

## Data-rich and societally-oriented geodesy curricular modules: design inputs and actual use patterns

The Geodesy Tools for Societal Issues (GETSI) project was initiated to address a dearth of resources for undergraduate learning about geodesy. Over the course of four NSF grants, GETSI has developed thirteen ~2-week modules that allow undergraduate students to engage in geodetic data analysis relevant to societally important topics of **natural hazards**, **water resources**, and **climate change**. Resources support learning in both **classroom** and **field** settings and at **introductory**- and **majors**-levels. The project has also conducted 46 instructor professional development events from 1-hour webinars to 2.5-day short courses that have reached more than 1400 participants. The primary focus of GETSI is to serve broader impacts by better equipping geoscience students to **address societal challenges** through STEM data analysis and application.

This particular study compares module design with how faculty actually use and value the resulting resources. At the outset of the first grant, two charrettes and a community survey informed design and with principles of backwards design and other evidence-based practices. To study the actual use patterns of the curricular modules, GETSI conducted “Share Your Experience Surveys” with faculty users (n=80). Eighty-six percent of respondents said they were “very likely” to use the resources again. The quality rating averaged 9 on a scale of 1-10 (10 being highest). The 80 respondents reported on directly reaching 4,969 students, suggesting the actual reach of the GETSI curricular materials is in the tens-of-thousands of students, given that 733 faculty have requested and been given access to private instructor resources. In keeping with initial faculty advice to divide modules into units for flexible adoption, almost no users completed an entire module as published. More typically faculty used a subset of the 3-6 units per module and made at least some modifications to what they did use. Respondent perceptions of resource usefulness also matched relative initial interest in different resource types with 96% of activities/labs being “useful” to “very useful”. Animations, instructor notes, and presentations achieving 89-93%; whereas assessments were only deemed 46% useful. Counter to initial predictions, however, instructors used “societally-focused” units at essentially the same rate (57%) as the more “data-focused” units (60%).

