

Chemical Education Seminar

From Isolated Uncertainty to Collective Success: Investigating Possible Mechanistic Links Between POGIL and Student Competency Beliefs in General Chemistry



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Mani L. Bhaumik Collaboratory,
Dongwon Yoo Seminar & Conference Hall
(Young Hall 4222)

POGIL (Process Oriented Guided Inquiry Learning) is a form of active learning during which students work in small groups solving scaffolded activities crafted to promote collaborative reasoning and conceptual understanding. Prior investigative efforts have documented noteworthy gains in critical thinking and cognitive reasoning following implementation of POGIL in STEM classrooms. However, the particularities by which POGIL shapes students' competency beliefs—that is, students' perceptions of their own ability to understand and succeed in disciplinary contexts—remains poorly understood. In this study, we investigated whether the implementation of POGIL activities during General Chemistry I Recitation sessions is associated with alterations in students' competency beliefs and perceived success. We leveraged a mixed-methods design to perform the following: administer pre- and post-semester surveys of competency beliefs; collect and compile structured engagement measures following each Recitation's POGIL activity; and probe weekly qualitative student reflections on individual learning as affected by group collaboration and facilitator engagement practices. Preliminary qualitative analyses suggest a consistent pattern: Students often report a shift from initial, individuated confusion to collaborative and collective problem resolution, underlining peer explanation and productive struggle as paramount to both their learning and their perceptions of learning. Furthermore, it appears that student engagement is sensitive to each group's pacing and each facilitator's individual style, with students' reporting greater confidence when taught by facilitators who strategically balanced offering guidance and encouraging autonomy. Taken together, the findings of this study imply a mechanistic model wherein structured collaboration, calibrated facilitation, and additive experiences of collective success jointly empower students throughout the emergent development of competency beliefs.

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