

EVALUATING UNDERGRADUATE, LABORATORY-BASED LEARNING EXPERIENCE IN PHARMACOLOGY

Hilary Lloyd^a, Tina Hinton^a, Alexandra Yeung^{b,c,d}

Presenting Author: Hilary Lloyd (hilary.lloyd@sydney.edu.au)

^aMedical Sciences (Pharmacology), The University of Sydney, Camperdown NSW 2006, Australia

^bInstitute for Innovation in Science and Mathematics Education, The University of Sydney, Camperdown NSW 2006, Australia

^cSchool of Physics, The University of Sydney, Camperdown NSW 2006, Australia

^dDepartment of Chemistry, Curtin University, Bentley WA 6845, Australia

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ABSTRACT

The distinctive role of laboratory-based teaching in science education is well recognised but whether the expected benefits of this style of teaching on student learning is realised is dependent upon multiple factors. Learning is a complex process, affected by different styles of learning and the educational learning space in which it occurs. For laboratory work to enhance student learning, laboratory experience needs to be positive. To evaluate students' experience of laboratory-based learning in an undergraduate pharmacology course, we have used survey instruments developed and supported by ASELL - Advancing Science by Enhancing Laboratory Learning (<http://www.asell.org/>) with a view to improving student learning outcomes.

At the University of Sydney, pharmacology is taught primarily to students enrolled in either a Bachelor of Science (BSc) or Bachelor of Medical Science (BMedSci) degree program. The unit of study "Pharmacology: Drugs and People" (PCOL2012) is offered in 2nd year, 2nd semester. Face-to-face teaching consists of 26 lectures, six workshops and four laboratories (two wet-labs and two computer-based, dry-labs).

In the present study, two survey instruments were used to evaluate students' laboratory experience. The first, *Laboratory Program Evaluation* was used to evaluate the students' overall experience of laboratory teaching within PCOL2012 and the second, *Student Evaluation of an Experiment* was used to evaluate students' experience of a specific wet-lab experiment entitled: "The effects of drugs on peristalsis in the guinea-pig ileum *in vitro*". This experiment illustrates how drugs can be used to unravel physiological mechanisms controlling gut movements. Students are required to do pre- and post-lab work (creating a flow chart of experimental procedures, experimental data analyses and report writing).

The surveys consisted of 14 closed questions and five (survey one) or four (survey two) open-ended questions. In each survey, the final question was: "Overall, as a learning experience, I would rate the experiment/these labs as" For PCOL2012, only 37% of students rated the overall laboratory experience as good or better. In contrast, the experiment "Drugs and Peristalsis" was rated by 65% of students as good or better. In reviewing comments, one criticism noted about the second wet-lab in PCOL2012 (entitled "Cholinesterase and Inhibitors") was the use of a semi-quantitative colorimetric assay to determine the hydrolysis rate of substrates by acetyl- and butyrylcholinesterase. To address this issue, we have revised the experiment for 2014. An ultra-fast, scanning absorbance microplate reader (SPECTROstar Nano, BMG LABTECH) will be used to measure, and display, the rate of hydrolysis in each of 48 wells. Additional changes will include holding the wet-lab in the recently opened "super-lab" (X-Lab, Charles Perkins Centre, The University of Sydney), with state-of-the art ICT support, and using LabTutor, ADInstruments (<http://www.adinstruments.com/products/labtutor>) for pre-lab work and to replace hard copy manuals. The revised wet-lab will be evaluated using the second of the ASELL survey instruments (see above). Details of ratings and comments will be reported in the presentation.

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