# EXPLORING THE FLIPPED CHEMISTRY CLASSROOM: A QUALITATIVE STUDY TO CHARACTERIZE THE ELEMENTS USED IN SUPPORTING A FLIPPED LEARNING ENVIRONMENT

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This qualitative study is part of a larger project to better understand the impacts of flipped learning on a diverse set of courses and students. Current studies of flipped learning in higher education Science, Technology, Engineering, and Mathematics (STEM) disciplines have mainly focused on single-courses and outcomes such as attendance, enjoyment of the learning environment, course grades, and course completion rates. Review of these studies show mixed results regarding the effectiveness of flipping. This split may be the result of differences in adoption or adaptation of the flipped method or differences in the assessment practices used to gauge effectiveness. Therefore, this multi-course multi-institution study, utilizing a coordinated set of assessment instruments, and accounting for adoption practices, is novel in scope and its potential for transforming the understanding of this learning environment. To better understand what it means to 'flip' a chemistry class, we interviewed instructors about their adoption practices, conducted classroom observations, analyzed classroom artifacts, and conducted student focus groups. Data collection took place in six introductory/general chemistry courses at four universities in the United States. The instructor-reported elements of all six courses were nearly identical, that is, all courses required students to 1) watch videos to acquire content knowledge outside of class, 2) complete pre-class assessments of knowledge, 3) build applications of knowledge through in-class activities, and 4) further assess knowledge through online homework. However, the way in which some elements were structured within a course were very different and could be responsible for varied course outcomes. For example, we observed that poor alignment of video content with the pre-class assessment and/or in-class activity reduced students' use of and perceived value in the videos. In addition, we found broad levels of engagement during in-class activities. An overview of similarities and differences, including their potential impacts will be presented.

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