

PROJECT SUMMARY

Overview:

The proposed research explores the long-term impact of Peer-Led Team Learning (PLTL), a nationally disseminated reform, on student learning and attitudes. The proposed work is situated within exploration and design research on engaged student learning. PLTL relies on peer leaders, undergraduates who have successfully completed a targeted course, to return to the target course and lead students in small group learning activities. There is a considerable literature base on the effectiveness of PLTL in promoting student success within the target class, but very limited research on the long-term impact of PLTL. The proposed research explores the impact of PLTL on both students within the target class and the peer leaders that facilitate the session. The proposed research relies on a parallel study design that explores long-term impact in both a naturalistic setting, an upper-level class in Analytical Chemistry, and in a controlled study. Combining the results in both studies provides a robust picture on the long-term academic impacts of PLTL. Additionally, the proposed research examines the long-term impact of PLTL on students' affect, an area of recent attention given the clear importance of affect on students' persistence and academic achievement.

Intellectual Merit:

Examining long-term concept retention is an important indication of meaningful learning, which is contrasted to limited concept retention associated with memorization. The proposed work addresses the dearth of research on long-term concept retention. In particular, the proposed work seeks to measure the long-term impact of a widespread education intervention targeting first-year chemistry, Peer-Led Team Learning, which has a considerable evidence base demonstrating short-term effectiveness. The proposed work explores multiple potential impacts of Peer-Led Team Learning, including examining the long-term impact on peer-leaders and students and considering both concept retention and impact on attitudinal measures. Finally, the proposed work considers multiple lenses to describe the long-term impact including: investigating within a naturalistic setting (an upper-level course in Analytical Chemistry) and a controlled setting; and measuring concept retention in student performance on conventional closed-ended assessments and student generated responses to open-ended assessments. Through employing multiple research lenses the proposed work explores the conditions under which long-term retention may be demonstrated.

Broader Impacts:

The proposed work will generate results that will inform undergraduate education in the sciences. In particular, it will explore the impact of a reform pedagogy on long-term concept retention relative to traditional lecture-based pedagogy. The results have the potential to offer a unique lens of measuring instructional effectiveness, which is beyond performance on the most proximal student assessments. The measure of instructional effectiveness, with an emphasis on long-term concept retention, can inform both post-secondary science instructors and discipline-based educational researchers. The results will be disseminated in academic journals that target both instructors and educational researchers. In addition, the project will generate a series of assessment that can be used in an upper-level Analytical Chemistry course, such as Quantitative Analysis, to explore students' use of General Chemistry content. The results and assessments generated will be of use to instructors of the course as they can serve to describe how students build on their General Chemistry content knowledge in learning Analytical Chemistry. The results and assessments will be disseminated via a network of instructors who regularly teach the course and via academic journals. Finally, the proposed work will be presented via a workshop at the Biennial Conference on Chemical Education to present a means for investigating long-term concept retention in post-secondary chemistry.