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Rethinking the Prelab Quiz

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Extended Abstract

Adequate student preparation before lab is vital to achieving learning goals, obtaining interpretable lab results, and having students feel capable, empowered, and excited. Many lab curricula seek to give that preparation through pre-lab readings and videos with a subsequent quiz at the beginning of lab time. While this strategy is reasonably effective, it can cause considerable stress for students (even though these quizzes are often a very token part of the grade) and consumes valuable lab time. During this ABLE mini, variations on the traditional lab quiz were discussed. Summarized below are the ideas generated including online quizzes before lab time, group testing, alternatives to quizzes, grading approaches, and pre-lab materials.

Thoughts on Lab Quizzes

1. Move pre-lab quizzes to an online format done before the start of lab. These quizzes would generally be open book and either untimed or, very generously timed, lowering stress, and freeing up structured lab time for activities and discussions
2. Choose an appropriate window for quiz submission. Many instructors indicated they would not accept quiz submissions more than 48 hours before the start of lab, thinking that much of the benefit of the preparation would be lost if done too far in advance while others would allow submission up to one week ahead.
3. Allow students multiple tries as a quiz, typically two. This has several benefits: it lowers stress, provides a contingency for technical issues, and allows students to learn from their mistakes the first time. Most but not all instructors felt it was inappropriate to give students multiple opportunities at the same quiz – obviously, this involves more work creating multiple quizzes or a bank of questions.
4. Include both old and new material on the quiz since students have difficulty seeing the big picture over multiple weeks.
5. Have group quizzes. Those who were in favor of them tended to have higher expectations, including more conceptual and open-ended questions, and more structure, like a group work contract that explains the expectations of your contributions to your group and how that will impact your grade.

Quiz additions and alternatives

1. Complete materials in addition to a quiz including imbedded video questions or worksheets but prohibit fast forwarding or viewing of online videos for pre-labs at faster than normal speed to deter students from gaming the process just to get the answers.
2. Create a lab outline. Participants mentioned outlines were a laborious but more effective approach to learning. Many who used this strategy felt they needed to explain how to make an effective outline at the course's beginning. One approach that reduced grading was to give a traditional brief beginning-of-lab quiz which is open outline – this also fostered student collaboration before lab as they worked together on their outlines.
3. Create a lab flowchart. This helps the students to better understand the order of the procedure and potentially why

each step is done. Variations on this idea included:

a. having a flow chart partially filled out and having the students fill out the rest
b. providing the students with the pieces or a set of key phrases to go into the flow charts
c. asking specific questions, like "What is the purpose of this step?"

Grading pre-lab assessments

Opinions differed on grading approaches. Students tend to be very grade driven. In contrast, some instructors said that students putting in the effort is really what they care about most, not their performance on the quiz. However, grading one another was seen as highly beneficial when wrong answers should be corrected and noted right away, like in matters of safety. Alternatively, an un-grading approach, as presented at the ABLE poster session by Aisling Brady, in which students take an automatically graded online quiz, then get a password to the key, and later need to justify their grades was seen by some as a good alternative to traditional grading.

Conclusions

While all the above strategies were appreciated and had benefits, many acknowledged that a simple, short, easy to grade lab quiz at the beginning of lab was reasonably effective at assuring preparation, did not take up too much lab time, and had the added benefit that students were more likely to be on time. This was made even better if any additional prelab lecture could be organized around the quiz (or the quiz organized around the lecture) so as to go over the answers.

This old-fashioned approach suggests another theme of the discussion – while many approaches might be flawed in some respects and one should look to improve instruction where one can, sometimes we can let the perfect be the enemy of the good. For example, some very effective approaches outlined above take much upfront instructor effort, and while these might be quite valuable in all courses, it is not reasonable to expect this sort of effort in a small upper-level lab course that might only be taught once or twice. Similarly, if your course goals involve improving lab notebook skills, the creation of a lab outline might be preferred approach. There is no single best approach.

Keywords: prelab quiz, student preparation

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