

# PROJECT EMBER

## Professional Development for Teaching

### What is the Challenge?

- The system of evaluating faculty success, especially at Research 1 institutions, often fails to encourage faculty to invest their time in professional development for teaching. As a consequence, it is often the case that:
  - Faculty lack knowledge of reform teaching strategies and continue to teach antiquated content in their courses. Moreover, instructors tend to teach in the ways they were taught (i.e., through lecture and direct instruction). This historical teaching leads to the propagation of mathematics learning experiences that are not current or modern in today's ever-changing world.
  - Although faculty are expert mathematicians, many might lack knowledge of how learners come to understand mathematics. They are not aware or knowledgeable of current research in mathematics education and how this body of research can enhance and support their effectiveness as a mathematics instructor.

### Solution

Provide mathematics instructors with high-quality professional development based on research on student thinking and building students' conceptual understanding of mathematics. This professional development should be consistent, connected, and coherent; that is, the efforts should provide a consistent messaging and philosophy about the teaching and learning of mathematics, should be connected to past professional development experiences and foreshadow future ones, and should be coherent in content relative to the mathematics courses being taught at the institution.

### What is the Innovation?

- Offering professional development for all instructors of targeted courses includes the following goals and components:
  - Allows for novice instructors, including graduate teaching assistants, to learn and experience reform-based instructional strategies that foster active learning and student engagement.
  - Allows for seasoned instructors to extend their knowledge of teaching and learning of mathematics by experiencing modern instructional strategies and engaging with novice instructors.
  - Provides experiences for instructors to engage in professional development that is consistent, connected, and coherent.
  - Includes opportunities for instructors – novice and seasoned – to observe one another and reflect on their observations.
  - Engages instructors in both informal (e.g., “brown bag lunches”, hallway conversations) and formal (e.g., workshops, conferences) professional development opportunities.

- Aims to focus on the mathematics content that is modern and relevant to the courses being taught and dovetails with efforts for course coordination.
- Simulates high-quality instructional practices so that instructors can experience the learning of mathematics from a student perspective while also allowing for instructors to debrief on the experiences from an instructor perspective.
- As outlined in *Transformational Change Efforts* (Smith, et al., 2020), “ongoing professional development is needed to help novice instructors implement new teaching techniques and reforms such as active learning” (p. 252).

### What are Some Key Terms to Know?

- Professional development
- High-quality instructional strategies

### How Does this Play Out Across the System?

- All levels: provide a supportive environment for instructors to participate in professional development in regards to the teaching and learning of mathematics
- Institution: redirect efforts across the institution to elevate the goal of student success and teaching and learning; reward instructors for conducting and engaging in professional development (locally and nationally), such as in the annual review process and promotion and tenure processes
- Department: builds a strong network and community of instructors focused on teaching and learning of mathematics; must be supported by administrators in terms of funding for professional development facilitators (locally or nationally), funding for instructors to participate in the professional development, and providing classroom space to conduct the professional development
- Course-Level: provide consistency in ways of teaching and learning for all students, regardless of the instructor they have
- Classroom-Level: implementation of high-quality instructional practices, such as active learning and high levels of student engagement

### How Can You Learn More?

- Read more about professional development in the *Transformational Change Efforts* book: <https://bookstore.ams.org/mbk-138>.
- Read MAA's Statement #1: Best Practices in Recruitment, Retention, Development, and Evaluation of Faculty in College and University Mathematical Sciences Departments: <https://maa.org/resource/best-practices-statements/>
- Ask an expert! The following faculty are a few who have facilitated professional development in higher education, as well as conducted research on the efforts:
  - April Ström, Chandler-Gilbert Community College
  - Dave Kung, Mathematicians Without Borders
  - Natasha Speer, University of Maine
  - Wendy Smith, University of Nebraska-Lincoln
  - Chris Rasmussen, San Diego State University

## Resources

- Smith, W. M., Voigt, M., Ström, A., Webb, D. C., & Martin, W. G. (Eds.). (2021). *Transformational change efforts: Student engagement in mathematics through an institutional network for active learning* (Vol. 138). American Mathematical Society.
- **I want to connect with others engaged in this same innovation**
  - [Zulip Network for Teaching-Focused Faculty](#)
  - [MAA Connect](#)