

DESIGNING LEARNING

A National Organization Leverages Systemic Change in STEM Teaching and Learning



AAU has made the improvement of undergraduate STEM education an organizational priority through a five-year initiative that seeks to help higher education institutions align teaching practices with evidence about how students learn best in STEM disciplines. As a national organization, AAU has an advantage of being able to convene crucial stakeholders like university leadership, disciplinary groups, other national organizations, and funding entities, says AAU project director Emily Miller.^a

The initiative includes the following activities (Association of American Universities, 2013b, n.d.):

^a Interview, November 15, 2013.

- Framework for systemic change.** AAU developed a framework to guide institutions and faculty as they commit to using research-based practices to improve STEM teaching and learning. The practices promoted by the framework include the kinds of student-centered, active learning pedagogy documented in the 2012 NRC report on DBER. The framework outlines a set of key institutional elements that need to be addressed in order to bring about widespread and sustainable change.
- Project sites.** With a three-year, \$4.7 million grant from the Helmsley Charitable Trust, AAU has provided seed money for pilot projects at eight AAU member universities—both public and private—in various regions of the country. These sites are implementing major undergraduate STEM education reform projects that address the three key elements of the framework: effective pedagogy, scaffolding and support for faculty, and cultural change at the institutional and departmental levels.
- AAU STEM network.** AAU is developing a network that will enable faculty and administrators at its member institutions to share best practices and promote sustainable change in undergraduate STEM teaching and learning. With seed funding from the Burroughs Wellcome Fund, AAU has developed an online hub to showcase promising programs and practices being implemented at member campuses and to support ongoing interaction among those who are leading reform efforts on their campuses.



- Metrics and evaluation.** With an NSF grant, AAU is developing metrics to help the project sites, as well as other institutions, assess the current status of STEM teaching and learning at their institutions and track the progress of their reform efforts. The metrics will also be used to evaluate the overall impact of the AAU STEM initiative.

“The initiative has created a platform to bring together individuals on our campuses who have wanted to have a dialogue with each other,” says Miller. The eight project sites are taking somewhat different approaches to implementing a common framework and are at different stages of promoting research-based practices.

The initiative has already had an impact (Association of American Universities, 2013a). All AAU member institutions have designated a campus point of contact to serve as a liaison with AAU for the STEM education initiative. In 2013, half of AAU’s

62 member institutions participated in a summer workshop focused on creating the AAU STEM network. Even the 23 institutions that applied for but did not receive project grants have been positively affected, notes Miller. As part of their applications, these institutions developed concept papers that examined such factors as department and faculty engagement, institutional commitment, likelihood of sustained organizational change, and commitment to evaluation and assessment. Many of the campuses have successfully advanced these proposed projects with other funding sources.

As a resource for other higher education institutions, AAU is disseminating examples of the innovative efforts to reform STEM teaching and learning that are being implemented by its member campuses (see www.aau.edu/stem).