

**We know more than we are, at first, prepared to acknowledge:
Journeying to develop critical thinking**

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Abstract: In this essay I present five passages in a pedagogical journey that has led from teaching undergraduate science-in-society courses to running a graduate program in critical thinking and reflective practice for teachers and other mid-career professionals. I have shaped these passages to expose some of my struggles—conceptual and practical—in learning to decenter pedagogy and to provide space and support for students to develop as critical thinkers. The key challenge I highlight is of helping people make knowledge and practice from insights and experience that they are not prepared, at first, to acknowledge. In a self-exemplifying style, each passage raises some questions for further inquiry or discussion. My hope is that the essay as a whole stimulates readers to grapple with issues they were not aware they faced and to generate questions beyond those I present.

The most important parts of any conversation are those that neither party could have imagined before starting. William Isaacs (1999)

In the mid-1980s I was teaching science in its social context as a new faculty member at a non-traditional undergraduate college. I began an ecology course with a brief review of our place in space before I asked students to map their geographical positions and origins. One student, "K," did not come back to earth with the rest of us, but remained off in her own thoughts. Some minutes later she raised her hand: "I always knew the sun, not the earth, was the center of the solar system, but do you mean to say..." K paused, then continued. "I'd never thought about the sun not being the center of the universe." From K's tone, it was clear that she was not simply rehearsing a new piece of knowledge. She was also observing that she had not thought about the issue but now she saw as obvious that the universe was not sun-centered. What other retrospectively obvious questions had she not been asking? What other reconceptualizations might follow? These questions pointed her along the path I hoped my students would take as critical thinkers—grappling with issues they had not been aware they faced, generating questions beyond those I had

presented, becoming open to reconceptualization, and accepting that their teacher should not be at the center of their learning.

My own pedagogical journey has led from teaching these undergraduate science-in-society courses to running a graduate program in critical thinking and reflective practice for teachers and other mid-career professionals. (A parallel journey in ecological and environmental research is described elsewhere, Taylor 2005.) In this essay I present five passages from this journey. I have shaped these to expose some of my struggles—conceptual and practical—in learning to decenter my pedagogy and provide space and support for students to develop as critical thinkers. Each passage raises some questions that I leave open for further inquiry or discussion. I hope, moreover, that the passages and questions stimulate readers to grapple with issues you were not aware you faced and to generate questions beyond those I present.

Of course, I cannot create for readers the experience of participating in a classroom activity or semester-long process. Nor can you divert me from the steps ahead or inject other considerations. If you could, I expect some readers would slow me down to ask for more detail about the situations I describe or for more explication of my line of thinking in relation to that of other writers. Indeed, it is one of the central tensions of my teaching and writing that I want to open up questions and point to greater complexity of relevant considerations even when I know that some members of my audiences would prefer a tight analysis shaped to address their specific concerns and background. In acknowledgement of these tensions, this essay is accompanied by a web-based forum for readers to engage or witness the author in conversation. This experiment befits the central pedagogical challenge the essay raises, namely, helping people make knowledge and practice from insights and experience that they are not prepared, at first, to acknowledge.

1. Becoming aware of the forces that hold us or release us

Since childhood star gazing in rural Australia I had known about the sun's marginal place in the Milky Way so I felt some superiority when K admitted that she had not realized this. To my chagrin, I subsequently discovered my own retrospectively obvious question about our place in space. I was reading Sally Ride's book on the space shuttle to my child, when I came to her description of astronauts regaining weight as they descended (Ride 1986). The idea conveyed was that weightlessness was a result of distance from the earth. Yet the space shuttle orbits only 300 kilometers up where the earth's gravity is still 90% of its strength down on the surface. So I started thinking about how to explain weightlessness correctly in a children's book. Try this—think of swinging an object around on the end of a piece of string. To make it go faster, you have to pull harder; if you do not hold on tight, the object flies off into the neighbor's yard. Astronauts travel around the earth fast—at 7.5 kilometers per second. They feel weightless because all of the earth's gravitational attraction on them goes to keep them from flying off into space. The earth's pull on the astronauts is like your pulling on the string—but, while you may let go, gravity never stops acting. When the space shuttle slows down on its return to earth, less of gravity's force goes to keeping the astronauts circling the earth and what is left over is experienced as weight regained.

After rehearsing this explanation a few times, another kind of weightlessness occurred to me. The sun's gravitational attraction is keeping me circling around it

—at 30 kilometers/second I figured out. On the earth I feel weightless with respect to the sun's gravity, but that force is acting nevertheless. I had never thought about this; I had considered myself a passenger on the earth, which the sun's gravity was keeping in orbit around it. I then realized that I am also zooming around the Milky Way galaxy, not as a passenger in the solar system, which the galaxy's gravitational attraction was keeping in orbit around it, but because the galaxy's gravity is keeping me orbiting around its center. It made me feel woozy to think of the sun and the rest of the galaxy "paying attention to me" all the time, keeping me circling at enormous speed through space—at over 200 kilometers/second, I soon learned. I wondered if every molecule in the galaxy was attracting every molecule of my body every moment. Was there some other way to think about gravity? Perhaps a further radical reconceptualization awaited me, possibly involving wooziness-inducing Einsteinian concepts such as curved space-time.

In recent years I have started courses and workshops on critical thinking by relating the reconceptualizations that occurred to K and myself. I usually follow the story with an activity. My goal is to have people respond to story and bring insights to the surface about how people can generate questions about issues they were not aware they faced. The activity begins, therefore, with a **freewriting** exercise (Elbow 1981) in which each of us writes for ten minutes starting from this lead off: "When I entertain the idea that I haven't been asking some 'obvious' questions that might have led to radical reconceptualizations, the thoughts/ feelings/ experiences that come to mind include..." After this writing, we pair up and describe situations in which we "saw something in a fresh way that made us wonder why we previously accepted what we had." We then list on the board short phrases capturing what made the "re-seeing" possible. The factors mentioned differ from one time to the next, but they always represent a diverse mix of mental, emotional, situational, and relational items, e.g., "relaxed frame of mind," "annoyed with this culture," "forgetting," "using a different vocabulary," and so on. I conclude the activity by simply noting the challenge, which is common to many other questions in education, of acknowledging and mobilizing the diversity inherent in any group. Recently, however, now that I have lists from several occasions, I have started to wonder whether the factors could be synthesized into general directions. Would future audiences gain from my cutting through the diversity and presenting the synthesis—or does this run against the grain of facilitating thinking about re-seeing?

2. Critical thinking as journeying

A few years ago I taught for the first time a general course on critical thinking. The students were mostly mid-career teachers and other professionals. This was also the occasion of my first telling the place in space story and running the re-seeing activity. Some of the students construed the story as a science lesson; evidently, I had to clarify the delivery and message. Later in the semester I had a chance to do this when we revisited the activity to practice lesson-plan remodeling. What emerged from the class discussion was that it mattered little to me whether students understood my weightlessness explanation. I only wanted them to puzzle over the general conundrum of how questions that retrospectively seem obvious ever occurred to them and to consider their susceptibility to recurrent reconceptualizations. During this clarification process the image occurred to me that when one's development as a critical thinker is like a personal journey into unfamiliar or unknown areas. Both involve risk, open up questions, create more experiences than can be integrated at first sight,

require support, yields personal change, and so on. This journeying metaphor differs markedly from the conventional philosophical view of critical thinking as scrutinizing the reasoning, assumptions, and evidence behind claims (Ennis 1987, Anon, n.d.). Instead of the usual connotations of "critical" with judgement and finding fault according to some standards (Williams 1983, 84ff), journeying draws attention to the inter- and intra-personal dimensions of people developing their thinking.

In retrospect, the immediate impetus for my re-seeing critical thinking as journeying seemed to have been the "life-course" of students during that fifteen-week semester. Early in the course many students expressed dependency on my co-instructor and me: "Aren't small group discussions an exercise in 'mutually shared ignorance'?" "Could the class be smaller?—we want more direct interaction with you." "I was never taught this at college—I'm not a critical thinking kind of person." Some students were uncomfortable with dialogues their two instructors would have in front of the class in order to expose tensions among different perspectives. They asked for clear definitions of and procedures for critical thinking and for particular assignments and activities. Their anxieties were most evident when they looked ahead to a new end-of-semester "manifesto" assignment, in which we asked for "a synthesis of elements from the course selected and organized so as to inspire and inform your efforts in extending critical thinking beyond the course." We responded to students' concerns with some mini-lectures, handouts, and a sample manifesto. Yet we also persisted in conducting activities, promoting journaling, and assigning thought-pieces through which students might develop their own working approaches to critical thinking. By mid-semester students who had been quiet or lacked confidence in their critical-thinking abilities started to articulate connections with their work as teachers and professionals.

We had reassured those who worried about the manifesto assignment that they would have something to say, but we were surprised by how true that turned out to be. For example, the student who was not the "critical thinking kind" began her manifesto with perceptive advice:

"If there is one basic rule to critical thinking that I, as a novice, have learned it is

DON'T BE AFRAID!"

She continued: "**Don't be afraid** to ask questions and test ideas, ponder and wonder... **Don't be afraid** to have a voice and use it!... **Don't be afraid** to consider other perspectives... **Don't be afraid** to utilize help..." She finished, "Above all, approach life as an explorer looking to capture all the information possible about the well known, little known and unknown and keep an open mind to what you uncover." Another student wrote a long letter to her seven year old: "To give you a few words of advice, yes, but mostly to remind me of what I believe I should practice in order to assist you with your growth." These manifestos displayed admirable self-awareness. To arrive there the students had taken risks and opened up questions, had experienced more than they were able at first to integrate and had sought support, and ended up seeing themselves differently (Taylor 2001a).

