

Special assessment considerations with online labs

Do online STEM labs present unusually challenging circumstances for [assessment](#)? Yes, and no. In this fourth part of our five-part series discussing online STEM labs, we're taking a look at the special assessment considerations inherent in online labs and how some faculty have tackled the challenge.

Anytime one asks students to demonstrate their understanding by doing, rather than through traditional examinations, there are some great opportunities for students to present their understanding in new and fun ways. This makes for engaging activities and opportunities for rich assessment.

How does any lab instructor know that each student has performed each lab themselves and has achieved desired objectives? This is a classic challenge of any lab experiences, as lab partner relationships are not created equal. One attribute of the online modality is that the work aspects of an activity can easily be separated from the social aspects within a lab partnership. Online, students can do their own work while receiving support on the side, but they can never have their work done for them by a stellar lab partner, or be let down by a less enthusiastic one. Further, online students have the opportunity to present their accomplishments to their instructor and to their peers in a variety of ways.

Dr. Jim Brinson of American Public University and Dr. James Brown of City University of New York suggest students submit still or video images documenting their work. Some require students to submit their name and date written on a piece of paper and held up at the completion of the lab experiment. This is a common way of authenticating individuals taking part in Q&A sessions on the internet and is a simple solution for determining authorship and integrity in an online lab. [Here's a video featuring both faculty members addressing variations of this strategy.](#)

Closer to home, Dr. Greg Finstad, Research Associate Professor, redesigned his face-to-face intensive lab course aimed at rural Alaska students for online delivery. His HLRM 170: *Health Issues in Domesticated Ungulates* students perform a necropsy as a final video presentation. This is a rich, individualized, and engaging assessment where students clearly demonstrate their understanding in unique ways, and where the products of that assessment have utility to others

far beyond the time span or even audience of the course. [Here is one example of a final presentation.](#)

In addition, the online modality allows one to design integrated assessments which promote and measure students' understanding on a more granular scale than is practical in a classroom environment.

Dr. Abel Bult-Ito uses a series of automated quizzes requiring 100% success before students can move forward in the course. These ungraded assessments function as competency barriers; students must demonstrate understanding before moving forward. Modules follow a consistent pattern of quizzes on fundamental concepts, data analysis, and finally interpretation and discussion of the data. According to Dr. Bult-Ito, the interpretation of data in discussion boards "has resulted in lively and very insightful discussions" and that "this array of assessments has resulted in a comprehensive assessment of student learning and competency."

Online STEM lab courses are not naturally more challenging to assess than in-classroom labs. Hands-on work with authentic tools and materials can be done in both, and the tweaks to [assessment methodology](#) for an online experience address issues of management rather than learning outcomes. By sharing rich media over the internet, and employing sound assessment strategies and design, there are no insurmountable barriers to the creation of a world-class online STEM lab experience.

Next week, we'll discuss our final topic in this five-part series on STEM lab courses. We'll consider *Emerging trends in online STEM lab design*.

FURTHER READING

Rowe, R. J. , Koban, L. , Davidoff, A. J. , Thompson, K. H., 2017. Efficacy of on-line laboratory science courses. *Journal of Formative Design in Learning*, 1, 1-12.