Geosciences in Sustainability: Upstream, Downstream, and in Between

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I am relatively new to teaching about sustainability and one year ago I wouldn’t have predicted being on this path. The inspiration to explore this theme relates in part to my collaborative research on the tectonics of Mongolia and Papua New Guinea, efforts that have been of interest to and garnered logistical support from mining companies. Over the years I have found myself contemplating the bigger picture of these companies operating in remote, foreign countries. My first real steps down the sustainability path are tied to having been selected as a University of Vermont Sustainability Faculty Fellow for AY2011-2012. This program included several workshops over the course of the year involving faculty from a variety of disciplines across campus and has the ultimate goal of infusing sustainability themes across a spectrum of courses offered at UVM. We have explored several topics, such as defining sustainability, systems thinking and emergent behavior, social conscience, and supporting infrastructure for developing service learning courses.

I have begun to weave a sustainability them into the rather traditional geology courses that I teach, such as petrology. To date, my petrology students and I have explored the sustainability of mineral, ore and hydrocarbon resources. After grounding ourselves in the relatively firm footing of resource formation, we attempted to address questions such as: How are known and projected resources estimated? What is the geographic distribution of production and exploration? What criteria determine economic viability of production? How resource-intensive is production? What are broader issues such as geopolitical concerns, environmental concerns, or issues related to equity (interspecies, interhuman, intergenerational)? Can innovations in technology improve economic viability or mitigate environmental concerns? Can human appetite or need for this resource be reduced?

I once struggled with ideas of how to integrate sustainability in my courses, but now see virtually endless opportunities for integrating geosciences into sustainability teaching. For example, geoscience themes dominate the upstream and downstream endpoints of technology. One only needs to ask students to pull out their cell phone and proceed to discuss where all the raw materials used to manufacturer them come from, including the petroleum-based plastics. What happens to our e-waste when you want to upgrade that phone or replace the battery? How do these upstream and downstream sides of technology affect our environment and influence political agenda? It is very easy to bring in the geopolitical and social conscience themes into these discussions. Depending on the class, these same themes can be explored and be heavy or light on the geoscience as needed.

Since having embarked on teaching sustainability, I am now thinking about courses (including collaboratively taught courses) I might like to offer in the future aimed at a broader audience than just geology majors. I found that participating in the UVM Sustainability Faculty Fellows program has been wonderful for making connections across campus and brainstorming ideas. Likewise, I believe this workshop will be a great way to broaden my perspective, networking and develop partnerships that will promote the goals the InTeGrate project.