[P16] RRICE: recruitment and retention in a chemical environment

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BACKGROUND: THE UNIVERSITY OF GLASGOW

Faculty Entry system. Science students are admitted by a central Admissions Office to the Science Faculties, and study a broad curriculum for the first one or two years, choosing their degree subject as they enter their third year. Chemistry therefore constitutes one third of a typical first-year science degree, with around 400 students taking 'Chemistry-1'. All students entering the course are required to have a good pass at Scottish Higher Chemistry or equivalent, and the course approximates very roughly to English A2 level. There is no segregation at first year level between potential chemists, and those who are taking chemistry as a requirement for a different degree. In a typical week, students attend three lectures, one problem session, and one 3-hour laboratory class. There is no small-group teaching, and lab experiments are carried out in pairs, with 60-80 students in the lab at any given time. At level 2, students may take chemistry as either 25% (about 40 students) or 50% (about 100 students) of their curriculum, by taking either or both of 'Chemistry-2X' and 'Chemistry-2Y' These 'courses approximate very roughly to English University first-year level. A student taking both X and Y typically attends five lectures a week, and either two 3-hour lab sessions or a (paper-based) group-work exercise, with small-group tutorials fortnightly. About 50–70 students are in the lab at any given time, with experiments carried out individually or in pairs. Although single-course students cannot continue with chemistry beyond this level, no distinction is made between potential chemists and other students.

In Glasgow University Chemistry Department, we are therefore involved with Recruitment and Retention over three periods: school level; a large first year class with a minority of future chemists; and a small second year class with a small majority of future chemists. Although students name a degree subject on their UCAS forms, they are in no way bound by this choice, and many graduate in a different subject, so recruitment and retention are both active and vital to the health of the department. This poster will present some of our recent approaches to RRICE with current under-graduates.

WHAT WORKS WELL AND WHAT NEEDS IMPROVEMENT?

Standard student feedback questionnaires, and informal verbal feedback, have in recent years indicated several strong likes and dislikes among the student body. *Laboratories appear to be unpopular*, while *group work at second year level has received very positive comments. Our approachability and 'open door' policy within the department is very highly appreciated*, and seems to be one of our greatest assets. The last two points will be explored further on the poster. We decided to probe students' likes and dislikes further at first and second year level, particularly with respect to the apparently unpopular lab classes, using more focussed questionnaires.

RECENT CHANGES TO LABORATORY TEACHING

The questionnaires were timely since our junior labs are in the process of redevelopment, to improve students' experiences and to reflect changing staffing within the Department of Chemistry. This year (2004-5), our second year students experienced the old-style 5-week Physical, Organic and Inorganic labs (in that order), while the first years had the first running of our new 8-week Synthetic and Quantitative labs. The Synthetic lab incorporates the old Organic and some Inorganic experiments, while the remaining Inorganic join the old Physical experiments to form the Quantitative lab. Although the experiments are thus changing relatively little, we have taken the opportunity to change the lab books more extensively. In particular, we were dissatisfied with the standard of report-writing, and felt students were under-prepared for this skill. First years therefore now have 'fill-in-the-blanks' report forms to show them what we expect to be incorporated into a report. Second years are required to complete independent reports in a separate hard-back lab notebook. Most of our lab reports, for both years, incorporate both 'pre-lab' and 'post-lab' questions. Other areas in which students seemed under-prepared included basic skills in handling both quantitative equipment (burettes etc.) and numerical data, so a new exercise to improve these aspects was developed to introduce the Quantitative lab at level 1.

STUDENTS' EXPERIENCES IN TEACHING LABORATORIES

We had several ideas about why students disliked lab classes. Based on our own experience, and students' comments, we suspected that school lab teaching was a poor preparation for the large labs encountered at University, which can seem intimidating. Increasing concerns about health and safety have reduced the range of chemicals available in school labs, so we wondered whether students found the actual experience of handling chemicals exciting or daunting. We know that the time required to complete the labs is much greater than that apparently required to attend lectures, problem classes, tutorials, etc., while the contribution to the final course assessment is relatively small (10% for labs, 50% for the June exam, and 40% for other continuous assessment for both years). One reason for maintaining this small 'reward' is the difficulty of preventing plagiarism in lab reports. We probed opinions on the importance of labs, on the extent of plagiarism, and on what aspects of the lab reports students felt took 'too much time'.

The questionnaires took the form of a series of statements, the students being asked to indicate how far they agreed or disagreed with each proposition. The take-up was pleasing, with return rates greater than 50% in each year group. The results of these questionnaires will be presented in greater detail on the poster, but here are some of our more interesting, and some of our more encouraging, results.

- Especially in first year, students clearly find working with 'real' chemicals and equipment satisfying.
- Students overwhelmingly enjoy working in pairs, but a significant minority strongly dislike group work.
- First year students were more likely to have enjoyed the labs, and to have found them 'lively and stimulating', and most students either enjoyed the labs or at least had no strong feelings against them.
- First year students were rather less likely to find the new-style write-ups 'too long and difficult', compared to the second years' response to the old ones.
- The longer new labs, as intended, enabled students to feel confident and efficient by the end of each lab.

- Opinion on whether ‘School labs were good preparation for University labs’ was divided, with significantly less agreement from second year than from first year.

- 2nd year students were more likely to find the labs intimidating at first, despite having seen them before. Our new structure seems to have eased the transition for the students who have experienced it.

These conclusions suggest that our new structuring has significantly improved students’ experiences in our laboratory classes.