InTeGrate

Interdisciplinary Teaching about Earth for a Sustainable Future

Supporting Interdisciplinary Teaching about the Earth for a Sustainable Future with the InTeGrate Website

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Importance of Interdisciplinary Teaching to Earth Related Societal Challenges

The 2001 NRC report on Grand Challenges identified a number of key environmental issues facing society today involving the management and usage of water, land, and mineral resources; Earth's evolving climate and environmental instability; and stress on biological and biogeochemical systems. These challenges involve ***complex, interacting natural and social systems.*** While geoscientists are particularly well equipped to explore and explain the relation of Earth systems through spatial, temporal, and complex systems reasoning (Manduca and Kastens 2012), other disciplines can better approach the engineering, political, ethical, and social aspects of these challenges. Thus, sharing and transfer of perspectives and research methods across these disciplinary silos can lead to deeper, more nuanced, and more rigorous discussions (e.g. Clark 1999; Hicks et al. 2010; Wijkman 1999).

Teaching approaches that integrate disciplinary perspectives can provide students with practice and training that may transfer to their post-collegiate endeavors. Lattuca et al. (2004), found that students show gains such as deeper conceptual understanding, the ability to see big-picture concepts, and critical thinking skills, though it was not entirely clear whether it is the interdisciplinary teaching itself or the way the material is taught that leads to the learning gains.

Interdisciplinary teaching strategies can increase the relevance of the material to students (Hofstein et al. 2011), lends itself to engaging student-centered teaching pedagogies (Lattuca et al. 2004), increases student collaboration and problem solving abilities, prepares students to enter the workforce, and seeks to answer urgent questions that will affect the future quality of life on Earth for us all (NRC, 2001). Interdisciplinary education that addresses the nature of complex Earth and environmental systems is also likely to play a role in developing effective policy around these issues (Herbert 2006).

Expertise from the InTeGrate Community

The material on the InTeGrate website aims to bridge disciplinary boundaries by providing a variety of resources built from community contributions at professional development workshops, within materials development teams, and in implementation programs. The materials incorporate a broad range of interdisciplinary voices, from faculty, to college and university program chairs, and employers (see Figure 1). The combined expertise and experience reflected in these web pages creates a set of innovative and effective ideas and strategies to help improve interdisciplinary teaching about Earth-related Grand Challenges.

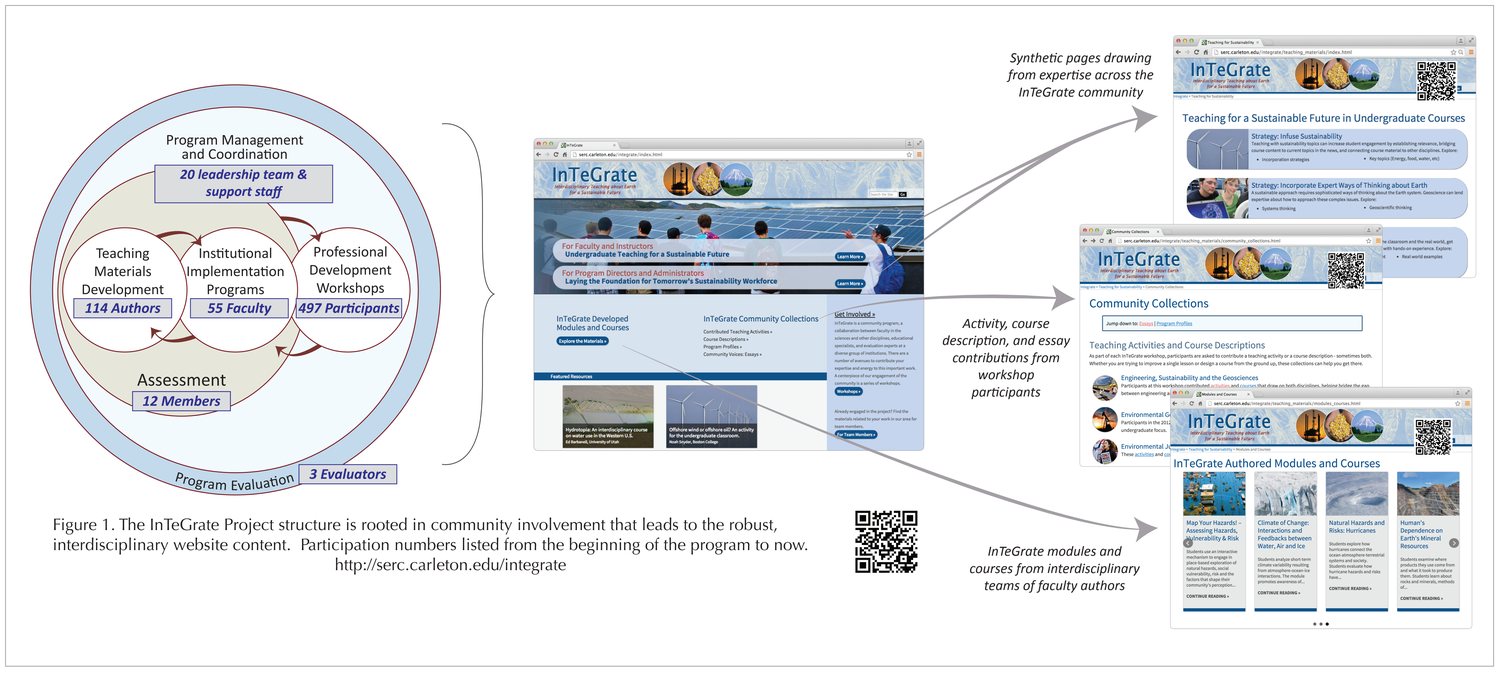
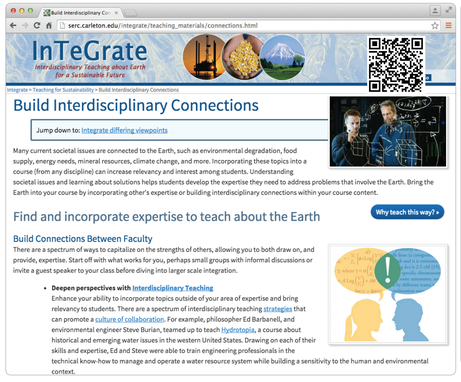


Figure 1. The InTeGrate Project structure is rooted in community involvement that leads to the robust, interdisciplinary website content. Participation numbers listed from the beginning of the program to now. http://serc.carleton.edu/integrate

Experience from Successful Interdisciplinary Teaching

Although there are clear benefits to interdisciplinary education, it is not a trivial task to teach in this manner. Potential barriers include: building collaborations with experts of complementary topics, identifying overlapping concepts that relate to the Grand Challenges, understanding and incorporating multiple points-of-view including disciplinary learning cultures and vocabularies, and finding ways to approach curriculum design at the course, program, or institutional level that align with your educational setting, student needs, goals, time, and budget. The rich discussions and successful experiences that underpin this content offer many creative and effective ways to overcome these barriers on the InTeGrate website. Learn from the many successes of your colleagues.



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