In retrospect, the students' confidence had begun to rise during classes involving various approaches to empathy and listening (Elbow 1986, Gallo 1994, Ross 1994, Stanfield 1997). I suspect that listening well helps students tease out

alternative views. Without alternatives in mind, it is difficult to motivate and undertake scrutiny of one's own evidence, assumptions, and logic, or of those of others. Being listened to seems to help students access their intelligence (in a broad sense of the term)—to bring to the surface, reevaluate, and articulate things they already know in some sense (Weissglass 1990). The resulting knowledge seems all the more powerful because it is not externally dictated (Friere 1970, Weissglass 1990). These are conjectures—I look forward to opportunities for more systematic exploration of the ways different people experience listening and being listened to in relation to their critical thinking.

3. Understanding by placing things in tension with alternatives

A colleague recently challenged me by asking why, although the critical thinking course ended positively, the student had been afraid in the first place. The force of this question led me to another: Had I been scared about my ability to bridge the gaps between my own thought processes and those of different students? Had I composed mini-lectures and handouts as if to say to students, "I have written down the lessons clearly, now it is your responsibility to understand the material"? Once fear was raised as an issue that teachers should consider, I am beginning to realize that it is a deep one. However, I want to leave that issue hovering in the background and instead take up the other thought about making lessons explicit.

Whatever I say about the power of students coming to their own reconceptualizations, I am still tempted by the more conventional approach for inducing re-seeing, namely, to spell out critiques of dominant views. I have written, for example, about the consequences of using natural selection to explain the evolution of organisms' adaptations to the environment. One consequence has been that the dynamics of the development and ecology of organisms get squeezed out (Taylor 1998). When I taught undergraduates in a program on biology in its social context, I led them through this and other critiques. (This was in the 1990s before I moved into the graduate education program, so I am going backwards in time here.) The first few times around there would be a few evaluations that claimed my course required students to accept the "dogma according to Taylor." These accusations disappeared, however, when I reframed the purpose of raising alternative ideas. I started to ask students not to accept the alternative ideas, but to consider them in contrast to standard ideas so as to check that they understood those ideas clearly (Taylor 2002a). For example, people often talk about DNA as a "blueprint" "coding for" an organism's traits. I would ask students to explore metaphors for the development of organisms that do not assume some central controlling molecule. After playing around with ideas such as improvisational dance, cheese making, and a casual conversation in an elevator, they saw the need to be more careful or precise about the biology of DNA.

The pedagogical shift—from critiquing dominant views to raising alternatives—led me in 1995 to compose the following view of students' developing as critical thinkers:

In a sense subscribed to by all teachers, critical thinking means that students are bright and engaged, ask questions, and think about the course materials until they understand well established knowledge and competing approaches. This becomes more significant when

students develop their own processes of active inquiry, which they can employ in new situations, beyond the bounds of our particular classes, indeed, beyond their time as students. My sense of critical thinking is, however, more specific; it depends on inquiry being informed by a strong sense of how things could be otherwise. I want students to see that they understand things better when they have placed established facts, theories, and practices in tension with alternatives (Taylor 1995a).

The pivotal role of reframing the pedagogical role of alternatives is evident in the way this paragraph continued:

Critical thinking at this level should not depend on students rejecting conventional accounts, but they do have to move through uncertainty. Their knowledge is, at least for a time, destabilized; what has been established cannot be taken for granted. Students can no longer expect that if they just wait long enough the teacher will provide complete and tidy conclusions; instead they have to take a great deal of responsibility for their own learning. Anxieties inevitably arise for students when they have to respond to new situations knowing that the teacher will not act as the final arbiter of their success. A high level of critical thinking is possible when students explore such anxieties and gain the confidence to face uncertainty and ambiguity.

Let me make some observations about my own journey before returning to the idea of understanding ideas by placing them in tension with alternatives. Retrospectively, I can see that the journeying metaphor for critical thinking was already forming four years before it occurred to me. It seems that reconceptualization is preceded by a phase in which the person on the journey has, so to speak, shot rolls of film, but the photos have not yet been processed and printed. The next paragraph of the 1995 account of critical thinking began:

There are few models for teaching critical thinking, especially about science... Just as I expect of my students, I have experimented, taken risks, and through experience am building up a set of tools that work for me. Moreover, I have adapted these teaching tools to cope with the different ways that students in each class respond when I invite them to address alternatives and uncertainty, and when I require them to take more responsibility for learning (Taylor 1995a).

Indeed looking back, I see that writing the statement of my teaching philosophy from which these excerpts have been drawn precipitated a phase of self-conscious pedagogical exploration and identity formation. This exploration led three years ago to my moving to a graduate education program and has continued in this new position (Taylor 2001b). In 1999, as a participant in a faculty seminar on "Becoming a teacher-researcher," I focused on a graduate course in which students undertake their own research projects, usually directed towards some educational change. Let me describe this because it extends the idea of understanding by placing in tension with alternatives.

I encourage considerable intra- and interpersonal exploration in defining and refining research direction and questions. An important part of this exploration comes through written and spoken dialogue around written work and successive revisions. For many students, such dialogue and revision are fraught; some strongly resist being weaned away from the familiar system of "produce a product and receive a grade." The specific teacher research began a month into the course with students writing their expectations and concerns in working under the "revise and resubmit" process. In the faculty seminar we digested the students' responses and used them as a basis for brainstorming about qualities of an improved system and experience. We clustered the large post-its on which we had written suggestions and ended up with five themes: "negotiate power/standards," "horizontal community," "develop autonomy," "acknowledge affect," and "be here now."

Back in class I discussed the students' responses with them and drew attention to the tension among the different themes (see Figure 1). "Develop autonomy" stood for digesting comments and making something for oneself, neither treating comments as dictates nor keeping one's work to oneself to insulate oneself. "Negotiate power/standards," on the other hand, recognized that students made assumptions about my ultimate power over grades translating into expectations that students would take up my suggestions. "Horizontal community" stood for building relationships other than the "vertical" one between professor and student.

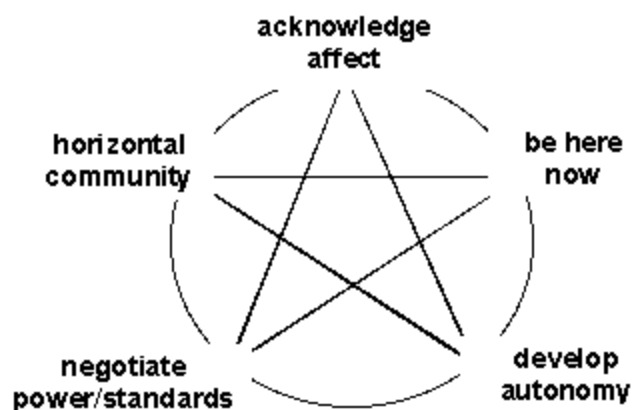


Figure 1. Five themes about improving the experience of dialogue around written work

We continued to refer to these themes and tensions during the course. A substitute was needed for "autonomy" (or, equivalently, "independence") because some students construed this as going their own way and not responding to comments of others, including those of professors. "Taking initiative" was suggested to me by my wife, but I realized that it applied to all five themes. I emailed my students: "[The challenge is to] take initiative in building horizontal relationships, in negotiating power/standards, in acknowledging that affect is involved in what you're doing and not doing (and in how others respond to that), in clearing away distractions from other sources (present & past) so you can be here now." A longer title soon emerged: "Taking initiative in and through relationships." That is, don't expect to learn or change

on one's own. Build relationships with others. Don't expect to learn or change without jostling among the five aspects.

Of course, the "mandala" of themes-in-tension had not specified how to teach and support students to take progressively more initiative. Nevertheless, I believe that it helped the students in that course recognize themselves and take more initiative in their learning relationships (Taylor 1999a). I expect, however, if it would be helpful for each new cohort to create their own mandala. I would like to present the insights from the original group (perhaps adding "explore difference" as a sixth aspect), but I also know that part of the power of any summary lies in creating it oneself.

4. Opening up questions

The research project course was a suitable venue for encouraging students to be more self-conscious about learning relationships. In other critical thinking courses I have had less time to explore the tensions captured by the mandala. Like most teachers, I feel the pressure of "content," that is, of moving through the relevant body of material. (This is true, even though the content of my current courses involves activities that place ideas in tension with alternatives, not pre-formulated critiques.) Let me introduce a tension in the content side of my teaching (one I also wrestle with in my contributions to environmental research Taylor 1999b) that extends the theme of the previous passage that understanding comes by placing things in tension with alternatives.

