

Backward design and assessment of Quantitative Analysis

A “backward design” has resulted in the creation of three 5-week units in a one-semester Quantitative Analysis course. The units are entitled Measurement, Error and Models of Matter and represent the desired “enduring understandings” that students should develop. Each unit consists of active lectures and a series of lab experiments that focus on the unit topic. Students take an exam in the fourth week. As the final assessment activity of each unit, students complete a project where they design and carry out a laboratory procedure to solve a problem. Students submit a project report or poster that describes the process used, the calculations, results and conclusions. The curriculum has been assessed by collecting and analyzing information regarding student achievement and from student surveys, focus groups and interviews. The four main conclusions of the assessment are as follows:

1. Student performance on the ACS standardized multiple choice exam are about the same.
2. The unit structure focuses content and strengthens the lecture/laboratory connection.
3. The separation of the topics “measurement” and “error” is an improvement.
4. Projects cause the students to apply their learning and think critically and can be used effectively as an assessment of learning.

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