**How do we teach the science of sustainability?**

Noah Snyder

Boston College

June 2012

The workshop introduction begins with the statement: "Sustainability is emerging as a central theme for teaching about the environment, whether it be from the perspective of science, economics, or society." To me, the term "sustainability" connotes environmental stewardship and solutions to environmental problems, and includes social and economic dimensions. “Sustainability science” implies the study of the dynamics of human-environment systems. I also see sustainability in the academic context as related to the actual running of the university (carbon footprint, physical plant, etc.), and I am interested in examples of teaching materials that use the campus as a natural laboratory to study the shift toward sustainable management of institutions. In my roles a geoscience faculty member and director of the interdisciplinary Environmental Studies Program at my university, I am interested in two questions related to sustainability:

(1) How does incorporating sustainability into geoscience curricula differ from incorporating environmental studies/science into geoscience curricula (and vice versa)?

(2) In teaching sustainability science, do we run the risk shifting too far toward advocacy? Might we start teaching students answers to environmental problems as opposed to how science informs human decision-making processes?

On the first question, over the past thirty years, many geoscience departments have been at the center of building interdisciplinary environmental programs at their universities. Now the trends are either building separate sustainability studies programs or shifting the emphasis of existing programs toward sustainability. I think these trends are positive because sustainability more clearly provides a framework for truly interdisciplinary dialog (i.e., across the entire university) than does the study of the environment. However, I struggle with how to best adjust environmental science courses and curricula to incorporate sustainability. I think that geoscience-based environmental programs have tended focused on understanding environmental *problems* such as climate change or the fate transport of pollutants in watersheds. At the introductory level, how does incorporating sustainability concepts into these topics yield different lesson plans? One way to proceed is make sure that each topic includes a discussion of solutions. I think that historically this is something that geoscientists have not been great at doing in their classes. The trouble with this path is that we run the risk of being perceived by students as advocating a specific solution, rather than teaching how to solve problems, as I explore further in the next paragraph. Another way forward is to more explicitly bring in interdisciplinary perspectives, for example: what are the economics and politics of preventing future climate changes? This runs into the issue of making course content too sprawling. At a curricular level, I think we need a mix of survey courses that introduce students to environmental science problems (and some solutions), which is something we have done well, and issue-oriented courses that go in depth on one topic from a variety of perspectives. Both types of courses must be offered to students without lots of prerequisites to ensure interdisciplinary participation.

As to the second question, scientists always grapple with the objectivity versus advocacy, and I do not wish to delve into that issue broadly. Suffice it say that I prefer to separate my teaching about scientific concepts from my personal views on what policies should be implemented to address environmental problems. Sometimes I editorialize a bit during lectures, but I always acknowledge this shift in perspective explicitly. The coupling of human and geologic systems forms the core of most of my research and teaching, so I am comfortable in that space. For me, the challenge is in providing students with the tools to understand how human societies need to change to become sustainable (as opposed to advocating for specific solutions). I don’t have a good answer to this challenge, and it is the primary reason that I want to attend this workshop.