

*Theory, Knowledge, & the Need for a New Science*

An Earth Education that supports sustainable societies

- Supports society from the ground up, taking an inclusive whole-society and whole-environment approach, including the natural, political, historical, prehistorical, infrastructural, economic, anthropological, and sociological.
- Supports and inspires all students to study the Earth and improve our world by intentionally combatting sociopolitical under-service and unequal privilege distribution in both content design and teaching practice.
- Supports a model and pedagogy of critical engagement with information, the natural world, and other people by dialoguing openly, listening actively, challenging assumptions, raising difficult questions, respecting personhood, modeling empathy, and building the skills necessary to record, analyze, synthesize, and apply relevant data and evidence.

These are a lot of goals constituting a lot to accomplish in a classroom, field trip, or laboratory. To me the greatest challenge has always been the norms of academia, institutions, and society with regard to higher education expectations in the natural sciences. Once one breaks down these boundaries and preconceptions, it's much easier to make progress in the classroom. In terms of a pedagogical framework, I've gained much inspiration from theorists like Keating (2016), who proposes a post-oppositional pedagogy that goes beyond "either/or thinking into the acceptance of multiplicity, contradiction, and paradox—energized by a search for complex commonalities spacious enough to contain differences." In a world bound by a political binary that commodifies everything from our individual bodies and identities to the world of science itself, it is incredibly easy to feel that modern socio-political dogma is inescapable. It is certainly a strong force! If we just keep jumping instead of designing a rocket, we'll certainly never leave the planetary surface...

We must begin thinking entirely differently if we want to solve the problem of living in a new, warmer world. It has always seemed to me that anthropology had a distinct advantage in pedagogy and public communication over geoscience, because it seems historically that the geosciences gave up on philosophy. Once you let go of disciplinary theory, you lose the vocabulary for explaining different thought paradigms, as well as their evolution. Understanding the construction of knowledge is an incredibly advantageous tool, especially for students and most definitely in today's information battleground. I try to embed epistemological questions in all levels of my classroom, especially the mid-level writing-intensive, but it's often difficult for students to think science entails anything but objective 'truth,' so it's difficult for them to recognize bias could play any role in science or affect the work of scientists.

The biggest controversies in my classroom (from intro- to upper-level undergraduate) are how to understand which things are most important, how to understand those things more thoroughly, how to combat or adapt to them most justly, and how to communicate about them with the people who have the greatest need to know them. That means we need a lot of integrative thinking unbound by norms and traditions, a hefty dose of social sciences, a thorough understanding of interconnected Earth systems and analyzing/sensing technologies, research and development toward new technologies, and a lot of scientific communication. We need a new way of thinking about doing science, or a new scientific paradigm. The question is, how do we get there and how do we train students to compete on that playing field?

Keating, A. (2016). Post-oppositional pedagogies. *Transformations: The Journal of Inclusive Scholarship and Pedagogy* 26(1):24-26.