The tension I have in mind is between presenting simple accounts versus attending to complexity and particularity. On the complex side, in the early 1980s I adopted the anthropologist Eric Wolf's image of structures—in his case, societies or cultures—as contingent outcomes of "intersecting processes" that involve diverse components and span a range of spatial and temporal scales (Wolf 1982, 385-391). Not surprisingly, I was attracted to the research emerging in the late 1980s that explained cases of environmental degradation, such as soil erosion or deforestation, in terms of processes that linked changes in local agro-ecologies, labor supply and the organization of production, and wider political-economic conditions (Watts and Peet 1993). During the same period I was stimulated by sociologists of science who highlighted scientists' "heterogeneous resources" and encompassed many activities within the concept of scientific work (Latour 1987; see also citations in Taylor 1995b). On the "simple" side, however, I was impressed by the rhetorical impact of simple environmental themes, such as "Natural resources need to be privatized, because resources held in common are inevitably degraded" and "Population growth will lead to environmental degradation." Similarly, simple themes about the process of science, such as "Convince others of what is really going on" have more impact than, say, "Unpack the heterogeneity of resources that different researchers, oneself included, mobilize to establish and apply knowledge."

My current response to this simple-complex tension has emerged from developing activities for interdisciplinary courses in which material must be accessible to a wide range of students. For example, in environmental courses I have students play out a scenario involving two countries. Each country has the same amount and quality of arable land, population size, level of technical capacity, and 3% annual population growth rate. I ask students to look ahead at the declining land area per household and decide what they would do in that situation. Their answers usually revolve around reducing consumption or using

contraception. Then I tell them that country A has a relatively equal land distribution, while country B has a typical 1970s Central American land distribution: 2% of the people own 60% of the land; 28% own 38%, which leaves just 2% of the land for the poorest 70%. Five generations before anyone is malnourished in A, all of the poorest class in B would already be—unless they act to change their situation. I divide the students into the wealthy, middle, and poor classes of country B and ask them again what they would do. Linking their impending food shortages to inequity in land distribution, the poor often propose taking over the underutilized land of the wealthy. The wealthy, anticipating this possibility, sometimes propose paramilitary operations that target leaders of campaigns for land reform. The middle class suggest investing in factories that employ the land-starved poor, or promoting population control policies for the poor. And so on. Although students do not learn the details of political, economic, or sociological analysis, the activity teaches them that the crises to which actual people have to respond come well before and in different forms from the crises predicted on the basis of aggregate population growth rates (Taylor 1997).

This simple, two countries scenario points to the need for more complex analyses of the dynamics among particular people who contribute differentially to environmental problems. As I make explicit to students, the scenario invites us to consider that the analysis of causes and the implications of the analysis would change if uniform units were replaced by unequal units, subject to further differentiation as a result of their linked economic, social, and political dynamics. I call this kind of proposition an "opening up heuristic"—simple to convey, but always pointing to the greater complexity of particular cases and to further work needed to study them. Instead of resolving the simple-complex tension, it seeks to render it productive (Taylor 1999b).

Opening up heuristics are simple to dictate to students and to demonstrate to other teachers. However, I am not sure how readily students and teachers add the heuristics to their tool-box and apply them to open up questions in other areas. I used to fret about this, but now see that I should not expect fast-track reconceptualization. My current, more modest pedagogical rationale is that tools placed in a tool box may get buried for some time, but can eventually be reached for. Helping this happen I suspect is a matter of patience and persistence—listening to, acknowledging, and supporting the diversity of students' thinking about particularity and complexity.

5. Translocal knowledge in participatory settings

We did make a terrible lot of mistakes... So we had a little self-criticism, and we said, what we know, the solutions we have, are for the problems that people don't have. And we're trying to solve their problems by saying they have the problems that we have the solutions for. That's academia, so it won't work.

So what we've got to do is to unlearn much of what we've learned, and then try to learn how to learn from the people. Myles Horton (1983)

My essay's final passage concerns a variant of the simple-complex tension. In the previous passages my ideal student or audience member appears to be a

person who would be stimulated by my critical thinking activities to seek more complexity in their own understandings of the world. A contrasting image, however, is of people who can make good use of more straightforward knowledge, as long as that can be brought to the surface. This tension has run through my environmental research, but only recently have I articulated it in the terms to follow.

I have long been inspired by participatory action researchers, such as the late Myles Horton and the Highlander Center, who shape their inquiries through ongoing work with and empowerment of the people most affected by some social issue (Greenwood and Levin 1998, Taylor 2002b). Yet my own environmental research has drawn primarily on specialist skills in quantitative modeling and analysis. For example, in a formative experience at the end of the 1970s, I was contracted by a government agency to undertake a detailed analysis of the economic future of a salt-affected Kerang irrigation region in south-eastern Australia. I completed this at a distance—both geographically and institutionally—from those most directly affected by the region's problems. The sponsors homed in on a finding in the final report that confirmed their preconception that the price charged for irrigation water could be increased. They were, however, unable to implement this change and nothing more resulted from the study (Taylor 1995b).

In contrast, let me draw some material from the phase of pedagogical exploration since 1995 mentioned earlier. Part of this has involved training in group facilitation with the Canadian Institute of Cultural Affairs (ICA). ICA's techniques have been developed through several decades of "facilitating a culture of participation" in community and institutional development. Their work anticipated and now exemplifies the post-Cold War emphasis on a vigorous civil society, that is, of institutions between the individual and, on one hand, the state and, on the other hand, the large corporation. ICA planning workshops elicit participation in ways that bring insights to the surface and ensure the full range of participants are invested in collaborating to bring the resulting plan to fruition (Burbidge 1997, Spencer 1989, Stanfield 1997, Taylor 2000).

Such participant "buy-in" was evident, for example, after a community-wide planning process in the West Nipissing region of Ontario, 300 kilometers north of Toronto. In 1992, when the regional Economic Development Corporation (EDC) enlisted ICA to facilitate the process, industry closings had increased the traditionally high unemployment to crisis levels. Although the projects resulting from the planning process are too numerous to detail, an evaluation five years later found that they could not simply check off plans that had been realized. The initial projects had spawned many others and the community now saw itself as responsible for these initiatives and developments, eclipsing the initial catalytic role of the EDC-ICA planning process. Still, the EDC appreciated the importance of that process and initiated a new round of facilitated community-planning in 1999 (West Nipissing Economic Development Corporation 1993, 1999).

When I learned about the West Nipissing case, I could not help contrasting it with my own experience in the Kerang study. Detailed scientific or social scientific analyses were not needed for West Nipissing residents to build a plan. The plan built instead from straightforward knowledge that the varied community members had been able to express through the facilitated participatory process. The process was repeated, which presumably allowed them to factor in changes

and contingencies, such as the start of the North American Free Trade Association and the declining exchange rate of the Canadian dollar. And, most importantly, the ICA-facilitated planning process led the community members to become invested in carrying out their plans and had enhanced their capacity to participate outside of that process in shaping their own future.

A difficult question has been opened up by the contrast between scientifically detailed analysis and participatory planning. Could a role in participatory planning remain for researchers to insert the "translocal," that is, their analysis of dynamics that arise beyond the local region or at a larger scale than the local? (Harvey 1995) For example, if I had moved to the Kerang region and participated directly in shaping its future, I would still have known about the government ministry's policy-making efforts, the data and models used in the economic analysis, and so on. Indeed, the "local" for professional knowledge-makers cannot be as place-based or fixed as it would be for most community members. I wonder what would it mean, then, to take seriously the creativity and capacity-building that seems to follow from well-facilitated participation, but not to conclude that researchers should "go local" and focus all their efforts on one place.

Recently I have seen something analogous to this longstanding tension in my research when I have tried to extend students' critical thinking into reflective practice. Experiences such as those reflected in this essay lead me to assume that students know more than they are prepared, at first, to acknowledge. Facilitation training leads me to assume also that students will become more invested in the process and the outcomes when insights emerge from themselves. On the other hand, when I explicitly adopt a facilitator's role, should I keep quiet if I see that a crucial insight is not emerging? How much will it stifle the group process if I, the teacher, contribute as well? In any case, even if I put on a facilitator's hat and keep quiet, I cannot ensure that I am perceived simply as a non-directive supporter of their process. I cannot completely erase the students' sense of me as a teacher with whom they need to negotiate power and standards (Taylor 2000). Decentered pedagogy cannot avoid active, charged, and changing relationships among all concerned.

Coda

The tension between facilitating and being more directive is evident not only in my teaching, but in the writing of this essay. I have tried to evoke a continuing pedagogical journey that "involves risk, opens up questions, creates more experiences than can be integrated at first sight, requires support, and yields personal change." I decided to tease out multiple strands, rather than hold onto one thread, hoping that each reader will find at least a few of the strands helpful to pull on during their own journeys (see also Taylor 2001c). I have exposed tensions—while not the path of maximum comfort, this is one way to model a process of keeping tensions active and productive. These various attempts to keep matters open, even ambiguous, led me to choose the epigraph about dialogue "that neither party could have imagined before starting." Yet, as author, I have spoken first and set many terms of any discussion that ensues. Rather than play down this tension, let me present a summary of this essay's themes in both a didactic and a dialogic spirit. The themes to follow, I would propose, need to be addressed in order to provide space and support for others in their critical thinking journeys. At the same time, I hope readers draw me into discussion that leads to new ways of addressing and conceptualizing the challenges I have

been opening up.

