

Transforming STEM Education in a Large Urban University (TSE@USF)

The TSE@USF project was funded by the National Science Foundation (Niu) systems institutional support for both faculty and students in STEM “gateway” courses.

With Dr. Gerry Meisels as PI, the TSE@USF Planning Team (PT) developed the implementation plan and ultimate proposal for funding the institutional reform program that was designed. The proposal was submitted to the NSF program, accepted, and the Systemic Transformation of Education Through Evidence-Based Reform (STEER) project resulted. Benefit from the WIDER funds further assisted in the transition to the STEER project.

The PT was a diverse group, with representation from faculty members, department chairs, and administrators with important experience and perspectives from their respective role groups. Each brought connections to internal university resources that were needed at points in the planning, whether connections to high-caliber seminar speakers or access to key offices at the university. The PT produced an extensive list of university policies and support structures that could facilitate or impede the change effort. The list includes items impacting faculty, graduate assistants, and undergraduate students. They then identified key policies on which to focus as leverage points for change – including tenure/promotion, evaluation of teaching, faculty assignments, faculty development, and facilities.

The PT took a strategic approach to its work, recognizing the importance of being systematic in articulating a vision, securing support, and ensuring alignment of the various elements of the implementation plan. The PT conducted an in-depth analysis of the current picture of the university STEM programs, including trajectories of students entering, leaving, and completing degrees in STEM fields and data regarding the reasons students change their major. This analysis formed the basis for conceptualizing and planning the needed interventions.

The project focused on a set of priority interventions – four pedagogical strategies, four curricular innovations – that were the subject of its course transformation efforts. This smaller, more focused set of interventions more readily engaged faculty within and across disciplines to be formed and supported to explore implementation. Concentrating efforts primarily on “gateway” courses also has the greatest potential impact on STEM major recruitment and retention.

A seminar series and faculty learning community continually exposed interested faculty to a range of ideas, from general principles to particular instructional practices. The seminars, which included leaders from several universities and other organizations, were widely attended. They included:

Prof. Adrianna Kezar, University of Southern California: STEM Education, Shared Leadership, and You
Dean Vasti Torres, University of South Florida: Do Students Under-represented in STEM Experience the Learning Environment Differently

Prof. Richard Pollenz, University of South Florida: Understanding Institutional Data Can Inspire University-Wide Adoption of Evidence-Based Practices in STEM Education

Prof. George Kuh, Indiana University: Fostering STEM Student Engagement: What Matters

Prof. Melanie Cooper, Michigan State University: Evidence-Based Approaches to STEM Education

Prof. E. William Wischusen, Louisiana State University: Impact of a Pre-Freshman Boot Camp on Student Performance

Dr. Jay Labov, National Research Council & N