

Preface

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This preface will point to some of my favourite parts in the articles that follow—all of them illuminating my life-long double question: How do people learn things and what can anyone do to help? The articles show situations where the teacher places learners in direct contact with the subject, capturing the learners' interest by a surprising phenomenon, or by seeming contradictions, or by a good question, inviting them to figure out what their own questions are, and how to approach them. Then her effort is to hear the learners' responses, to understand them, in order to craft her own next move.

I treasure Schneier's vivid descriptions. I treasure her equating the dance of the body with the dance of the mind; her quote from John Dewey—about “the giving of the mind”; her discovery of unlikely ways to engage her students' minds—without yet knowing the value that might develop from a particular intellectual engagement. I treasure the rhythms of children—Annie, Mary, Jenny—trying to reconcile contradictions within their own beliefs. I treasure Mary's lovingly folding the poem to her breast.

I am very taken with Schneier's thinking/image that when the students had difficulty, their understandings existed in some place quite separate from the words/symbols that they were given in school. Whether it was a simple fraction, or language used figuratively, the mark on the page did not reach/touch the understandings at all—and she knew her words would not have reached, either. She sees the symbols as shadows, but lacking the objects or ideas that they are shadows of. The symbols are manipulated according to rules given—but none of it makes any sense outside that manipulation, which acquires greatly exaggerated importance in schools because it must be done correctly for the tests.

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I am intrigued by Schneier's thought that the greatest difficulties come from "encountering a symbol system that is partially familiar to the student but has increased in complexity." Whole numbers are familiar, but when numbers are parts of fractions, their meaning needs to be broadened—capable of becoming, even, the opposite of one's first understanding of them. Similarly, in figurative language, words now play very different roles.

Cavicchi also relates movements of the body to movements of the mind in her marvelously developed metaphor of learning and teaching 'at sea'—when all is not decided ahead of time—when one can not be sure where the study is going. Her definition of cognitive disequilibrium—'awareness of uncertainty' is a gem of simplicity and clarity. And then there is the image of being at sea—a quintessential disequilibrium. We eventually get our sea legs ('[t]his back and forth, this responsiveness to whatever arises'). In the case of learning and teaching, each voyage requires new adjustments—and onward it goes. "[T]here are no end-points of static immobility."

Just as sea legs counter a movement of the sea with a movement of the body, Cavicchi points out, so our mental structures are able to respond to phenomena that unsettle our understandings, and are able to settle them again, differently. The body responds with an action that 'reverses' the effect of the wave. The mind responds with a mental move that cancels out (reverses) the effect of the intrusion—it can imagine getting back to how it was before, and sees how it can reverse back and forth between these two conditions.

Cavicchi develops the 'at sea' metaphor with ever more richness—including the understanding that not only learners, but teachers, too, need to be "fluidly involved in going into the unknown." There are several short examples in all of the papers in this issue. And Cavicchi's lengthy, detailed description of learning to be a teacher while helping Halle learn about physics is almost unique in the research literature. "Anywhere along these multiple ways, students and teacher are apt to find their thinking and expectations cast into disarray," she writes. Learning at sea requires boldness on all sides.

Yang Yan's paper emphasizes an aspect that all three share. Cavicchi's describes her first year of learning to teach in a new way. Schneier's paper was written during her first year as a teacher. Yang also describes being a newcomer to this experience, in her case as a learner. I find that the 'newness' gives an intensity to each of the papers, as the teacher/authors try to find their ways—a journey that yields continuing insights as experience accumulates.

Yang Yan launched into a study of the moon "[j]ust by watching the moon and following my surprises, reactions, and anticipations..." She started this study in a one-semester course with me, and was able to continue it in further courses with Cavicchi—which did not necessarily focus on the moon, but which allowed and helped her to keep working on her ever developing understanding.

Her feelings about her relationships with her fellow students and her teacher in that first semester are surprising and fascinating for me. The most fascinating part of the paper, though, I find, is how she responded to an observation she made that semester that was not at all compatible with what she had understood up to that point. Her paper gives a marvelous account of what it was like to be experiencing

the ‘absence of certainty.’ That particular disequilibrium was the focus of her thoughts for months, and she describes the many different—often surprising to me—qualities of such a period. There *was* an Aha! moment. But my favourite part of this account is her rendering of the blurred division between knowing and not-knowing—back and forth, losing her new understanding, reconstructing it, feeling it slip away, finding it again.

These papers are full of details that explore and elucidate the question—which is really every teacher’s question: How do people learn things and what can anyone do to help?