

How Does Student Performance on Formative Assessments Relate to Learning Assessed by Exams?

By Gary Smith

A retrospective analysis examines the relationships between formative assessments and exam grades in two undergraduate geoscience courses. Pair and group-work grades correlate weakly with individual exam grades. Exam performance correlates to individual, weekly online assessments. Student attendance and use of assessment feedback are also essential factors.

f frequent and effective formative assessment increases student content comprehension and achievement of learning outcomes (e.g., Wergin 1988; Black and Wiliam 2004), then should not these assessments relate to student performance on infrequent exams that describe the actual learning accomplished at a particular time in the course? This paper examines the question by retrospective analysis of student achievement in two undergraduate geoscience courses taught at a large university. Statistical analyses compare student scores on assignments and exams to provide insights into the functions of assessment and active learning. There are no control groups or efforts to limit potential variables in student performance so only tentative conclusions are drawn from the results.

Development of course formats Like many university science professors, I began my career teaching mostly lecture-based courses (in some cases with companion, teaching-assistant-instructed laboratory sections) and primarily used periodic within-term and final exams to determine students' grades. I was generally satisfied with student achievement and student evaluations of my teaching were higher than the mean scores at my institution. But despite my general satisfaction with the courses, I was concerned about how effective my assignments were at promoting learning.

One course of interest in this study is a lower-division lecture and laboratory Earth History course, which I teach once per year with an enrollment of 25–35 students, 50–75% of whom are majors in Earth and planetary sciences or environmental science. The course has one freshman-level prerequisite. Early on, I included analysis- and synthesis-oriented homework assignments



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