A Strategy to Increase Formative Assessment and Student Engagement during Labs

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Jenifer C. Utz and Angela Hammond, Life Sciences

Learning Objectives (LOs) and Associated Practice Activities

In a 200-level biology laboratory course, we developed learning objectives (LO) for each lab. We also developed practice activities that directly corresponded to each LO. Students earned participation credit through completing the practice activities. As students progressed through their lab work and felt ready, they would request that the lab instructor come check their progress towards mastering a particular LO. If students were successful with the practice, the instructor would mark completion for that LO on the students’ lab handout. If students were not successful, the instructor would provide feedback and recommend additional learning approaches. Since the purpose of the practice activities was to provide formative assessment, students were never penalized for mistakes. The LOs and associated practice tasks address the need for students to know what needs to be learned, to identify gaps or misconceptions in their knowledge, and to gauge their learning progress.

Example: Following completion of the lab, the student will be able to identify the structures of the brain, including the cerebrum, diencephalon, cerebellum, and brainstem

___ Name 2 structures of the brain that are composed of gray matter
___ Name 2 structures of the brain that are composed of white matter
___ Identify 3 structures of the cerebrum

Student Achievement Increased When LOs Were Implemented

We observed the following benefits:

- Increased interactions between students and more group collaboration
- Increased interactions between students and instructors
- Balanced instructor interaction with all students (all students received instructor feedback multiple times during each lab session)
- Students demonstrated better time management and full use of lab time
- Students became more confident in their knowledge and skilled in how to prepare for graded quizzes and exams

Student achievement improved on lab assignments, and students shared positive comments on course evaluations.

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Representative student responses to the question, “What is the major strength of the anatomy and physiology lab?”

- “What we need to learn every week is well outlined.”
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How other UNLV teachers might adopt this practice

Begin with creating LOs for a specific lab, assignment, or chapter. Develop a set of practice questions or tasks that correspond to each LO. Consider the following during your development process:

- emphasize that mistakes are a valuable part of the process; the practice questions/tasks are "low stakes", they are designed to help students explore the material and understand the level of knowledge that will be required for success on later quizzes or exams
- practice should be geared for in-class time and clarify what students need to follow up with during out of class time
- instructor feedback is important

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