In Defense of Pluralism: An Essay in Trespass

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As I read the "Call for Papers" for this second volume of the *PSC Journal on Writing Across the Curriculum*, I feel I can claim that this essay belongs to one of the suggested topics, namely, reflections on writing in the disciplines. Five years ago, Sally Boland put me on the original committee called the Task Force on Writing Across the Curriculum. I attended quite religiously the first few meetings of the Task Force and even made some comments from time to time as the ebb tides of adrenaline alternated with the flow tides. Much of my comments was not very well focused, partly because I did not, to start with, have an adequate idea of what writing across the curriculum meant. Instinctively, however, I made one comment, that the projects for writing had to be very different for the different disciplines, that we must eschew Procrustean uniformity. Mary-Lou Hinman was anxious to embark on the program and I was too ignorant to be of much help. So, I initiated and accomplished my replacement by a person whose certitude about the *summum bonum* of life allows me generally, albeit paradoxically, to preserve my own values at some safe distance.

The Task Force took off soon thereafter, and Mary-Lou's expostulations and remonstrations worked wonders with me. I was converted to her cause. I participated in a well-attended and well-orchestrated workshop, discovered some fascinating persons like Robert Hayden, and even

did some writing assignments in the presence of a mixed gathering and read them aloud. Shortly after that, I introduced "writing" (Journals, Reports, etc.) in my courses as a regular and systematic feature. Things were quite upbeat for some time and my original caveat, that the projects of writing had to be very different for different disciplines, was about to recede into oblivion, when suddenly came a rude awakening, the circumstances of which may be less important here than the question that was raised in my mind afresh.

There is a fundamental, but unresolved, question of what makes good teaching in a discipline which simultaneously enables the students to write well in that discipline. In what follows, I shall attempt to provide a sketch of some material, which veers around the problematique centered in this fundamental, but unresolved, question. The limitation of space will not permit me to do more.

Following Plato, a body of thought aspiring to resemble anything like a philosophy of education must have, to a greater or less degree, an ethical theory justifying a goal, a metaphysical theory supporting some of its operational implications, and an epistemological framework explaining the effectiveness of the teaching methods. Whatever the importance of it to the modern mind, a secularized refrain in terms of Locke, namely, the production and maintenance of a good society, defined as one in which people find pleasure or happiness in the performance of duty (or, perhaps, pursuit of life), gets inscribed on the mast of any modern-day educational project. With metaphysics being held at bay, therefore, the epistemological desideratum turns out to be the most contested ground in the modern education system.

In Europe in the inter-war period, and in America until as late as the early 60's, educational psychology fell under the domination of behaviorism, which sought to banish "mind" from all theory of education. It was almost a non-arguable thesis, a pronunciamento, a policy statement, in the name of objective methods. Fortunately, its spell was not too long-lived.

Today even among the behavioral revisionists the naive model of stimulus-response is no longer in use. The organism, O, as a black box, has been inserted into the the S-O-R model, and interactive feedbacks have appeared in other models. The decisive break with behaviorism, however, came first tentatively with the Gestalt psychologists and then more dramatically with Piaget and his followers, and the linguistic theorist, Chomsky. Although they offer very different perspectives on the nature of language and its development, both Piaget and Chomsky are firmly opposed to the view that human learning can be understood in terms of the reinforcement connections between stimulus and response. The fact, however, remains that the bane of behaviorism is still widespread, sometimes under different rubrics, often incognito, in our education system.

Today even a freshman knows something about cognitive science, the most active field in the theory of learning. Cognition is defined as the "mental activities—how information enters the mind, how it is stored and transformed, and how it is retrieved and used to perform such complex activities as problem solving and reasoning. Thinking—the manipulation and transformation of information in memory—and language—a sequence of words—are important aspects of cognition." (Santrock, *Psychology*, 2nd edition, 1988). And how is language defined?—"a sequence of words that involves infinite generativity, displacement, and rule systems. The rule systems include phonology (sound system), morphology (meaning of sounds we say and hear), syntax (how words are combined for acceptable phrases and sentences), semantics (meaning of words and sentences), and pragmatics (ability to engage in conversation effectively)."