The central challenge addressed in the essay is that of helping people make knowledge and practice from insights and experience that they are not prepared, at first, to acknowledge. Some related challenges for the teacher/facilitator are to:

- a. Help students to generate questions about issues they were not aware they faced.
- b. Acknowledge and mobilize the diversity inherent in any group, including the diversity of mental, emotional, situational, and relational factors that people identify as making re-seeing possible.
- c. Help students clear mental space so that thoughts about an issue in question can emerge that had been below the surface of their attention
- d. Teach students to listen well. (Listening well seemed to help students tease out alternative views. Without alternatives in mind scrutiny of one's own evidence, assumptions and logic, or of those of others is difficult to motivate or carry out; see also point i, below. Being listened to, in turn, seems to help students access their intelligence—to bring to the surface, reevaluate, and articulate things they already know in some sense.)
- e. Support students on their journeys into unfamiliar or unknown areas. (Support is needed because these journeys involve risk, open up questions, create more experiences than can be integrated at first sight, and yield personal change.)
- f. Encourage students to initiative in and through relationships, which can be thought of in terms of themes that are in some tension with each other: "negotiate power/standards," "horizontal community," "develop autonomy," "acknowledge affect," "be here now," and "explore difference."
- g. Address fear felt by students and by oneself as their teacher.
- h. Have confidence and patience that students will become more invested in the process and the outcomes when insights emerge from themselves.
- i. Raise alternatives. (Critical thinking depends on inquiry being informed by a strong sense of how things could be otherwise. People understand things better when they have placed established facts, theories, and practices in tension with alternatives.)
- j. Introduce and motivate opening up heuristics, that is, propositions that are simple to convey, but always point to the greater complexity of particular cases and to further work needed to study those cases.
- k. Be patient and persistent about students taking up the alternatives, opening up heuristics, and other tools and applying them to open up questions in other areas. (Experiment and experience are needed for students to build up a set of tools that work for them.)
- l. Take seriously the creativity and capacity-building that seems to follow from well-facilitated participation, while still allowing space for researchers to insert

the "translocal," that is, their analysis of changes that arise beyond the local region or at a larger scale than the local.

Teaching/Learning Tools

Freewriting

Literature Cited

- Anon (n.d.). "Definitions of Critical Thinking."
<http://www.kcmetro.cc.mo.us/longview/ctac/definitions.htm> (viewed 18 Feb. 2001).
- Burbidge, J. (Ed. (1997). Beyond Prince and Merchant: Citizen Participation and the Rise of Civil Society. New York: Pact Publications.
- Elbow, P. (1981). Writing with Power. New York: Oxford University Press.
- Elbow, P. (1986). "Methodological doubting and believing: Contraries in inquiry," in Embracing Contraries. New York: Oxford University Press, 254-300.
- Ennis, R. H. (1987). "A taxonomy of critical thinking dispositions and abilities," in J. B. Baron and R. J. Sternberg (Eds.), Teaching Thinking Skills: Theory and Practice. New York: W. H. Freeman, 9-26.
- Friere, P. (1970 [1984 printing]). Pedagogy of the Oppressed. New York: Continuum.
- Gallo, D. (1994). "Educating for empathy, reason, and imagination," in K. S. Walters (Ed.), Re-thinking Reason: New Perspectives on Critical Thinking. Albany: State University of New York Press.
- Greenwood, D. J. and M. Levin (1998). Introduction To Action Research: Social Research For Social Change. Thousand Oaks, CA: Sage.
- Harvey, D. (1995). "Militant particularism and global ambition: The conceptual politics of place, space, and environment in the work of Raymond Williams." Social Text 42: 69-98.
- Horton, M. and B. Moyers (1983). "The adventures of a radical hillbilly: An interview with Myles Horton." Appalachian Journal 9(4): 248-285.
- Isaacs, W. (1999). Dialogue and the Art of Thinking Together. New York: Currency.
- Latour, B. (1987). Science in Action: How to Follow Scientists and Engineers through Society. Milton Keynes: Open University Press.

Ride, S. and S. Okie (1986). To Space and Back. New York: Lothrop, Lee & Shephard.

Ross, R. (1994). "Ladder of Inference," in P. Senge (Ed.), The Fifth Discipline Fieldbook. New York: Currency, 242-246.

Spencer, L. J. (1989). Winning Through Participation. Dubuque, Iowa: Kendall/Hunt.

Stanfield, B. (Ed.) (1997). The Art of Focused Conversation. Toronto: Canadian Institute of Cultural Affairs.

Taylor, P. J. (1995a). "Teaching Philosophy," http://www.faculty.umb.edu/peter_taylor/goaloverview.html (viewed 1 October 2001).

Taylor, P. J. (1995b). "Building on construction: An exploration of heterogeneous constructionism, using an analogy from psychology and a sketch from socio-economic modeling." Perspectives on Science 3(1): 66-98.

Taylor, P. J. (1997). "How do we know we have global environmental problems? Undifferentiated science-politics and its potential reconstruction," in P. J. Taylor, S. E. Halfon and P. E. Edwards (Eds.), Changing Life: Genomes, Ecologies, Bodies, Commodities. Minneapolis: University of Minnesota Press, 149-174.

Taylor, P. J. (1998). "Natural Selection: A heavy hand in biological and social thought." Science as Culture 7(1): 5-32.

Taylor, P. J. (1999a). "From 'dialogue around written work' to 'taking initiative'." http://www.faculty.umb.edu/peter_taylor/citreport.html (viewed 1 October 2001).

Taylor, P. J. (1999b). "What can agents do? Engaging with complexities of the post-Hardin commons," in L. Freese (Ed.), Advances in Human Ecology, Vol. 8. Greenwich, CT: JAI Press, 125-156.

Taylor, P. J. (2000). "Alternating between teacher and facilitator." International Association of Facilitators, Toronto, Canada, April 27 - 30 (<http://iaf-world.org/iaf2000/Taylor.PDF>).

Taylor, P. J. (2001a). Peter Taylor, "Critical thinking manifestos," <http://www.cct.umb.edu/tfcfb-TOC.html> (viewed 26 November 2001).

Taylor, P. J. (2001a). "From Critical Thinking to Reflective Practice, especially about Environment, Science & Society," http://www.faculty.umb.edu/peter_taylor/portfolio01-TOC.html (viewed 1 October 2001).

Taylor, P. J. (2001c). "Thought pieces on Teaching/Learning

dynamics and Reflective Practice."

http://www.faculty.umb.edu/peter_taylor/TL-TOC.html (viewed 10 August 2001).

Taylor, P. J. (2002a). "Non-standard lessons from the "tragedy of the commons"," in M. Maniates (Ed.), Empowering Knowledge: Teaching and Learning Global Environmental Politics. Boulder, CO: Rowman & Littlefield.

Taylor, P. J. (2002b). "'Whose trees are these?' Bridging the divide between subjects and outsider-researchers," in R. Eglash and G. DiChiro (Eds.), Appropriating Technology: Vernacular Science and Social Power. Minneapolis: University of Minnesota Press.

Taylor, P. J. (2005). Unruly Complexity: Ecology, Interpretation, Engagement. Chicago: University of Chicago Press.

Watts, M. and R. Peet (1993). "Environment and Development, Special double issue." Economic Geography 69(3-4): 227-448.

Weissglass, J. (1990). "Constructivist listening for empowerment and change." The Educational Forum 54(4): 351-370.

Williams, R. (1983). Keywords: A Vocabulary of Culture and Society. New York: Oxford University Press.

West Nipissing Economic Development Corporation (1993). "Vision 20/20: Shaping our futures together, Executive Summary." (April 1993).

West Nipissing Economic Development Corporation (1999). "Vision 2000 Plus, Executive Summary." (June 1999).

Wolf, E. (1982). Europe and the People Without History. Berkeley: University of California Press.

TEACHING and LEARNING for REFLECTIVE PRACTICE

Taking Yourself Seriously is designed for anyone who wants to integrate “head, heart, hands, and human connections” in their research and writing. The intended audience is not limited to students. Nevertheless, a pedagogical current is obvious—the book's origins lie in Peter's research and writing courses; the **Phases** and **Cycles and Epicycles** frameworks are designed to be translated readily into assignments, classes, and stages of semester-long student projects; and theses or dissertations fit well under the category of a **Synthesis of Theory and Practice**. The pedagogical challenges of teaching students to take themselves seriously warrant, therefore, some more discussion.

What follows takes the form of *snapshots* from Peter's journey teaching research and other courses for the Critical and Creative Thinking (CCT) Graduate Program at the University of Massachusetts Boston. CCT, despite the “thinking” in its name, is about changing and reflecting on *practice*. The Program aims to provide its mid-career or career-changing students with “knowledge, tools, experience, and support so they can become constructive, reflective agents of change in education, work, social movements, science, and creative arts” (CCT 2008). In this vein, it seems less important for us to describe the detail of the classroom mechanics and CCT course requirements, than to stimulate reflection and dialogue about the challenge of supporting students (and others) to develop as reflective practitioners.

A book cannot recreate for readers the experience of participating in classroom activities and the unfolding process of a program of studies. Even so, some readers might want us to explicate our line of thinking and relate it to what others have written and done. We do not, however, attempt that. Instead, we offer the snapshots in a spirit of opening up questions and pointing to a complexity of

relevant considerations, not of pinning down answers with tight evidence. We encourage readers to participate in the online forum that accompanies this book (see Resources section later in Part 4) so as to engage the authors and each other in ongoing conversation and in sharing resources, struggles, and accomplishments.

