Rethinking the implicit learning objectives of the laboratory through students' experiences: Findings from 114 hours of fieldnotes in the chemistry laboratory

Abstract

There are a variety of laboratory learning activity designs in chemistry that all represent different intended explicit and implicit learning objectives of the instructor. Past work shows that students' experiences during laboratory learning activities do not align with the instructor's intended learning objectives (framed as the purpose) and has studied students' achievement on assessments of those learning outcomes. In our study, we apply a different framing, one which assesses the laboratory design by comparing what students are asked to do for the learning activity with what they can *actually do* during the laboratory. By taking this framing, we can begin to understand what is possible and reasonable for students to achieve during the situated laboratory learning activity. In this study, I undertook ethnographic fieldnotes of students' experiences during the laboratory, focusing on what students were doing and the questions they were asking. Through our analysis, I situate the findings into the culture of chemistry as a discipline, practical restrictions in the context of the experiment and its assessment, and students' lived experiences. What laboratory learning activities represent is more complex and nuanced than what the instructor intends. Future designs need to account for students' situated experiences. This study invites educators to consider what students can actually do during their laboratory time and provides an approach for educators to examine their own practices.