

QUALITY REVIEW

APRIL 2017

CASE STUDY

**PAL (Peer-Assisted Learning)
for First Year Chemistry**

Origin:

First year chemistry is taken by students across a number of entry streams, including food and nutritional science, environmental science, biological science, physics, and chemical sciences. Thus, the students have very diverse backgrounds and expectations. Some are very interested in pursuing chemistry to degree level and beyond, many of these students have a strong chemistry background and high grades in chemistry in their Leaving Certificate (school leaving exam). Others, with little or no chemistry background, need to reach a certain level of competency in the subject for future study in other areas. While delivery of material in first year chemistry lectures assumes very little knowledge, it is not possible to slow the pace sufficiently for students who are less familiar with the material without compromising the overall standard and quality of the course. Thus there is a need for extra support beyond the lecture-hall.

Rather than providing this using “traditional” tutorials, Chemistry decided to develop a peer-to-peer support system whereby 2nd to 4th year chemistry undergraduate students would be recruited and trained to act as peer-assisted learning (PAL) leaders for first year students. Our objectives were twofold:

- (i) to support and enhance the learning experience of first year students
and
- (ii) to provide second to fourth year students with the opportunities to develop their communication skills and to revise key concepts in chemistry.

PAL for chemistry has been in operation since 2008-2009; PAL schemes for first year students in other disciplines (e.g. physics, maths) in SEFS (Science, Engineering and Food Science) have since been introduced, thus providing additional support to first years across the physical sciences.

Purpose

The overarching aim of the PAL scheme is to provide first year students with a disciplinary induction into chemistry, thus facilitating their understanding of the subject, and easing their transition from secondary school to university. Thus this initiative aligns with national policy priorities for Transition to Higher Education.¹

Because it is a peer-to-peer support scheme, a further purpose is to afford undergraduates from second year onwards an opportunity both to enhance their communication skills and to consolidate their understanding of basic chemistry concepts by acting as PAL leaders.

The design and implementation of the PAL for chemistry scheme has been modified since its inception and the focus of this case study is the current scheme with data from the academic year 2015-2016

¹ The PAL scheme preceded the recommendation of the National Strategy for Higher Education to 2030 (the Hunt Report) that institutions should take deliberate steps to better prepare their First Year students to engage successfully in learning

Design

The scheme is designed to provide student-to-student support for first year undergraduate students taking chemistry. The material covered during PAL sessions is directly related to the course content of the first year chemistry modules taken by the students; the lecturers on these modules review PAL material related to their part of the course thus ensuring that the PAL sessions are delivered in the context of the lectures.

Students are organised into groups requiring similar levels of assistance. Three to four PAL leaders are assigned to each group, thus providing flexibility within each group. Through observation of the students at work, groups can be sub-divided into smaller groups of those having similar learning paces. Typically the sub-groups have no more than four students, thus encouraging interaction through discussions and question-and-answer sessions and enhancing the transfer of knowledge between peers

An essential part of this scheme is that PAL leaders are trained to provide this peer support. Specific training is provided through the [CM0003 Peer Assisted Tutoring Sessions](#) module. The objectives of this module are: (i) to introduce students to teaching techniques and methods (ii) to reinforce and revise their basic chemistry knowledge through transferral of knowledge to their peers and (iii) to develop necessary skills in order to facilitate group discussion and learning. All students who have passed their first year chemistry modules are eligible to take the CM0003 training module.

Implementation

A team of people is responsible for the coordination of PAL within chemistry including a dedicated PAL coordinator and PAL instructors.

The scheme is open to all students taking first year chemistry modules² irrespective of their subsequent degree pathways. Thus not only students who may undertake further studies in chemistry-related programmes, but also environmental science students or food and nutritional sciences students have the opportunity to sign-up to PAL sessions. Students are informed about the scheme during their orientation, via Blackboard, and in their first lecture. Initial assignment of students to groups is according to self-assessment of their own needs however, if necessary, groups can subsequently be rearranged by coordinators/leaders in order to group students of similar needs.

There were fourteen PAL sessions scheduled in total in '15-'16, seven in each semester. The sessions began in the third week of the first semester. A typical session offers opportunities for question-and-answer sessions and/or coverage of approaches to past examination papers. Each PAL session lasts for 60 to 90 minutes. The pace of the session is determined by the needs of the students in each group. Topics covered in PAL sessions each week are closely aligned to that week's lectures, and are reviewed by the relevant lecturer each week.

² With the exception of first year engineers who take a chemistry course designed specifically for their needs.

A key requirement is that PAL leaders are familiar with the material to be covered in each PAL session. To ensure this, PAL leaders are given briefing sessions in advance of each PAL session, and have time to reflect on the topics and contact the PAL instructor with any queries before the particular session. The briefing sessions are led by a staff member with a qualification in Teaching and Learning in Higher Education with assistance from chemistry graduate students. The material covered in each session is put in a briefing booklet which includes background material on the topic, worked examples, and exam-type questions.

A further feature of the scheme is the PAL leaders' presentation day. In order to consolidate their learning, each PAL leader made a short presentation at the end of semester 2 to an audience including the other PAL leaders, the PAL coordinator and PAL instructors. Leaders were asked to prepare a short presentation on how to go about answering a typical exam question, with particular emphasis on how to make the approach memorable for the student.

The commitment of the leaders to the programme is shown by the fact that all 42 PAL leaders who volunteered in '15-'16 attended at least 10 of the 14 PAL sessions and no leader missed more than two sessions. In addition, several of the leaders had previously completed the CM0003 module and so had returned to the programme purely on a voluntary basis. These "senior" PAL leaders play an important role in supporting and advising new PAL leaders.

First year students attend PAL sessions on a voluntary basis, although are requested at the start of the year to commit to as many sessions as possible. In '15-'16, 161 students turned up for the first PAL session. Of these 123 attended subsequent PAL sessions. The average attendance for PAL sessions through the year was 100 students which is a positive indicator of the perceived usefulness of the scheme.

Review: Main outcomes

Since its initial implementation in 2008/09 the scheme has been successful in enhancing student learning in terms of its primary objectives.

- Participation rates and the active commitment of students both at 1st year level and later years of the programme indicate that students perceive a learning benefit.
- Feedback from 1st year students specifically indicates that PAL is a very helpful part of their first year course.
- Reflections from PAL leaders show that the PAL scheme provides them with invaluable experience both in revising key concepts and in developing communication skills.
- A quantitative measure of the impact of the scheme is the number of students participating year on year.
- A further indication of the impact of the scheme is the wider adoption of the approach within SEFS.