

What Happens When Students Build the Experiment?

An Equity-Minded SoTL Study of MiniLabs

This equity-minded Scholarship of Teaching and Learning (SoTL) study examines the impact of short, in-class experimental activities (“MiniLabs”) on conceptual understanding and sense of belonging in a junior-level mechanical engineering Heat Transfer course. Introduced prior to students’ exposure to turnkey laboratory systems typically encountered in their graduating semester, these MiniLabs address inequities in prior experimental experience by providing early, scaffolded opportunities to design and build simple experimental setups. Four 75-minute MiniLabs engaged students in collaborative data collection, shared analysis, and reflection, emphasizing experimentation as a collective practice (Felten 2013). Assessment included pre/post concept quizzes and belonging surveys. Preliminary results indicate a 14% gain in conceptual understanding and promising trends in belonging. Informal, student-initiated conversations revealed transfer of learning to employment contexts, including internship interviews, as well as to other coursework. Students described the MiniLabs as challenging yet enjoyable, highlighting productive struggle and collaboration.