze transformations. Meaningful social engagement and opportunities for personal introspection contribute to participants discovering new possibilities for work with others on ideas they brought to the workshop. Of course, what participants state in the end-of-workshop evaluations cannot show that they followed through on intentions to stay connected or to make shifts in their own projects and work relations. (A need or desire for periodic re-charging of their ideas and intentions is evident in the return of past participants to later workshops.)

Conclusion

Our report of the workshops processes used in the New England Workshop on Science and Social Change brings into focus the question: What moves researchers to develop themselves as collaborators? Our conjecture is that people are so moved when they see an experience or training in collaboration as "transformative." After reviewing the evaluations from NewSSC workshops we concluded that the 4R's–respect, risk, revelation, and re-engagement–provide important conditions for interactions among researchers to be transformative.

"Conclude" seems too definite however; our discussion leaves open many questions about the theory and practice of collaboration. We acknowledge, especially, some unresolved tensions between process and product. Clearly, our description and analysis has emphasized process; indeed, process that stimulates more process (i.e., further engagement and development as a collaborator). Of course, this is a product of a kind, but collaboration is also meant to yield concrete outcomes, such as those for environmental research we arrived at in our initial thinking (Box 1). Outcomes remain important to us, but we did not view evaluation of the products of the NewSSC workshops (NewSSC 2008) as necessary to support the analysis we have presented

here. In fact, we are prepared to push back a bit further against the conventional emphasis on "deliverables." If STS researchers (and environmental researhcers as well) seriously want durable products to emerge from collaboration, they should not allow the more concrete, "sum of the parts" objectives to eclipse the less tangible, "greater than the sum of the parts" ones (Box 1). Would-be collaborators, we propose, need to make opportunities to explore process and develop as collaborators. If the NewSSC workshops are any guide for collaborative inquiry and knowledge-making, taking the time it takes to "connect theoretical, pedagogical, practical, political, and personal aspects of the issue at hand" represent time, energy, and funds well spent.

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Appendix. Extracts from participant evaluations that illustrate the 4Rs
(The full evaluations are linked to the webpages for each workshop; NewSSC 2010.)

1. Respect.

"The primary strength of this workshop was in bringing together diverse people from diverse yet intersecting fields and allowing them to exchange expertise and to share inspiration and support for innovative educational/activist efforts."

“The workshop was special to me in that I saw 12 people put in time, effort, creativity to figure out how to work together.”

The workshop was “special because it focused very intentionally on quality of interaction, and because the ‘side trips’ could be done as part of the workshop instead of surreptitiously.”

"One immediate impact was to participate in a collective that was created from so many different experiences."

"This workshop… made me realize I have an academic community I never knew existed…"

2. Risk

"… successful in creating a space in which participants could take risks…"

"… people participated, questioned, revealed vulnerabilities,…"

"…(most) academic markers are removed from consideration so all participants are expected to play all the time…. The workshop tries to employ multiple ways of knowing and learning about the world, so everyone is uncomfortable at least some of the time. As one participant noted, he was learning the most during the times he was most uncomfortable.”

"… it enables one to develop in very different ways, depending on the group."

"The workshop format will benefit from an explicit model of leadership/facilitation skills showing how to alternate deftly between centralized control and focus, on the one hand, and distributed authority and unrestricted scope on the other."

"Participating the second time, I was able to concentrate more on specific details and was not as overwhelmed by the wealth of methods, processes, and group interactions."

3. Revelation.

"The various activities do not simply build connections with others, but they necessitate the discovery of the identity of others through their own self-articulations. But since those articulations follow their own path, one sees them not as simple reports of some static truth but

as new explorations of self, in each case. Then one discovers this has happened to oneself as much as to others-one discovers oneself anew in the surprising revelations that emerge in the process of self-revelation."

"Ultimately, I believe we have all come to embrace, not only ourselves and each other, but the process! And I believe too that we all are in silent agreement that we depart better persons for the experience, refreshed from the supportive net of the community that has held us fast during this perilous self-discovery. Oh, and then!...one begins immediately to hatch plans for helping others to feel this same wonderful way."

4. Re-engagement.

"The energy level of all attendees was remarkable given our considerable duties as professors and researchers."

The workshop "engaged people in multiple ways… Fully engaged people can develop exciting ideas and insights."

"For those of us working in the spaces between disciplines, especially the spaces between science and other disciplines, this kind of intellectual community is invaluable... I can't say enough about this experience."

"This workshop model is something I would like to continue to engage in at various points throughout my academic career."

" [I]ts impact seems very difficult to evaluate fully and effectively, as it involves examining methodological shifts and perhaps subtle rearrangements in infrastructure or organizational relationships at multiple locations following the workshop itself. These "products" are not documented on paper."