

MAKING LAB 'PRE-WORK' WORK

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KEYWORDS: multimedia learning, online assessment, physics education

BACKGROUND

Laboratory classes are a key part of first year physics but, for many students, the objective is to complete the task and get out! How do we engage students more effectively with the lab experience?

One means of increasing engagement is 'pre-work' completed before the lab classes. In higher years this might involve some research on the topic of the experiment but, for very structured first year experiments, the more limited goal is to get the students thinking about the theory and practice of the experiment before the lab class. To be of benefit to students, the pre-work needs to be marked and good feedback provided, but this can occupy a significant proportion of student and tutor time in the lab class.

AIMS

We have begun a program to move our lab pre-work from a pen-and-paper exercise to online learning, offering:

- Multimedia learning with images, videos and animation combined with a voice over;
- Segmentation of short pieces of information interspersed with assessment questions;
- Interactivity for students to guide their pace of learning;
- Instant feedback on student performance.

The primary aim is to offer students a much improved introduction to the apparatus and the physics of each session so they better understand what they will be doing. Online delivery also offers:

- Saving time in the lab sessions currently used by pre-work marking and introductory talks;
- Trimming lab manuals of material that students typically don't read anyway!

Balanced against this are some potential disadvantages to be managed:

- Potential loss of interaction between tutors and students about pre-work, although this loss can be minimised if the online feedback is good;
- Management complexity in providing pre-work when students are rotating through a variety of experiments in different order during the semester.

DESCRIPTION

The pre-work has been implemented using Adobe Captivate® to provide a mix of explanatory text, multiple choice and numerical questions and short instructional videos, integrated into the Blackboard learning system. Pre-work modules are selectively released to students based on their timetable of lab experiments, while marks are automatically captured in the Blackboard Grade Book.

To date we have trialled two forms of pre-work. The first and simplest is essentially an online quiz, covering theory, equipment and experimental techniques. The student is referred to the lab manual for the information needed to do the quiz. The more complete version alters the pre-work substantially by using text, images and video content to introduce the experimental equipment and procedures alongside the theory.

RESULTS

Student surveys indicate that online pre-work is popular and a better introduction than its paper-based precursor. Even without the instructional content, 20% more students reported that the pre-work quizzes helped them understand the equipment and techniques, compared to the paper-based versions. The complete version, with video content, is even more popular, with 82% of students agreeing that the extra information in the pre-work module was useful to them.

Proceedings of the Australian Conference on Science and Mathematics Education, University of Sydney, Sept 29th to Sept 30th, 2014, page 91, ISBN Number 978-0-9871834-3-9.