

Bringing Transcendence into the Classroom: Revisioning the Scope of Science Instruction

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VEXTATION

Inspiration for this work stems from two different aspects of my experiences as a science educator. I've found adolescent students typically to be disconnected from a largely irrelevant (to them) science curriculum driven by high stakes testing. Myriad and predictable influences add up to student underachievement and basic lack of respect for science. This is confusing to me as a person who has bought into science and enjoys finding out new ideas about the natural world. Also, I've come to realize a student's religious outlook plays a fundamentally significant role in disengagement with scientific ideas. Adolescents main task is developing a strong sense of meaning, for which they will readily discard discreet truths.

For adolescents in general, respect is a critical factor, this is all the more so in urban settings. Being respected, respecting others, generating an image that others will not assail are the most important concerns students have. Science is not to be respected for many reasons. First, it admits (prides itself, in fact) on the possibility of being wrong. Respect must be built on sturdier ground in the adolescent mind. Second, if there is a source of strength and guidance in adolescents' lives, chances are it is a person of strong religious conviction. Studying material explanations of nature is doubly damned, not only is science incomplete (and often incoherent) it directly contradicts the world view of the people adolescents hold in the greatest esteem; their parents, relatives and ministers.

The second reason I come to this work is that I spend a great deal of time each semester helping students process how to deal with the science vs. religion debate in their future classes. Beginning teachers are at least cautious about discussing controversial subjects such as evolution. Some mention that they would like to avoid the subject altogether, if possible, this despite the fact that they recognize evolution as a central unifying principle. There needs to emerge a new way of thinking about the conflict between science and religion that honors the essential characteristics of both schools of thought. Also this new way must provide students with an unambiguous understanding about how both science and religion are essential, complimentary aspects of human thought.

The sentiment I wish to capture in this work is neatly summarized by Wendell Berry:

To live we must daily break the body and shed the blood of Creation. When we do this knowingly, skillfully, reverently, it is a sacrament. When we do it ignorantly, greedily, clumsily, destructively, it is a desecration. In such a desecration we condemn ourselves to spiritual and moral loneliness, and others to want.

Berry's words speak eloquently to the interconnectedness and interdependence of us all with all that is. Training students to have this perspective challenges the assumption that there is a science/spirituality divide. Additional sources I draw on to guide this work involve how complexity theory is critiquing what science means. For instance, Stuart Kauffman points out that transcendent complexity in nature requires that we "break the Galilean spell."

Our ability to perceive and consider the world around us place each human smack in the middle of complex and dynamic systems that defy the abilities of the most intelligent of us to put all the pieces together in a consistent whole. Religion provides a ready shortcut to the myriad complexity of nature, by ascribing all its working to a divine and pervasive spirit. The ability to experience the divine calls to a basic characteristic of humanity. We seek meaning and are well adapted as a species to make up truths to support our deeply held ideas. Treating religious ideation (e.g., creationism) like any other misconception misses the mark by a wide margin. Ontology tends to trump epistemology in this regard. Compared to a simple and majestic soup of religious explanation, our students perceive cold scientific truth as a thin and unsustaining broth.

VENTURE

A venture to combat my vexation centers on finding aspect of sacredness and interconnection through the science we experience in our everyday lives. The focus of this work is expanding a consideration of science to include the transcendent, while fostering scientific understanding as the essential way of relating to the natural world.

For the past several years in my classes I have implemented consumer product inquiries. Students are charged with the responsibility of conceiving, conducting and presenting a scientific investigation about things they use everyday. Inevitably these investigations resolve in some way to show how the interconnected nature of the universe relates in many ways to the mundane things we do every day of our lives. Students investigating:

- Cleaning products grapple with what it means to be clean and still be “green.”
- Detergents deal with gender stereotyping and family roles.
- Aspirin discover the dark side of big pharmaceutical companies.
- Bubble bath relate in new ways to the joy of fatherhood.
- Nail polish question the expectations of beauty and femininity.

Extending this work with my students I am beginning to conduct interviews with workers in energy intensive industries. There are three (YES, THREE!) nuclear power plants in the town where my institution is located. In each plant, the process of generating nuclear energy involves putting out hundreds of megawatts of power by annihilating miniscule amounts of matter every second, sending that energy out to power a good sized portion of eastern North America. Far from being a stark scientific process, I see this as taping into the fundamental nature of the universe to do something useful for millions of people. By interviewing workers, I want to explore their relationship to “sacredness” and the science of what they do.

To turn this work from idle musings I have begun to develop a methodology for generating and analyzing how people generate meaningful frameworks of understanding from the science of everyday experiences. The procedure involves getting subjects to relate how they are personally connected to their work by constructing concept maps relating ten key ideas. Each person brainstorms an individual list of the top five terms they think of when considering the importance and significance of their work. To this list they add the five terms: sustainability, efficiency, reverence, service, need and are asked that they interrelate all ten terms to describe how they view their work as meaningful. Analysis of these diagrams will look for persistent patterns regarding how people derive a sense of personal meaning from their work.

People that work in the nuclear industry often rebuff negative comments with assertions along the lines of “if you want to keep the lights on, you need us.” I want to drill deeper into this sentiment and see if at a fundamental level people see their work as a sacrament where they “daily break the body and shed the blood of Creation” or, if they simply see it as an opportunity to earn a paycheck and nothing more. Examination of this data may illuminate how we are to better teach students to understand the harmony and insight that can be gained from fully engaging in science.

Social Capital

I see this work relating to the notion of social capital in several interesting ways. First, in a negative sense, I see many of the lower socio-economic students I work with as being posed with an unspoken dilemma with regard to science. To adopt a scientific world-view they may feel that they need to reject a religious viewpoint that they have been brought up with and value greatly. Science educators pay little consideration to the fact that in asking students to accept the truths of science, we are also asking that they adjust a religious view, which provides deep meaning in their lives. The essential problem of adolescence is figuring out how to negotiate a social milieu. The concept of social capital relates to the accumulated wealth of understanding and relationships that enable us to relate to the world and to those around us. How science can be seen as a mechanism for relating to the physical world and how science students and workers value their social community over that of science, if the two are in conflict, is the essential aspect of this work. For the urban adolescents I work with it’s about respect “what can I respect?” and “what brings respect to me?” This is social capital as they view it.

Another connection to social capital I am attempting to strive for in this work I could best term as “deep literacy” (to play on “deep time”). For those deeply literate in science, there is no separation from experiences with nature and the ability of those experiences to generate an authentically spiritual connection. It is the divinity that surrounds us that moves us to inquiry. A scientifically informed person swims through miracles every second of their life. Science education can and must afford students, of all ages, opportunities to engage their spiritual selves in the pursuit of a deep and meaningful understanding about their place in the cosmos.