

USING TECHNOLOGY TO DEVELOP TRANSFERABLE SKILLS AND ENHANCE THE LABORATORY EXPERIENCE IN FIRST YEAR CHEMISTRY

Dino Spagnoli^a, Shannan Maisey^a, Tristan D. Clemons^a, Nikki Y.T. Man^a, Siobhan Wills^a, Isaiah T. Awidi^b, Mark Paynter^b

Presenting Authors: Dino Spagnoli (dino.spagnoli@uwa.edu.au) and Shannan Maisey (shannan.maisey@uwa.edu.au)

^aSchool of Chemistry and Biochemistry, University of Western Australia, Crawley WA 6009, Australia

^bCentre for Education Futures, University of Western Australia, Crawley WA 6009, Australia

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Background

The laboratory has the potential to be a rich learning environment for students in any science discipline. (Hofstein and Lunetta 2004) The evolving nature of the job market in the 21st century has demanded that graduates leave university equipped with a broad range of generalised attributes. From an early stage in tertiary education, laboratory classes must reflect this need by actively highlighting skills such as: communication, problem solving, critical thinking and teamwork as well as practical competency. Herein lies the problem for educators in that these skills are inherently logistically difficult to assess and require a degree of self-reflection in order to be properly developed. Thus laboratory classes, associated assessments and learning resources must be adapted to provide students with tangible evidence of their development of these skills and to provide opportunities for institutional and self-directed feedback. (Galloway and Bretz 2015)

Aims

This project aims to develop technology-enhanced methods to highlight and enable students to receive automatic feedback on a particular generic skill that is being assessed in a laboratory. We have two objectives in this project:

- To develop pre-laboratory activities which enhance problem solving and critical thinking skills.
- To develop a usable, motivating online feedback system to assist students to develop and track practical skills attainment over the course of their unit.

Design and methods

To evaluate the impact of the pre-laboratory activity students were asked to complete a survey, which aimed to answer the following research questions:

- Did the pre laboratory activity prepare students for the laboratory practical?
- Did the pre laboratory activity stimulate the students' curiosity for the laboratory practical?

To evaluate the impact of an online feedback system to develop and track practical skills we asked students to complete a survey, which aimed to answer the following research question:

- Are the practical laboratory skills (and in-situ recall of practical theory) of students performing recrystallisation experiments improved by providing feedback in the form of online self-directed development exercises before subsequent attempts of those skills?

We will also administer interviews with lab demonstrators about the techniques they use to teach and give feedback on practical skills as well as how they perceive students to perform specific tasks and their knowledge of specific practical theory.

Results and Conclusion

Preliminary data will be presented on two surveys given in semester 1 2016. Results from the first survey indicate that while students feel well prepared for the laboratory, more work is needed to stimulate their curiosity about the experimental procedure. Initial results of the second survey will provide the baseline of knowledge that students have of the recrystallisation laboratory skills in the current format. We will also gain insight from the demonstrators on how they perceive student development of practical skills. We will discuss the direction and approach we are taking in semester 2 2016 based on the preliminary data to improve and integrate feedback and assessment of practical, problem solving and critical thinking skills in the first year chemistry laboratory.

References

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