* * *

I. Goals of research and engagement; goals of developing as a reflective practitioner

Each of the **Phases of Research and Engagement** is defined by a goal. I (Peter) made the phases and goals explicit after my first semester teaching research and writing to CCT's mid-career graduate students. One student, an experienced teacher, had dutifully submitted assignments, such as the **Annotated Bibliography**, all the time expressing skepticism that this course was teaching her anything new: "I have already taken research courses and know how to do research papers." Indeed, I felt that most of her submissions did not help move her project forward; the form was there, but not the substance. I often asked her to revise and resubmit, emphasizing that the point was not to complete, say, the annotated bibliography just because I, the instructor, deemed this an essential part of a research project. The point was for her to do the annotated bibliography in a way that brought her closer to being able to say "I know what others have done before, either in the form of writing or action, that informs and connects with my project, and I know what others are doing now." By the end of the semester I had made such goals and the corresponding **Phases** an explicit organizing structure for the course and other research projects. The resistance of this student had given me an invaluable push to rework my own syllabus.

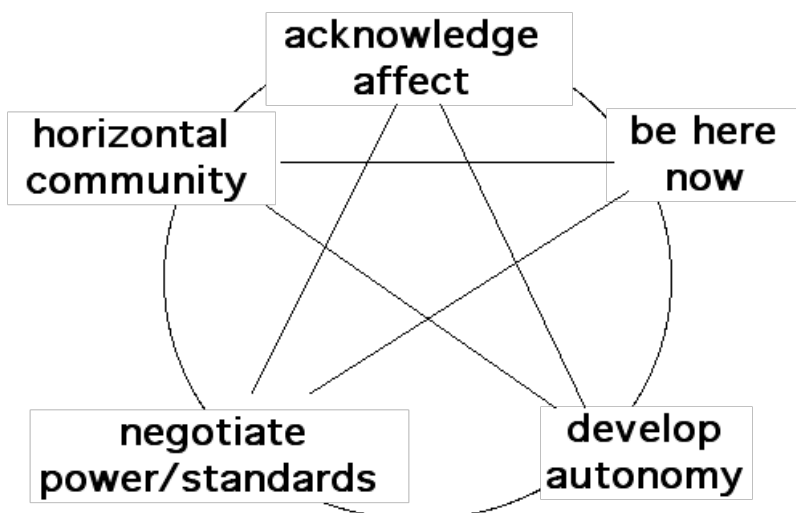
The goals of research and engagement represented, however, only half of what was going on in the research and writing course. I

identified ten additional goals related to the process of pursuing a major research and writing project. Over the next year, helped by some teacher research (snapshot 2), I refined these **Reflective Practitioner Goals**. I have since incorporated both sets of goals into a **Self-Assessment** that students complete at the end of the research and writing course as well as at the end of their studies. (See also **Assessment that Keeps the Attention Away from Grades** in a way that is consistent with the two sets of goals, required **Personal and Professional Development Workbook**, and other expectations for **Research Organization**.)

2. Making space for taking initiative in and through relationships

I want students to see **Dialogue around Written Work** as an important part of defining and refining research direction and questions. However, students are familiar with the system of submit a product, receive a grade, check that assignment off the to-do list, then move on to the next one. They know that they have to expose their submissions to the instructor, but are uncomfortable about subjecting their work to dialogue. My challenge, then, has been to get students into the swing of an unfamiliar system as quickly as possible so they can begin to experience its benefits.

I chose to focus on this challenge when I participated in a faculty seminar on “Becoming a teacher-researcher” during my second year teaching CCT students (Taylor 1999). A month into semester the students in the research and writing course completed a survey about their expectations and concerns in working under what they called the “revise and resubmit” process. The participants in the faculty seminar then reviewed all the students' responses and brainstormed about qualities of an improved system and experience. We wrote suggestions on large Post-its, which we grouped and gave names to. Five categories or themes emerged: “negotiate power/standards,” “horizontal community,” “develop autonomy,” “acknowledge affect,” and “be here now.”



Five themes about improving the experience of dialogue around written work. (A sixth theme, "explore difference," was added later.)

In the following class I initiated discussion with the students around their responses and the themes generated by the faculty seminar. We clarified the meaning of the themes and explored the tensions between them (conveyed by the connecting lines in the figure above). For example, “develop autonomy” stood for digesting comments and making something for oneself—neither treating comments as dictates nor insulating oneself by keeping from the eyes of others. Yet, “negotiate power/standards” recognized that students made assumptions about my ultimate power over grades, which translated into their thinking that I expected them to take up my suggestions. These assumptions about the “vertical” relationship between instructor and student do have to be aired and addressed, but “horizontal community” captured the need for students to put effort into building other kinds of relationship.

During the rest of the semester, class discussions continued to refer to the themes and tensions. We applied them to the whole research and engagement process, not only to dialogue around written work. I looked for a substitute for “autonomy” after some students construed this word as going their own way and not responding to

comments of others, including their instructors. When “taking initiative” was suggested by my wife, I realized that it applied to all five themes. I emailed my students: “[The challenge is to] take initiative in building horizontal relationships, in negotiating power/standards, in acknowledging that affect is involved in what you're doing and not doing (and in how others respond to that), in clearing away distractions from other sources (present and past) so you can be here now.” Don't wait for the instructor to tell you how to solve an expository problem, what must be read and covered in a literature review, or what was meant by some comment you don't understand. Don't put off giving your writing to the instructor or to other readers and avoid talking to them because you're worried that they don't see things the same way as you do.

A longer phrase soon emerged: “Taking initiative in *and through* relationships.” That is, don't expect to learn or change on one's own. Build relationships with others; interact with them. This doesn't mean bowing down to their views, but take them in and work them into your own reflective inquiry until you can convey more powerfully to them what you are about (which may or may not have changed as a result of the reflective inquiry). Finally, do not expect learning or change to happen without jostling among the five themes-in-tension. The themes do not always pull you in the same direction, so your focus might move from one to another, rather than trying to attend to all of them simultaneously.

Of course, laying out this “mandala” did not specify *how* to teach and support students to take progressively more initiative. Nevertheless, I believe that talking about the five points helped the students recognize themselves and take more initiative in their learning relationships. Since then I have presented the insights from the original group to new cohorts—often adding “explore difference” as a sixth theme.

(Presenting an analysis or action plan developed by a previous group is never as powerful as a group creating its own. Given this,

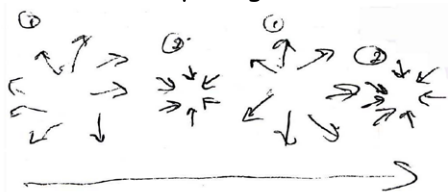
I have asked each new cohort in the research and writing course to contribute to ongoing teacher research around the question: “By what means can the group function as a support and coaching structure to get most students to finish their reports by the end of the semester?”; see **Support and Coaching Structure**).

3. Opening wide and focusing in

A colleague in the faculty seminar on teacher research (snapshot 2) participated in the first class of the research and writing course as if he were a student. The class consisted of: an overview of the phases from me; a Q&A session with a student from the previous year's class (during which I was absent from the room); and some freewriting, rough drafting, and peer sharing of an initial project description. The colleague, Emmett Schaeffer, commented afterwards on the oscillation the students faced between opening wide and focusing in. He also noted that the students were somewhat “dazed” about how much was opened up and put in play during this first session (Box 1). As my thank you email expressed (Box 2), having someone else see what was going on helped me articulate and own a tension that runs through most of my teaching.

Box 1. Comments from a colleague on the student experience at the start of the research and writing course

→ on “divergent” thinking
certainly, at first, and, if I understand correctly, throughout the process,
you think one engaged in research and engagement should remain open, both to others and their opinions, but also to one's “divergent” (from one's conscious, explicitly formulated path) thinking, feeling, etc.
--sort of [1] opening wide, [2] focusing and formulating,



[1] the “opening wide” could take the form of:

any less than fully formulated thinking
free writing
sharing (with a partner, teacher, group) one's formulations
(written or oral)

then,

being fully attentive to what one has expressed (intended or otherwise), as well as to feedback

[2] the focusing and formulating stage could take the form of:

oral/written formulations with an explicit purpose and more
(always simply comparative) fully formulated

→ what about students being "dazed," "overwhelmed" and "confused"?
(and perhaps not only at the beginning)

My guess as to purpose:

(of course partly you don't choose this outcome, it's rather a function
of students' previous training but to some extent I think it's inherent
in your approach and philosophy)

1. experiential learning - It'll become clear through doing it
(and reflecting on the doing that requires some doing).
2. everything up in the air (not settled, in place, foreclosed, etc.)
to maximize
 - a. vision of possible outcomes
 - b. their agency in influencing settling
 - c. model of anxiety and confusion inherent (at first) in
sharing and remaining open, while proceeding to try various
ways to "sort things out"

Box 2. Thank you email about the affirmation-articulation connection

Emmett,

I really appreciate your keen observations and the work you did in synthesizing them into the notes. What we did together was rare and special -- I could only remember one other time I got a colleague's observations that affirmed but also helped me articulate and own what I was doing. That time was an ESL and Spanish teacher who had asked to visit a class of mine about biology and

society. She noted my comfortable use of ambiguity. Much followed for me from her naming this. In fact, I suspect that the affirmation-articulation connection is a key to the observed person doing something productive with the observations.

Thanks,
Peter

4. From educational evaluation to constituency building

The same observation about having to move between opening out and focusing in was made independently a few years later by a student, herself an experienced college teacher, when she summarized the experience of the course on evaluation and action research. Snapshots 1 to 3 have not mentioned that course, but it was evolving at the same time as the course on research and writing. When I first took over teaching this second course, the title and emphasis was educational evaluation. I soon had this changed to evaluation of educational change so as to clarify that it was not about assessment of students. Moreover, to meet the needs of the diverse, mid-career professionals and creative artists that enter CCT, “educational change” had to be construed broadly to include organizational change, training, and personal development, as well as curricular and school change.

