

Connecting Learning to Action through Local Communities
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Over the last 8 years, the InTeGrate project has worked to bring together learning about the Earth with an understanding of the societal problems this knowledge can help address. Focusing on the undergraduate level, the project has created a teaching philosophy, highest quality teaching materials, and models of their use in all kinds of courses and institutions. It has supported a growing community committed to implementing this vision. As we look to the future, building on this work and that of countless other projects, I think two things are essential:

- 1) We must connect learning to action.
- 2) We must work collectively across all learning environments.

Connecting learning to action. Education is about preparing students for action, be it in the workplace or in their life as a citizen, family member and friend. The relationship between learning and the capacity to use that learning is a topic of high interest to educators at all kinds: how do we ensure that students can use the algebra they learn in math in their science classes? Their high school education in college? The scientific skills they learn in higher education in their employment? Their understanding of history and the humanities to create a compassionate life? In every case that I know of, the answer is that they must practice, and further, that performance in the future will depend on the number and variety of opportunities they have to practice using these skills.

Then it should come as no surprise that if we want students to be able to use their Earth education to address societal issues, they must have opportunities to practice. We have come to understand that students learning about scientific research need to have opportunities to practice all phases of the research process from identifying something they want to research, through study design, data collection and analysis, to publication and discussion. I would argue that by analogy, to make Earth learning actionable in society, students must have the opportunity to identify issues that they care about, develop needed relationships, use their science knowledge to inform or address the issue, and present and discuss the results. Further, just as with learning to do scientific research, learning to put Earth science to action in society will need to be scaffolded both within an opportunity and as a sequence of opportunities across time. Figuring out how we do this for all students in all kinds of communities is one of the grand challenges of our time.

Working collectively across all learning environments. As educators-- K-12 educators, undergraduate educators, graduate educators, informal educators -- we have during my professional career primarily worked to improve our sector of education. I think this was an important and appropriate way to proceed and the much good has come of it. However, just as

good physics, chemistry, biology and Earth science is insufficient for solving a complex scientific problem (or good science, social science and humanities are insufficient for solving a wicked problem), I no longer believe that we can produce the Earth literate individuals and communities that are required for resilient, sustainable, just communities by solely improving our individual sectors. It is time to add a focus on the learning pathways individuals take over the course of their lives and make sure that we collectively make those pathways strong. A strength of education in our country is its diversity, however, an outcome of that diversity is that each location has different strengths, weaknesses and opportunities. Add to this that people move around over the course of their lives and you have a very complicated system. In this landscape, how do we focus on the learner and support them in moving from one learning opportunity to the next across their lives? How do we link these opportunities to opportunities to use learning within communities or on a national or global scale? What will this work teach us about how to strengthen the educational offerings within our own setting? By thinking collectively about learning within the communities we serve we have the opportunity to strengthen our individual work, learn across sectors, better support our students to action, and increase the ability of our communities to become sustainable and just.