



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

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Science graduates need to be effective communicators: they need to be able to write concisely and clearly in an appropriate format, and they must be confident at oral presentations. Increasingly employers are seeking evidence of the development of such key generic skills during a degree program. Moreover, there is increasing evidence that improvement in communication skills may also improve general learning outcomes by enhancing critical thinking and analytical skills. It is also clear that students acquire such skills most effectively when they are embedded within the general curriculum and presented in a discipline-specific context (Bowden, Hart, King, Trigwell and Watts 2000). However, while academics frequently express concern about their students' ability to communicate effectively, they often feel they lack the expertise and confidence to teach these skills explicitly (Burkill, Corey and Healey 2000).

This project drew together academics from across the Faculty of Science, Engineering and Technology to develop a faculty-wide approach to embedding the teaching of communication skills within the science curriculum. The team also included project-dedicated staff, specialist educational developers from the Flexible Education Unit and representatives of other faculties. We have developed a program that provides all Science, Engineering and Technology students with instruction in tertiary literacy, and, importantly, provides the staff with ideas and support material for teaching and assessing communication skills effectively within their own discipline. At the core of the project is a web-based resource, accessible through WebCT to all students and staff of the faculty. The Scientific Communication Skills resource contains: instructional material for students on written communication skills (the *Scribble* web site), instructional material for students on verbal communication skills (the *Babble* resource), and practical tools for teaching staff who want to incorporate communication skills into their subjects.

*Scribble* includes modules in Academic Writing, Essay Writing, and Report Writing. The modules contain instruction, discipline-specific examples, interactive activities, practical tools, and complete well-written and poorly-written sample student essays and reports. *Babble* provides guidelines for developing and delivering oral presentations. The material is specifically tailored to the needs of students studying science and engineering courses at the University of Tasmania. In the case of *Scribble*, students select one of five discipline categories and all material is then presented in a discipline-specific context. A substantial effort was made to develop imaginative discipline-specific examples, in order to generate and maintain both students' interest in the material and their recognition of its validity and relevance to their study.

While the material for students can be used by students working independently, the resource is designed to be incorporated into units. The Scientific Communication Skills resource therefore includes practical tools for teaching staff who want to address communication skills within their units. Resources for staff include: discipline-specific models of scientific or technical reports, essays, and oral presentations; sample assessment criteria and marking sheets linked to instructional material in *Scribble* or *Babble*; tools for facilitating peer marking exercises; quizzes to assess



student skill levels; and evaluation tools. A sub-group of the teaching staff involved in the project piloted implementation of the resource during the 2003 academic year, using the tools provided by the resource. For example, a chemistry lecturer, in collaboration with project staff, tailored the marking sheets provided by the resource to his practical lab assignments, led an in-class tutorial introducing the resource and his assessment criteria, and facilitated an in-class peer marking exercise where students used the marking sheet to assess a student report from the previous year. The lecturer used the marking sheet, which provided links to the relevant Scribble pages for each criterion, for each of the unit's four practical reports, giving students a means for improvement in specific skill areas.

Evaluation of the resource and its incorporation into teaching on learning outcomes is in progress. The evaluation includes:

- feedback from members of the staff pilot group, using interviews, to gauge their perception of the usefulness of the resource
- feedback from students, using questionnaires and focus groups, to determine their perceptions of the Scribble and Babble resources, the scientific communication skills workshops, and the inclusion of relevant assessment and marking criteria into their assignment work; and
- independent marking of written assignments to assess changes in student skill level. This includes both 1) comparison of written work from early and late in semester- and year-long units involved in the pilot implementation and 2) comparison of written work collected in 2002, prior to inclusion of explicit teaching of written communication skills, with written assignments collected in 2003 from units involved in the pilot implementation.

Initial results are positive. Teaching staff have reported that development and use of the resource has impacted constructively upon their teaching, primarily by giving them further knowledge and confidence in teaching and assessing communication skills. The majority of students surveyed found the resource and associated learning exercises were useful, and many felt that the quality of their assignments had improved as a result. The Scientific Communication Skills resource thus provides flexible paths into improved learning outcomes from both the staff and the student perspective.

### **Acknowledgments**

We acknowledge the enthusiastic participation of the project reference groups, the evaluation consultant Dirk Koudstaal, and the expertise of the instructional designers. The Essay Writing and Report Writing modules within Scribble were developed through a collaboration with Unilearning, University of Wollongong. This project was funded by a Teaching Initiatives Grant from Prof. Sue Johnston, PVC Teaching and Learning, University of Tasmania.

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