

Lessons Learned from Competency Grading in a Statics and Mechanics of Materials Course

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Students are commonly assessed and graded using traditional means – they are given assignments and tests, each is scored in some way, and those scores add up to a course grade. Depending on the quantity and weighting of the assignments and tests, it is often possible for a student to do very poorly on one or more assessments and still pass the course. Because of this, they may or may not have the necessary knowledge to perform successfully in a subsequent course. At Boise State University, many students passing the statics and mechanics of materials course were not able to successfully use that content in follow-on courses. This prompted a change in the course grading from the traditional method to one based on competency. Competency grading requires students to prove competency in defined skills in order to pass the course. This seemed like a perfect fit for the statics and mechanics of materials course. This study provides the details of the competency grading for the course, evaluates the first semester of use, and provides lessons learned for other faculty interested in trying this grading method.

This study evaluates using competency grading in a junior level construction management statics and mechanics of materials course. Twelve objectives were defined as the minimum standards for passing the course (a C- grade). Students were required to demonstrate competency in all twelve. Examples include: Given a beam or truss with loadings, calculate reactions; Calculate the centroid of a composite shape; and Calculate and draw the moment diagram for a simply loaded beam. Students could earn higher grades by demonstrating higher levels of competency with harder skills such as: Given a truss, find the reactions and determine the forces in the members by method of sections. To demonstrate competency, students were given a statics/mechanics problem representative of each objective in a test setting. Problems were graded Pass/No Pass. Any objective not passed on a given test day could be repeated on a later test day, with a new representative problem. This study asks a number of questions including: (1) What did students think of the competency grading method? (2) What problems were encountered by students when using the competency grading method? (3) Are students better prepared for follow-on courses that use the material learned in this course? (4) What challenges were incurred by the faculty due to the competency grading method?

The students were asked for their feedback on this grading method as part of their course evaluations. It was expected that students would express a mix of positive and negative feedback for the competency grading method. At the beginning of the semester, there was a lot of trepidation, but as the semester continued, their concerns seemed to be lessening. It is hoped that students will perform better in follow-on courses than they have in the past. If students that experienced competency grading in their statics and mechanics of material course are more successful in the follow-on courses that use this base knowledge than students with traditional grading, competency grading might be considered for use at other universities. Competency grading might also be considered for other similar types of technical, problem solving courses.

Keywords: Traditional grading, Competency grading,