ITP Internship Proposal
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My proposed work aims to promote the use of *active learning* in undergraduate STEM courses. In contrast with passive learning (e.g., lectures), active learning engages students with the domain knowledge through interactive course activities. Recent evidence for the effectiveness of active learning interventions in undergraduate STEM courses has resulted in widespread adoption of technology and collaboration to engage students actively with learning materials (Freeman et al., 2014). For instance, the University of Wisconsin-Madison has launched The Wisconsin Collaboratory for Enhanced Learning (WisCEL), which provides learning centers with a variety of tools that support active learning pedagogies for undergraduate courses. These spaces may include mobile whiteboards, projectors, movable furniture, and other supports for technology and collaboration. However, such investments in technology and collaboration supports may not yield the potential benefits of active learning. Effective *instructional support* may be needed to help instructors and students transform their classroom practices. Research should investigate how best to support instructors and students in utilizing the technology and collaboration and inform the design of active learning interventions in undergraduate STEM courses (Wu & Rau, 2017).

An ITP internship on active learning with WisCEL directly contributes to my research in how students learn through active learning strategies (e.g., generating and revising visual representations). My research shows that students benefit from instructional support that helps students engage actively with STEM content (Wu & Rau, under review). Specifically, instructional support for formative feedback may be effective when provided by technology and collaborating peers in active learning settings (Wu & Rau, 2017). To extend my research and the ongoing work at WisCEL, I will develop, implement, and evaluate a tool or intervention in collaboration with instructors to help students engage in active learning strategies in WisCEL courses.

Proposed Work:

1. Design, conduct, and evaluate an active learning intervention: In collaboration with WisCEL staff, instructors, and students, I will develop a tool or intervention that guides student reflection on their own learning practices and provides feedback on how best to improve them. If possible, I will work with WisCEL to deploy a randomized control trial to evaluate the effects of the tool.
2. Bring tool to scale for WisCEL courses: The tool will be designed such that it can be adapted for implemention in a broad range of WisCEL courses. I will collaborate with WisCEL staff and instructors to implement and evaluate the tool in WisCEL courses.
3. Translate scientific research on active learning to practitioners and other stakeholders: To help WisCEL staff, instructors, and students adopt the most effective active learning practices, I will review, synthesize, and present findings on active learning interventions from both educational sciences and discipline-based education literatures. I will also publish and present the results of studies described above to practitioners and researchers.