The revised title still missed the central motivation for the course in the CCT curriculum, which was: “If you have good ideas, how do you get others to adopt or adapt them?” Put in other words: “How do you build a constituency around your idea?” This concern can lead researchers into evaluating how good the ideas actually are (with respect to some defined objectives) so they can demonstrate this to others. It can also lead a researcher to work with others to develop the idea so it becomes theirs as well and thus something they are invested in.

Taking an individual who wants “to do something to change the

current situation, that is, to take action” as the starting point, Action Research became the central thread. The course title was eventually changed again to reflect the emphasis on Action Research for Educational, Professional and Personal Change. The “**Cycles and Epicycles**” model that emerged made room for group facilitation, participatory planning, and reflective practice, as well as for systematic evaluation. The next two snapshots touch on group processes; the one after links the research side of Action Research to Problem-Based Learning.

5. Conditions for a successful workshop

My own research during the 1980s and 1990s focused on the complexity of ecological or environmental situations and of the social situations in which the environmental research is undertaken. Since the 1990s collaboration has become a dominant concern in environmental planning and management, although the need to organize collaborative environmental research can be traced back at least into the 1960s (Taylor et al. 2008). Collaboration is self-consciously organized through the frequent use of workshops and other “organized multi-person collaborative processes” (OMPCPs).

I started to try to make more sense of the workshop form after participating during the first half of 2000 in four innovative, interdisciplinary workshops primarily in the environmental arena (Taylor 2001). Two ideals against which I assessed these workshops were that group processes can: a) result in collaborators’ investment in the product of the processes; and b) ensure that knowledge generated is greater than any single collaborator or sum of collaborators came in with (see discussion in Part 4 of strategic participatory planning). As a postscript to my analysis of why a workshop (or OMPCP) might be needed to address the complexity of environmental issues, I assembled a list of guidelines or heuristics about making workshops in general work.

At my first presentation on this topic there was in the audience a professional facilitator, Tom Flanagan, who offered to help me

develop a more systematic set of principles for bringing about successful workshops. The process he led me through involved:

- a. Defining my criteria for a *successful* workshop;
- b. Rephrasing the heuristics as conditions that might contribute directly or indirectly to these criteria being fulfilled;
- c. Answering a set of questions of the form: “Would addressing condition A significantly help in achieving condition B?”

The results of steps a and b are given in Box 3. The questions in step c were generated by CogniSystem software that analyzed my responses and then arranged the conditions in a “structural model” from “deep” to “top,” where deeper conditions are helpful for the ones above them.

Box 3. Criteria and Conditions for a Successful Workshop

A. Two criteria of success

i) the outcome is larger and more durable than what any one participant came in with. Durable means

- a) the participants are engaged in carrying out or carrying on the knowledge and plans they develop; and
- b) the knowledge is applied and has significance.

ii) participants' subsequent work enhances the capacity of others to flexibly engage, that is, to connect with people who are able to take initiative—or are almost able to—in forming communities of practice/change collaborations that provide their participants experiences that enhance their ability to flexibly engage.

B. Conditions that might contribute directly or indirectly to these criteria being fulfilled

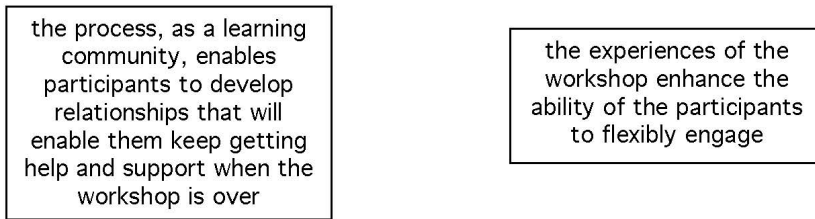
- it brings to the surface knowledge of the participants that they were not able, at first, to acknowledge.
- participants get to know more about each others' not-yet-stable aspects.
- quiet spaces that occur are not filled up.
- participants recognize that there is insight in every response.
- the facilitator invites participants to share the experience of being unsure, but excitable.
- the facilitator provides participants with the image of a workshop as a journey into unknown areas or allowing them to see familiar areas in a fresh light. (A workshop/journey involves risk; requires support; creates more experiences than can be integrated at first sight; yields personal changes.)
- participants gain insight into their present place and direction by hearing

what they happen to mention and omit in telling their own stories.

- participants are heard.
- participants hear others and hear themselves better as a result of being heard.
- this hearing of others leads participants to examine decisions made in advance about what the other people are like, what they are and are not capable of.
- participants inquire further on the issues that arise in their own projects.
- participants inquire further into how they support the work of others.
- participants' energies are mobilized by the process.
- there is a wide range of participants, not only technically expert participants.
- the plans allow for individual participants to select and focus on a subset of the workshop-generated specific plans or knowledge in their subsequent work.
- the process, as a learning community, enables participants to ask for help and support during the workshop.
- the process, as a learning community, enables participants to develop relationships that will enable them keep getting help and support when the workshop is over.
- participants find opportunities to affirm what is working well.
- the reflection on each phase leads to one concrete product to take into next phase.
- the experiences of the workshop enhance the ability of the participants to flexibly engage.

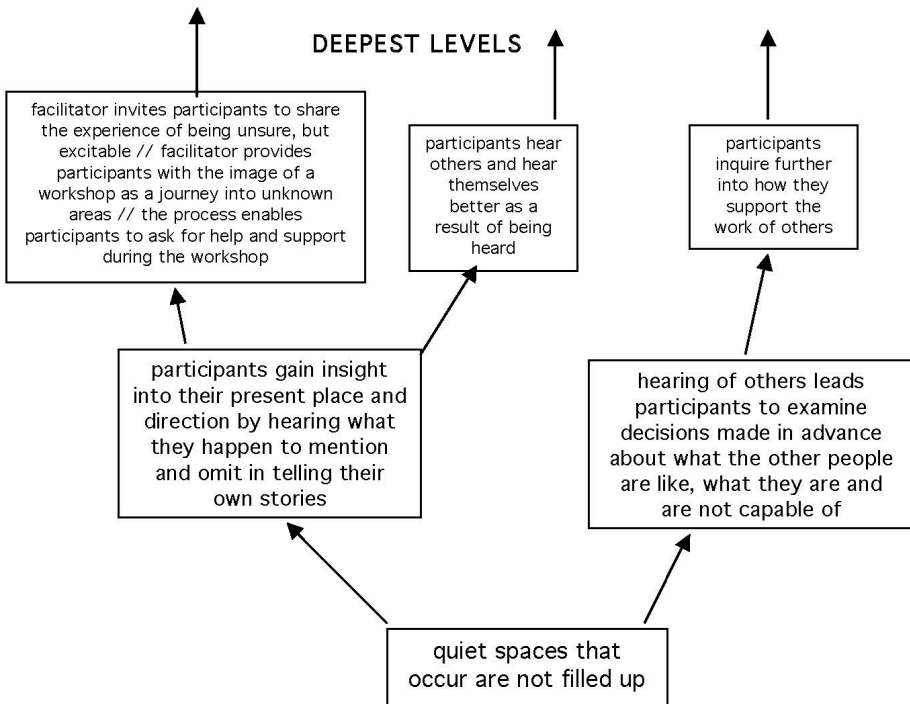
Tom's intention was only to introduce me to structural modeling, not to lead me systematically through the full process, so I should not over-interpret the outcome of our computer-aided analysis. I include here only the deepest three layers and the top of the model to help readers picture a structural model (see figure below). Let me draw attention, however, to the deepest condition, “quiet spaces that occur are not filled up.” It is no small challenge for someone organizing or facilitating a workshop (or OMPCP) to ensure that this condition is met. Conversely, when we try to squeeze too much in a limited time and the quiet spaces condition is not met, we should not be surprised that the criteria for a successful workshop are not achieved.

TOP LEVEL



INTERMEDIATE LEVELS (omitted)

DEEPEST LEVELS



Extracts from the structural model

6. Four R's of developing as a collaborator

Group processes not only need skillful and effective facilitators; they also need participants or collaborators who are skilled and effective

in contributing to the desired outcomes. 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 to persist even when they encounter resistance. What moves them to pursue such development?

I have had an opportunity since 2004 to address this issue through an annual series of experimental, interaction-intensive, interdisciplinary workshops “to foster collaboration among those who teach, study, and engage with the public about scientific developments and social change.” The workshops are documented in detail on their websites (NewSSC 2008), but a thumbnail sketch would be: They are small, with international, interdisciplinary participants of mixed rank (i.e., from graduate students to professors). There is no delivery of papers. Instead participants lead each other in activities, designed before or developed during the workshops, that can be adapted to college classrooms and other contexts. They also participate in group processes that are regular features of the workshops and are offered as models or tools to be adapted or adopted in other contexts. The themes vary from year to year, but each workshop lasts four days and moves through four broad, overlapping phases: exposing diverse points of potential interaction; focusing on detailed case study; activities to engage participants in each others' projects; and taking stock. The informal and guided opportunities to reflect on hopes and experiences during the workshop produce feedback that shapes the unfolding program as well as changes in the design of subsequent workshops.

