Improving Geoscience Learning and Increasing Student Engagement Using Online Interactive Writing Assignments with Calibrated Peer Review.

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Peer review is a hallmark of the publication process for scientific research, yet it is rarely used as a pedagogical approach in university geoscience courses. Learning outcomes for university geoscience courses include content knowledge and critical thinking and analysis skills, and often include written communication of scientific issues or concepts. Because lecture and memorization is not the most effective learning approach for many students, instructors are increasingly exploring teaching approaches that involve active engagement. In this context, writing assignments that engage students in using content, constructing arguments, and critiquing other students' work are highly desirable. However, many of us struggle with extensive writing requirements in our courses because the workload associated with having the instructor provide detailed comments on writing is daunting, especially in large-enrollment courses, and organizing effective peer review by students is very challenging. Calibrated Peer Review (CPR) is a web-based program that involves students in writing and in reviewing each other's writing. It is designed to allow for more involved writing and feedback experiences with much less instructor time. Here we report on the results of a qualitative-methods analysis of narrative survey responses from students using CPR in an introductory geoscience class. In addition to an impact on the students' writing and their understanding of what goes in to effective writing, the results indicate that CPR acted as reinforcement for content learning, and an impetus for gaining a deeper understanding of content material. It allowed students to see how other students explained and analyzed content, and to check their understanding of a topic in relation to other students in the class. Not surprisingly, the instructor reported that students performed far better on exam questions that tested knowledge covered by CPR assignments.