Flexible delivery of communication skills to science students: a faculty-wide project

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Abstract: Science graduates need to be effective communicators. Improvement in communication skills may also improve general learning outcomes by enhancing critical thinking ability and understanding of the subject material. It is generally acknowledged that students acquire communication skills most effectively when they are explicitly taught and embedded within the science curriculum. Our faculty-wide project has developed a program that provides all science, engineering and technology students with appropriate instruction in discipline specific tertiary literacy skills. At the core of the project is a web-based resource that is accessible by all students and all academics of the faculty. This interactive instructional resource supports the development of academic writing skills, essay and report writing, and oral communication skills. The resource contains discipline-specific material that may be used by students individually or incorporated into classroom activities. The resource also contains teaching and assessment tools to help staff integrate communication skills into their own curriculum. The impact of the project upon learning outcomes for students across the faculty is being assessed throughout 2003. This paper describes the development of the resource, and illustrates ways in which it is being incorporated into teaching.

The influence of multimedia resources in and out of biomedical studies

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Abstract: With respect to the provision of learning support materials, it is generally accepted that enriched learning environments are better than simple didactic sessions and consequently improved resources ultimately lead to better learning, which in turn leads to improved grades. The use of a dedicated multimedia teaching room specifically set up to create a learning environment for biomedical science within a nursing program has been documented and correlated with the student's final mark and course retention. The significance of this study is that the results and retention for biomedical science studies are further compared to studies in which the resource room would have been of no benefit. Failure rates and course retention rates were not significantly different between students who did not use the facility (n=237) and those who used it only once (n=47), however there were demonstrable differences between the first group and students who accessed the resource on multiple occasions (n=203). However the results of those students using the resource, show that they were significantly disadvantaged in non-biomedical studies where the availability of the resource did not assist them. Within the limitations of the study, the data does support the premise that access to dedicated teaching materials improves learning, which translates to better grades.

Designing an assessment task for scientific report writing using a mastery goal approach to ensure self-evaluation and application of feedback

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Abstract: By identifying the report writing skill deficits of students drawn from a cohort of mixed abilities, an assessment task for scientific report writing was developed. After first submission of a report based on a laboratory exercise, a cohort-specific marking scheme was developed by the academic based on the skill deficiencies of the student group. After the return of ungraded reports together with the marking scheme, self-evaluation and/or peer review was possible. The opportunity to amend the report allowed for direct application of feedback. Using this methodology, improvement of the skills of the entire student population was possible, regardless of the abilities of the student prior to the assessment task. The resubmitted report resulted in elevated marks compared with those that would have been obtained after first submission; rewarding the student for the application of feedback. Positive outcomes arising from this task were that students of varying aptitudes were able to measure their own skill improvement against tangible criteria, and were also able to enjoy a degree of learning success independent of the ranking within the group.

Independent field-based projects in behavioural ecology for 'deep learning'

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Abstract: A project is currently being conducted which aims to assess student's learning experiences of an independent field-based activity in a third year course offering in *Ecology* at the University of Newcastle. Students as part of the course are required to carry

out independent fieldwork on an animal species of their choice documenting the subject's behavioural repertoire and subsequently creating and testing hypotheses about the behaviours observed. The activity has been designed based on Ramsden's (1992) principles of a student-centred approach to learning which aims to create a learning context which fosters a 'deep-approach' to learning. A deep approach is characterised by an intention to understand, focussing on the concepts applicable to solving problems (hypothesis testing), relating previous knowledge to new knowledge and has an internal or intrinsic motivational emphasis. Deep approaches empower students to take an active and independent role in their own learning experiences. Preliminary results of student feedback via a questionnaire and a series of open ended written responses will be assessed examining the success of the activity in terms engendering independence and internal motivation, encouraging problem solving skills and thus fostering a deep approach to student learning.

Reference

Ramsden, P. (1992) *Learning to Teach in Higher Education*. London: Routledge Press.

Teaching biochemistry differently: collaborative peer group activities in large classes

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Abstract: Traditional university teaching of undergraduate biochemistry is generally delivered in lectures and laboratory classes. Online teaching environments have recently enabled different approaches to content delivery and assessment. By developing an online repository of content (lecture notes, exercises, formative and summative assessment), the academic can now construct new teaching and learning methodologies and experiences for the student, since formal lecture time can be reduced and replaced by other learning activities that promote active student involvement. We have designed and implemented a new teaching and learning initiative for second year Biochemistry involving collaborative learning in Peer Groups (Dobos, Grinpukel, Rumble and McNaught 1999; Dobos 2001). In this program, students are engaged in structured discussions, problem solving and concept mapping exercises, and seminar preparation, in a collaborative group setting. Additional sharing of ideas occurs through student-generated materials, Web Board online asynchronous discussions and group seminars. The Peer Groups are facilitated and managed by the students. The Peer Group program enables the students to actively engage in a discourse on biochemical concepts and adopt different approaches to learning. Furthermore, through participation and practice, the students are improving their communication and teamwork skills necessary in the workforce. In this paper we report on further developments of the program in response to student feedback, and its implementation in large classes. Our findings indicate that the group activities need to be carefully designed and structured, and closely aligned to the other learning activities of the curriculum, in order to provide maximum benefit to the students. The timetabling of classes, institutional infrastructure and student resources are critical to the efficacy of the program and the learning experience of the student.

References

Dobos, M., Grinpukel, S., Rumble, B. and McNaught, C. (1999) *Learning Biochemistry in Peer Groups Facilitates and Enhances Student Understanding*.

Dobos, M. (2001) Learning Biochemistry in Peer Groups: a new approach which enhances the student experience. *Proceedings of the Research and Development into University Science Teaching and Learning Workshop*. Sydney: UniServe Science.

Integrating activities, e-environment and objective driven curriculum design in the learning environment

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Abstract: An objective driven curriculum design with experiential learning activities, and e-learning are integrated into the learning environment, resulting in increased student satisfaction, enjoyment, and assessment results. Curriculum objectives, used as the basis for the curriculum design, are assigned to module topics and assessment items, becoming the drivers for key concepts highlighted in lecture and tutorial activities. Sparse lecture notes are supplemented by summarized outcomes at the end of the week. As content is replaced with experiential activities, students develop an application of knowledge in the learning experience, with direction to additional resources for details. The knowledge gained from the directed readings and experiential activities form student knowledge for implementing their practical assignments. The use of an e-learning environment complements the process with online discussions, student portfolio management, and assignment submission and assessment. Some students feel they haven't learnt much with real life examples, activities and experiences as the tools for the learning approach. Others see the big picture and find the experience highly rewarding. Additional key elements for the curriculum design include a team-based teaching approach with tutor input to teaching activities, and tutor and student reflection used to improve the curriculum design and delivery, on a weekly and semester basis.