



PTAS Project Report (for SMALL PROJECT GRANTS)

Project Title: Developing Context-Based Physical Chemistry Laboratory Investigations

Principal Investigator : Scott Moonie
School / Department : Chemistry

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Grant recipients are expected to submit a brief report at the conclusion of their project which outlines briefly the following: nature of work completed; outcomes; benefits to student learning/student experience; dissemination activity (where relevant – actual and planned) and how the activity could inform future work or be transferred to other subject areas in the University. The brief report will be published on the IAD web pages.

Brief Report (maximum 500 words)

What did you do?

We developed a new curriculum approach to teaching advanced laboratory work in chemistry. The central idea was to structure students' learning around experimental design. Typically this is problematic, because the jump from routine lab work to investigative work is too great. Therefore we designed a curriculum where students completed laboratory experiments in two parts – the first part was structured, so that students familiarised themselves with the experimental equipment, data outputs, analysis approaches, etc and the second part was unstructured, where students had to use the skills gained in an investigation. We call this approach “unfinished recipes”.

What did you find out?

The new approach worked very well. We found that students had a much better sense of what they were doing; students were able to plan their work and begin investigations much more coherently. And students really enjoyed it! We moved from a situation where these labs were a source of frustration and complaint to one where students reported enjoying doing this work.

How did you disseminate your findings?

Conference presentations on this approach were given at a major international conferences: 7th EuCheMS Conference in Liverpool and garnered a lot of interest as well as workshops in University of Liverpool, University of Maynooth, Ireland, and University College Cork, Ireland. We also published a journal article on this approach to share with others, and this is now on the internet at: <https://pubs.acs.org/doi/10.1021/acs.jchemed.8b00511>. In all cases, the support of PTAS is acknowledged.

What have been the benefits to student learning?

Students have gained greater experience in experimental planning. While this is still difficult at the advanced level, because it is done in a more structured way, students are able to work through the stages of planning and dealing with set-backs in a much more organised supported way.



How could these benefits be extended to other parts of the university?

There are lessons to be learned for any area of curriculum involving complex planning or organising. We will share the results at the Assessment and Feedback in the Sciences event in 2019 and the university Teaching and Learning Conference.

Who can be contacted for further details?

Michael Seery, Director of Teaching, Chemistry (michael.seery@ed.ac.uk).