The ongoing evolution of the workshops has been stimulated not only by written and spoken evaluations, but also by an extended debriefing immediately following each workshop and by advisory group discussions, such as one in 2008 that addressed the question of what moves people develop themselves as collaborators. A conjecture emerged that this development happens when participants see an experience or training as transformative. After reviewing the evaluations we identified four “R's”—respect, risk, revelation, and re-engagement—as conditions that make

interactions among participants transformative (Box 4; see Taylor et al. 2011 for elaboration and supporting quotations from the evaluations). A larger set of R's for personal and professional development will be presented in snapshot 9 (indeed, the larger set pre-dated and influenced the formulation of these 4R's).

Box 4. Four R's that make interactions among researchers transformative

1. Respect. The small number and mixed composition of the workshop participants means that participants have repeated exchanges with those who differ from them. Many group processes promote listening to others and provide the experience of being listened to. Participation in the activities 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 staying with the process as the workshop unfolds or “self-organizes” without an explicit agreement on where it is headed and without certainty about how to achieve desired outcomes.

3. Revelation. A space is created by respect and risk in which participants bring to the surface thoughts and feelings that articulate, clarify and complicate their ideas, relationships, and aspirations—in short, their identities. In the words of one participant: “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.”

4. Re-engagement. Respect, risk, and revelation combine so that participants' “gears” engage. This allows them to sustain quite a high level of energy during throughout the workshop and engage actively with others. Equally important, participants are reminded of their aspirations to work in supportive communities—thus, the prefix *re*-engage. Participants say they discover new possibilities for working with others on ideas related to the workshop topic.

7. Problem-based learning

In contrast to the step-by-step progression in most accounts of action research, the “cycles and epicycles” model allows for extensive reflection and dialogue. This is essential not only for constituency-building, but also for problem-finding, that is, for ongoing rethinking of the nature of the situation and the actions appropriate to improving it. In this sense action research mirrors Problem-Based Learning (PBL), at least the kind of PBL that begins from a scenario in which the problems are not well defined (Greenwald 2000). Stimulated by the work of my CCT colleague, Nina Greenwald, I began to introduce a PBL approach in the evaluation course which led it evolve into an Action Research course. I then brought PBL into other courses on science in its social context. The way I have come to teach with PBL is given in Box 5 (extracted from Taylor 2008a, which includes links to examples of PBL scenarios and student work).

Box 5. Problem-Based Learning, an Overview

Students brainstorm so as to identify a range of problems related to an instructor-supplied scenario then choose which of these they want to investigate and report back on. The problem definitions may evolve as students investigate and exchange findings with peers. If the scenario is written well, most of the problems defined and investigated by the students will relate to the subject being taught, but instructors have to accept some “curve balls” in return for

- student engagement in self-invented inquiry;
- content coverage by the class as a whole; and
- increased motivation for subsequent, more-focused inquiry (see “inverted pedagogy” below).

Four features of this PBL are worth noting:

Interdisciplinary Coaching: The instructors facilitate the brainstorming and student-to-student exchange and support, coach the students in their individual tasks, and serve as resource persons by providing contacts and reading suggestions drawn from their longstanding interdisciplinary work and experience.

Inverted pedagogy: The experience of PBL is expected to motivate students to identify and pursue the disciplinary learning and disciplined inquiry they need to achieve the competencies and impact they desire. (This inverts the

conventional curriculum in which command of fundamentals is a prerequisite for application of our learning to real cases.)

KAQF framework for inquiry and exchange: This asks students to organize their thinking and research with an eye on what someone might do, propose, or plan on the basis of the results, presumably actions that address the objective stated in the PBL scenario.

Internet facilitation: The internet makes it easier to explore strands of inquiry beyond any well-packaged sequence of canonical readings, to make rapid connections with experts and other informants, and to develop evolving archives of materials and resources that can be built on by future classes and others.

PBL was enthusiastically pursued by one CCT student and led to her transformation from community-college librarian with no science background to participant in campaigns around health disparities and employment as a research assistant in the biomedical area. Although I will not tell her story here, it moves me to recount some earlier reflections on students' development in the CCT Program as a whole, which make up the last two snapshots.

8. Journeying

One course I taught for the first time after I joined the CCT Program was “Critical Thinking.” Mid-way through the first semester, when the topic was revising lesson plans, we revisited a demonstration I had made during the first class. The details are not important here, except to say that some students had interpreted the demonstration as a science lesson even though the science aspect seemed unimportant to me. Discussion of the discrepancy led me to articulate my primary goal more clearly, which was that students would puzzle over the general conundrum of how questions that retrospectively seem obvious ever occur to us. That puzzle was meant to lead into considering how we might be susceptible to further re-seeings. The image that arose for me during the discussion was that a person's development as a critical thinker is like undertaking a personal journey into unfamiliar or unknown areas. Both involve risk, open up questions, create more experiences than can be integrated at first sight, require support,

yield personal change, and so on. This journeying metaphor differs markedly from the conventional philosophical view of critical thinking as scrutinizing the reasoning, assumptions, and evidence behind claims (Ennis 1987, Critical Thinking Across The Curriculum Project 1996). Instead of the usual connotations of “critical” with judgement and finding fault according to some standards (Williams 1983, 84ff), journeying draws attention to the inter- and intra-personal dimensions of people developing their thinking and practice.

The image of critical thinking as journeying gave me a hook to make sense of my development as a teacher. In narrating my own journey, I attempted to expose my own conceptual and practical struggles in learning how to decenter pedagogy without denying the role I had in providing space and support for students’ development as critical thinkers (Taylor 2008b, but written circa 2000). The central challenge I identified was that of helping people make knowledge and practice from insights and experience that they are not prepared, at first, to acknowledge—something that seems relevant to teaching research and engagement as well as critical thinking. Several related challenges for the teacher or facilitator emerged, which are summarized in Box 6.

Box 6. Helping people make knowledge and practice from insights and experience that they are not prepared, at first, to acknowledge

Teacher-facilitators should:

- a) Help students to generate questions about issues they were not aware they faced.
- b) Acknowledge and mobilize the diversity inherent in any group, including the diversity of mental, emotional, situational, and relational factors that people identify as making re-seeing possible.
- c) Help students clear mental space so that thoughts about an issue in question can emerge that had been below the surface of their attention.
- d) Teach students to listen well. (Listening well seemed to help students tease out alternative views. Without alternatives in mind scrutiny of one’s own evidence, assumptions and logic, or of those of others is difficult to motivate or carry out; see also point i, below. Being listened to, in turn,

seems to help students access their intelligence—to bring to the surface, reevaluate, and articulate things they already know in some sense.)

e) Support students on their journeys into unfamiliar or unknown areas (see paragraph above).

f) Encourage students to take initiative in and through relationships (see snapshots 2 and 3 above).

g) Address fear felt by students and by oneself as their teacher.

h) Have confidence and patience that students will become more invested in the process and the outcomes when insights emerge from themselves.

i) Raise alternatives. (Critical thinking depends on inquiry being informed by a strong sense of how things could be otherwise. People understand things better when they have placed established facts, theories, and practices in tension with alternatives.)

j) Introduce and motivate “opening up themes,” that is, propositions that are simple to convey, but always point to the greater complexity of particular cases and to further work needed to study those cases (Taylor 2005).

k) Be patient and persistent about students taking up the alternatives, themes, and other tools and applying them to open up questions in new areas. (Experiment and experience are needed for students—and for teachers—to build up a set of tools that work for them.)

l) Take seriously the creativity and capacity-building that seems to follow from well-facilitated participation (see snapshots 5 and 6), while still allowing space for researchers to insert the “trans-local,” that is, their analysis of changes that arise beyond the local region and span a larger scale than the local.

9. Many R's

When the CCT graduate program was moved under a Department of Curriculum and Instruction, I decided to learn more about the theory that guided that field. I came across Doll's (1993) account of postmodern curriculum design, which centers on his “4R's”: richness, recursion, relation, and rigor. My immediate response was that Doll's R's do not capture a lot of what goes into CCT students' mid-career personal and professional development. I soon had twelve R's, and then more. The figure below took shape as I played with ways to convey that some R's will make limited sense until more basic Rs have been internalised and that opening-out periods alternate with periods of consolidating experiences to date.



The Rs of personal and professional development

I sometimes present this schema to students as a way to take stock of their own development. I suggest that they reflect at the end of each semester. For as many Rs as make sense, they should give an example and articulate their current sense of the meaning of any given R. I also use the many R's to remind myself as a teacher to expect the flow of any student's development to be windy and less than direct. (In this sense the schema of many R's stands as a counterpoint to the popular idea of backward design in curriculum,

that is: identify desired results; determine acceptable evidence of students achieving those results; plan learning experiences and instruction accordingly, making explicit the sought-after results and evidence; Wiggins and McTighe 2005.)

* * *

The snapshots from Peter's journey suggest a windy and less-than-direct flow of development as a teacher and facilitator of research and engagement. Although we can imagine readers thinking they need to see more of the action and background behind the snapshots, we will not try to fill in more. Instead, we end with the hope that the account of this pedagogical journey, together with the tools and frameworks of Parts 1 and 2 as well as the illustrations in Part 3, help you move ahead in your own journeys of research and engagement—journeys in which you take risks, open up questions, create more experiences than can be integrated at first sight, require support, and generate personal and professional change.