So, language, it would seem, is a highly complex, but strictly rule-governed, infinitude. And the newly emerging cognitive science seeks to deal with the mediation of our knowledge of the external world by *representations*, i.e., by mental objects that stand for things outside. It should follow then that the mediation that connects mental representations in different disciplines with their corresponding expressions through written language will call for different kinds of facilitation for its efficiency. When a mathematical discipline is at issue, there can be some fascinating, though

unsuspected, features involved.

Philosophically speaking, cognitive science has very pronounced Cartesian implications. The first such implication is that representations have no necessary connection to the things they represent (often a mathematician's stock-in-trade), known as representational skepticism. The second implication is that it is possible to study the mind without paying any attention to the reality it is supposed to represent (again often a mathematician's stock-in-trade), known as methodological solipsism. The third implication is that mind and body are two different kinds of things, known as Cartesian dualism.

When a discipline (say, a mathematical discipline) is so characteristically imbued with the first two implications, is it possible that the mapping into language in such a case is best accomplished with a stricter adherence to the structural formalism? At a lower level of abstraction, we may point out that the cognitive science, as it is developing, is not free from very thorny ontological and epistemological issues. When a mathematical statistician deals with the concept of R^2 (goodness of fit), is she dealing with a propositional attitude or an example of qualia (felt experience)? Is it know *that* or know *how*? Is it procedural, declarative, or tacit knowledge? One may know declaratively that a bicycle has two wheels and that one must balance in order to ride it. One may not know how to ride a bicycle on that basis. That requires prolonged problem-solving, which a learner of mathematics must undertake (one can also learn to work out a mathematical problem by rote, without learning). As Kohler showed, such problem-solving needs insight, preceded by cool, quiet, prolonged pondering.

Incidentally, take this questionable, but standard, claim. Integration of ideas is supposed to be facilitated when there is a direct relation between two ideas, and impeded when the relation must be inferred. A textbook example is as follows:

> Intergration facilitated:
>
> Ed was given an alligator for his birthday. The alligator was his favorite present.
>
> Integration delayed:
>
> Ed was given lots of things for his birthday. The alligator was his favorite present.
>
> (Weiten, *Psychology*, 1989)

Will it be invariably wrong to say that the second case, by creating a momentary suspense and the appropriate atmosphere, makes a deeper impression on the mind? The second one is cooler, quieter and more effective. A mathematician may prefer the second one! It may be more like a mathematical conclusion.

What I am driving at is that a discipline like mathematics, for example, is a uniquely structured discipline, and human language, too, is a complex, but highly structured, matter. It is possible that lectures in mathematics, for example, at the college level should be more structured, not less; that students may both learn mathematics and write about it better when a cool, quiet, formal, non-emotional environment prevails in the classroom, free from the excesses of noisy catechism. Such an environment may not be created successfully overnight. We may need to teach our students of the IAC (Introduction to the Academic Community) course what to expect in some of the disciplines in particular, that neither being couch-potatoes nor behaving hyperactively in the classroom is appropriate or beneficial, that emotion can also be recollected in tranquility. Or, alternatively, it takes the right emotion to control emotion. (Incidentally, one of my nephews finished College Algebra at the age of eight or nine, helped non-intrusively along by me. Later in life, he also earned the National Science Foundation, U.S. President's Award for young investigators in science. It was all accomplished in tranquility. He has *written* two books and many papers since then. I am also finding my students writing their journals quite well on the basis of my relatively structured lectures.)

Indeed, the connections between mathematics and language may be

very deep and organic. In his Managua lectures, Chomsky speculated on the mathematical ability of human beings, considering that it was never a factor in evolution. He thought the mathematical ability of human beings might just be a reflection of some other ability. What is that ability? Probably language. In a certain abstract sense, the structure of mathematics is abstracted from the structure of language.

But that is a deeper matter which may never be resolved. In the meantime, we may quite advisedly ponder over the following remarks of Bertrand Russell on the contrast between Behaviorism and Gestalt psychology:

> Animals studied by Americans rush about frantically, with incredible display of hustle and pep, and at last achieve the desired solution by chance. Animals observed by Germans sit still and think, and at last evolve the solution out of their inner consciousness.
>
> (quoted in Johnson-Laird, *Computer and the Mind*, 1988)

That should inhibit any unthinking zeal on the part of anybody for regimenting our teachers' styles.

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