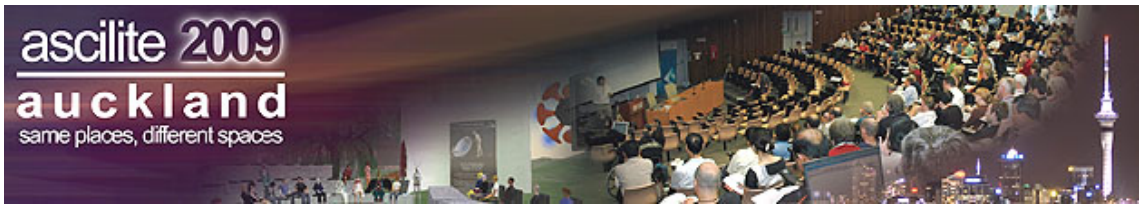

New media to develop graduate attributes of science students

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This interactive session draws on the expertise of participants to assist development of materials for teaching 'new media communication skills' to university science students. By enabling students to become the source of multi-media content, lecturers can teach them valuable professional skills through the 'authentic' learning task of catering to real online audiences.

Keywords: new media, graduate attributes, science, authentic assessment

Purpose of the ALTC 'New Media for Science' project

This project is designed to develop the graduate attributes of science students via science communication, specifically through student publication on the web. The web has become a medium of learning and publication that students find engaging, staff increasingly see as practical, and employers value as relevant. The web also offers ready opportunities for cross-university and international collaboration.

We are funded by the Australian learning and Teaching Council (ALTC) to identify, develop, and disseminate teaching strategies and resources suited to large classes in science, strategies that have students creating "new media," such as podcasts, blogs, webzines, and web sites. New media are an appropriate focus not only because of their increasing relevance professionally but because they engage university students in authentic tasks and work-integrated learning, strategies that have proven effective in development of graduate attributes.

These outcomes have been demonstrated by project team members over the past decade, *e.g*., student-created 'Day in Science' web sites at UNSW, which provide career guidance for high school students (Rifkin, 2007; www.adayinscience.net) and science videos produced by students at the University of Otago that are reaping a high volume of visits on *iTunes University*.

Science communication is the focus because the field encompasses key graduate attributes of written and oral skills, teamwork, ethics, and critical thinking, areas where studies suggest that instruction in university science could benefit from assistance. The project builds on a range of undertakings around Australia, including efforts to improve teaching in science disciplines, graduate attributes, new educational technology, and capabilities and attitudes of the "net generation," entering students who are increasingly familiar – though not entirely expert – with camera phones, *FaceBook*, *Wikipedia*, *YouTube*, and other "new media" capabilities.

With the materials that we are developing, lecturers in science – and other disciplines – should increasingly be able to exploit a growing number of publication opportunities provided by the web to enhance the learning that students can gain from involvement in production processes.

Specific aims

This project was conceived with particular learning outcomes in mind. Science students should develop:

- Ability to communicate accurately and clearly about complex scientific topics and issues, including insight into target audiences, aims of communication, strategies for communicating effectively, and methods for garnering feedback to correct mistakes and foster improvement;

- Awareness of the norms guiding various forms of communication – written, oral, and new media; norms range from what information to include and not include in a scientific blog to permissions for use of images and styles of writing that take advantage of the non-linearity afforded by hypertext links;
- A level of skills in new digital technology, as well as confidence, adaptability, and teamwork capability, leading to effectiveness in creating content, commissioning web development, and employing new media to reach key audiences.

We are working to achieve these learning outcomes by identifying, developing, and disseminating teaching strategies and supporting materials, such as assignment guidelines enabling students in chemistry to create wikis, which lecturers can adapt to suit their class content, and a list of pitfalls to avoid when having teams of students from a large, first-year, biology class create short videos.

Essential to the development, testing, and dissemination of these materials is cultivation of a community of practice. This community of practice includes the core team of science communication academics and a range of "early adopter" science academics, a number of whom are already giving their students “new media” assignments. We are also recruiting new collaborators, both through existing networks of “usual suspects” at each university and via a series of conference workshops, such as this one at the ASCILITE conference.

Why science communication?

This project relies on the relationship of the field of science communication to the disciplines of science. Science communication is a relatively young academic area that addresses informal science education, public relations and journalism, and science-in-society as well as science content (Mulder, Longnecker & Davis, 2008). Science communication academics educate students to publicly communicate about research and the implications of that research. Students also learn to facilitate debate about how to address current issues involving science, such as climate change or genetically modified foods.

Tertiary-based science communication programs are increasingly taking a leading role in developing the graduate attributes of science students (Australian Council of Deans of Science, 2001). It is universally accepted that our graduates should have good skills in oral and written communication. Almost every job advertised has, among its essential selection criteria, the need for “communication skills.” The Employability Skills for the Future report (DEST, 2002) cited communication skills as being critical.

Representatives of industry employers have reported an overall lack of confidence in graduate abilities, particularly with respect to “generic skills” gained through a Bachelor of Science (Raison, 2006). To quote one study: “Many enterprises reflect[ed] that they no longer wanted technical ‘boffins’ or operators who could not communicate on their work to peers or clients” (DEST, 2002). Yet, studies have identified insufficient communication skills and related abilities, especially in science graduates (Australian Council of Deans of Science, 2001).

Members of the academic field of science communication, in collaboration with science academics, have been asked to address this need. Hundreds of students are now being taught in core GA subjects in science degree programs at Monash University and UNSW. New Zealand’s Ministry of Science and Technology is currently considering whether science communication should become an obligatory part of all science degrees, echoing a recommendation at the University of Western Australia. This sentiment is not peculiar to the Asia-Pacific, as a UNESCO report (2003) recommends: “… Science communication training [should be] part of a scientist's education.”

New media learning and publication opportunities

New media can be a seen as a Trojan horse, attracting students to learn how to understand and cater for target audiences. These sorts of “real world” publication opportunities have been restricted until recently. Student participation and responsibility for the content and organization of science publications has generally been an extra-curricular enterprise participated in by a self-nominated few. The law review and student newspaper are time-honoured traditions.

Today, the web allows for cost-effective publication, which in turn enables student publication to become a mass learning activity, which can be integrated into coursework. Students have the opportunity to explore the advantages – and challenges -- of employing video, audio, images, social networking, and hyperlinked text to enhance their communication. They can also monitor web hits and feedback to gauge effectiveness. However, while today's students may be "web orientated", they are not as web capable as

popular belief suggests according to findings of the ALTC's "Net Generation" project (Kennedy *et al*., 2007), which echoes our own experiences in recent years.

The hurdles that web publication still presents to students -- and the insights -- are evident in classroom discussion, peer evaluation, and reflective assignments completed by hundreds of our students over the past decade. Their essays suggest that they recognise how their effort and assessment have become "authentic," like "real world" teamwork, strategising, and editing activity. Importantly, they overwhelmingly evince an appreciation that their submissions are available to a real viewing public, a public whom scientists must increasingly seek to engage (Davies, 2008; Trench, 2008; Dumlao & Duke, 2003).

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