References

Adams, F. with M. Horton (1975). *Unearthing Seeds of Fire: The Idea of Highlander*. Winston-Salem, NC: John F. Blair.

Agrawal, A. (2001). "State formation in community spaces?: The Forest Councils of Kumaon." *Journal of Asian Studies* 60(1): 1-32.

Boice, R. (1990). *Professors as Writers: A Self-Help Guide to Productive Writing*. Stillwater, OK: New Forums Press.

Borchers, J. and C. Maser (2001). *Understanding Constraints in Sustainable Development*. Chelsea, MI: Lewis.

Bradford, A. (1999). *Guidelines for dialogue*.
<http://www.cct.umb.edu/guidelinesdia.htm> (viewed 2 Jan 2012)

Brown, P. (2007). *Toxic Exposures: Contested Illnesses and the Environmental Health Movement*. New York: Columbia University Press.

Burbidge, J., Ed. (1997). *Beyond Prince and Merchant: Citizen Participation and the Rise of Civil Society*. New York: Pact Publications.

Calhoun, E. F. (1994). *How to Use Action Research in the Self-Renewing School*. Alexandria, VA: ASCD.

Cameron, J. (2002). *The Artist's Way*. New York: Tarcher.

CCT (Critical and Creative Thinking Program) (2008). *Overview*.
<http://www.cct.umb.edu/overview.html> (viewed 2 Sep 2008)

——— (2010). *Research and study competencies*.
<http://www.cct.umb.edu/competencies.html> (viewed 1 Dec 2011)

Craig, D. V. (2009). *Action Research Essentials*. San Francisco: Jossey-Bass.

Critical Thinking Across The Curriculum Project (2011). Glossary. <http://mcckc.edu/services/criticalthinking/criticalthinkingproject/glossary.asp> (viewed 3 Dec 2011)

Daniel, D., C. Fauske, P. Galeno and D. Mael (2001). *Take Charge of Your Writing: Discovering Writing Through Self-Assessment*. Boston: Houghton Mifflin.

Denzin, N. K. and Y. S. Lincoln, Eds. (2005). *The Sage Handbook of Qualitative Research*. Thousand Oaks, CA: Sage.

Dervin, B. (1999) "Chaos, order, and sense-making: A proposed theory for information design." Pp. 35-57 in Jacobson, R. (ed.), *Information Design*. Cambridge, MA: MIT Press. <http://communication.sbs.ohio-state.edu/sense-making/art/artabsdervin99mit.html> (viewed 11 Jul 2011)

Doll, W. E. (1993). *A Post-Modern Perspective on Curriculum*. New York, Teachers College Press.

Elbow, P. (1981). *Writing with Power*. New York: Oxford University Press.

Elbow, P. and P. Belanoff (2000). "Summary of kinds of responses." Pp. 7ff in *Sharing and Responding*. Boston: McGraw-Hill.

Ennis, R. H. (1987). "A taxonomy of critical thinking dispositions and abilities." Pp. 9-26 in Baron, J. B. and R. J. Sternberg (eds.), *Teaching Thinking Skills: Theory and Practice*. New York, W. H. Freeman: 9-26.

Gibbs, L. M. (1982). *Love Canal: My Story*. Albany: State University of New York Press.

Goode, E. (1998) "When bars say no the smoking," New York Times, 15 Dec.

Greenwald, N. (2000). "Learning from Problems." *The Science Teacher* 67(April): 28-32.

Greenwood, D. J. and M. Levin (1998). *Introduction To Action Research: Social Research For Social Change*. Thousand Oaks, CA: Sage.

Highlander Research and Education Center (n.d.), <http://www.highlandercenter.org/about.asp> (viewed 30 Nov 2011)

Holman, P. and T. Devane, Eds. (1999). *The Change Handbook: Group Methods for Shaping the Future*. San Francisco: Berrett-Koehler.

Horton, M. and B. Moyers (1983). "The adventures of a radical hillbilly: An interview with Myles Horton." *Appalachian Journal* 9(4): 248-285. (See also Video, Public Broadcasting System, 1981)

Institute of Cultural Affairs, <http://ica-associates.ca/> (viewed 30 Nov 2011)

Isaacs, W. (1999). *Dialogue and the Art of Thinking Together*. New York: Currency.

Kemmis, S. and R. McTaggart (2005). "Participatory Action Research: Communicative Action and the Public Sphere." Pp. 559-603 in Denzin, N. and Y. S. Lincoln (eds.), *The Sage Handbook of Qualitative Research*. Thousand Oaks, CA: Sage.

Legendre, B. (n.d.). *Exploring your writing preferences*. Ithaca, N.Y.: Cornell University Writing Workshop (available at <http://www.faculty.umb.edu/pjt/legendre.pdf>; viewed 9 July 2010)

NewSSC (New England Workshop on Science and Social Change) (2008). Links to webpages and associated materials for workshops. <http://www.stv.umb.edu/newssc.html> (viewed 28 Aug 2008)

Palmer, P. J. (2000). *Let Your Life Speak: Listening for the Voice of Vocation*. San Francisco: Jossey-Bass.

Park, P., M. Brydon-Miller, B. Hall, T. Jackson (eds.) (1993). *Voices of Change: Participatory Research in the United States and Canada*. Westport, CT: Bergin & Garvey.

Peters, P. (1996). "Who's local here? The politics of participation in development." *Cultural Survival Quarterly* 20(3): 22-60.

Pietro, D. S. (ed.) (1983). *Evaluation Sourcebook*. New York: American Council of Voluntary Agencies for Foreign Service.

Ribot, J. C. (1999). "Decentralisation, participation and accountability in Sahelian forestry: Legal instruments of political-administrative control." *Africa* 69(1): 23-65.

Ross, R. (1994). "Ladder of Inference." Pp. 242-246 in Senge, P., A. Kleiner, C. Roberts, R. Ross, and B. Smith, *The Fifth Discipline Fieldbook*. New York: Currency.

Scharmer, O. (2009). *Theory U: Leading from the Future as It Emerges*. San Francisco: Berrett-Koehler Publishers.

Schloss, P. J. and M. A. Smith (1999). *Conducting Research*. Upper Saddle River: Prentice Hall.

Schmuck, R. (1997 or 2006). *Practical Action Research for Change*. Arlington Heights, IL: Skylight.

Schuman, S., Ed. (2006). *Creating a Culture of Collaboration: The International Association of Facilitators Handbook*. San Francisco, Jossey-Bass.

Selener, D. (1997). *Participatory Action Research and Social Change*. Ithaca, NY: Cornell University Press.

Senge, P., A. Kleiner, C. Roberts, R. Ross, B. Smith (1994). *The Fifth Discipline Fieldbook*. New York: Currency.

Stanfield, B. (Ed.) (1997). *The Art of Focused Conversation*. Toronto: Canadian Institute of Cultural Affairs.

——— (2002) *The Workshop Book: From Individual Creativity to Group Action*. Toronto: Canadian Institute of Cultural Affairs.

STEMTEC (1998) Workshop on science, technology, engineering and mathematics education, University of Massachusetts Medical School, November

Taylor, P. J. (1999). From 'dialogue around written work' to 'taking initiative'. <http://www.faculty.umb.edu/pjt/citreport.html> (viewed 28 Aug 2008)

——— (2001). Generating environmental knowledge and inquiry through workshop processes. <http://www.faculty.umb.edu/pjt/ECOS.html> (viewed 28 Aug 2008)

——— (2005). *Unruly Complexity: Ecology, Interpretation, Engagement*. Chicago, University of Chicago Press.

——— (2008). "Developing Critical Thinking is Like a Journey." In Ollington, G. F., *Teachers and Teaching Strategies, Problems and Innovations*. Hauppauge, NY, Nova Science Publishers.

——— (2009). Step-by-step presentation of the Cycles and Epicycles framework of Action Research. <http://www.faculty.umb.edu/pjt/ARcycling2.html> (viewed 28 Nov 2011)

———, S. J. Fifield, C. Young. (2011). “Cultivating Collaborators: Concepts and Questions Emerging Interactively From An Evolving, Interdisciplinary Workshop.” *Science as Culture*, 21:89-105.

Thomashow, M. (1995) *Ecological Identity: Becoming a Reflective Environmentalist*. Cambridge, MA: MIT Press.

Tuecke, P. (2000). Creating a wall of wonder with the TOP environmental scan. International Association of Facilitators, Toronto, Canada, April 27 - 30.
<http://www.faculty.umb.edu/pjt/tuecke00.pdf> (viewed 6 Jul 2011)

Turabian, K. L. (2007). *A Manual For Writers of Term papers, Theses, and Dissertations*. Chicago, University of Chicago Press.

Vonk, R. (1987). “Indigenous agroforestry systems: A case study from the CARE-Kenya agroforestry extension program, part I & II.” Papers delivered to the Social Forestry Program at the University of California, Berkeley, 21 & 22 September.

Weissglass, J. (1990). “Constructivist listening for empowerment and change.” *The Educational Forum* 54(4): 351-370.

West Nipissing Economic Development Corporation (1993). *Vision 20/20: Shaping our futures together*, Executive Summary. (April 1993).

——— (1999). *Vision 2000 Plus*, Executive Summary. (June 1999).

Wiggins, G. P. and J. McTighe (2005). *Understanding by Design*. Alexandria, VA: Association for Supervision and Curriculum Development.

Williams, R. (1983). *Keywords: A Vocabulary of Culture and Society*. New York, Oxford University Press.