BLOGGING BIOLOGY & PODCASTING PHYSICS: AUTHENTIC LEARNING VIA STUDENT CREATION OF NEW MEDIA

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ABSTRACT

The ALTC-funded 'New Media for Science' project explores ways to engage science students in authentic learning - to develop both their content knowledge and graduate attributes - via science communication. Specifically, we are looking at ways for students to create multi-media publications for the web and assessing the effectiveness of such learning activities. This paper offers twenty examples of new media assignments, including blogs, wikis, podcasts and video creation. We describe assignments that students are already completing for university classes in Australia and New Zealand as well as listing similar assignments that may be employed by science lecturers. The attractions of these methods of teaching and learning are addressed along with reported and perceived difficulties in conducting and assessing new media projects.

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A NEED FOR COMMUNICATION SKILLS

Universities have long recognised communication skills as a vital element in a graduating student's set of generic attributes (Australian Council of Deans of Science, 2001; DEST, 2002). Over the last decade, studies of employer needs and expectations have identified a perceived lack of communication skills amongst graduates, especially in science (Raison, 2006). Responsibility for developing communications skills - and often graduate attributes, in general - is increasingly falling to science communication academics. It can be argued that integration of science communication into the science curriculum can strengthen contextualisation of scientific knowledge, with some contending that such integration can also deepen understanding of content.

At the same time, the ubiquity of online and mobile communication technologies suggests that today's students have many new opportunities to practice and develop their communication skills. They can publish their words, images, and conversations on the web. The internet allows for cost-effective publication, which enables student publication to become a mass learning activity, one that can be integrated into coursework rather than reserved for extracurricular efforts (e.g., an online version of the traditional student newspaper). Many more students can now learn how to understand and cater for target audiences as well as discovering the advantages of employing video, audio, images, social networking, and hyperlinked text - collectively referred to here as 'new media' - to enhance their communication.

In participating in the production of new media, students engage in authentic and collaborative learning; they develop graduate attributes such as written and oral skills, teamwork, ethics, and critical thinking; and they gain professionally valuable knowledge and experience in science communication.

However, while today's students may be 'web orientated', they are not as web capable as popular belief suggests, according to findings of the 'Net Generation' project funded by the Australian Learning and Teaching Council (Kennedy et al., 2007). These results echo observations and experiences of project team members in recent years.

There is an opportunity to expand students' general familiarity with new media into new skills and attributes. The ALTC New Media for Science project (Rifkin, Longnecker, Leach, Davis & Orthia, 2009) engages science lecturers and students in the production and publication of innovative and informative 'new media', concentrating on wikis, podcasts, blogs and videos that convey scientific content.

INNOVATIONS IN STUDENT ASSIGNMENTS

Over the past year, we have gained insight into the range of new media assignments being undertaken in science classes in Australia and New Zealand. While some lecturers simply publish their own lecture notes, a large class of first-year chemistry students created team podcasts (Bartle, Longnecker & Pegrum, 2010). Some examples from this range of activity are not assessed, being employed mainly to give students practice in digital media communication. Others involve a formal assessment procedure.

The project team has collected examples of new media activities and assessments from their own teaching as well as from interviews of 'early adopter' academics identified at conferences and through professional networks. Team members have also brainstormed a set of potentially worthwhile assignments, variations on existing teaching strategies. This set of new media assignments has been subdivided into four areas according to each one's aim:

A. To *practise skills* in new media
B. To focus on *class content and teamwork*
C. To *gain feedback* from classmates or a target audience using new media
D. To *contextualise content* – production of new media related to general science topics.

These activities encompass everything from simple *PowerPoint* presentations, to animations, the creation of audio and video podcasts, and the production of television or radio shows.

Table 1: Existing & potential new media assignments for science students

A.	**Practising multi-media skills**
1.	Student creates a 1-minute podcast/video introducing themselves to the class
2.	Student creates a short video of a person/place/item that is relevant to the subject
3.	Student creates a 1-minute video on how to make a video
4.	Student uses a blog to reflect and peer assess group work activities in the laboratory/field
5.	Students critique classmates' or lecturer's videos using a ratings/comments system
B.	**Focus on class content & coordination of student activities (teamwork)**
6.	Student team creates a short (2–3min.) podcast to explain a scientific concept in the subject area or related to a class field trip
7.	Student team creates a lab report video, e.g. dissection or experiment
8.	Student team creates an animation of a laboratory technique
9.	Student team creates a wiki to explain a concept in science, e.g., element of the periodic table, or to produce a report, class notes, or a literature review
10.	Online collaboration with science students from other universities on wikis or *Facebook* sites
C.	**Using new media strategically, to attract attention/ gain feedback**
11.	Students create online *PowerPoint* presentations with opportunity for peer review
12.	Students create a performance, e.g. science show for children on *You Tube* or a radio show on science topic for public audience
13.	Students create a webzine or a set of science news stories
14.	Students create and promote an online event or product
15.	Student creates a blog and promotes it online, monitoring the number of readers and comments
D.	**Contextualising content**
16.	Student interviews a science professional and uploads it to a website
17.	Students create videos about young researchers, including research, storyboard, interview, editing, and publishing online
18.	Students blog regularly (3x per week) on a controversial science topic
19.	Students review professional reports by scientists
20.	Students (PhDs) produce a website promoting their research to industry.

CHALLENGES AND NEXT STEPS

In gathering this range of new media assignments, we determined that such activities may be adapted across many areas of science and mathematics, be used as individual or team projects, and be assigned in large or small class sizes.

Difficulties expressed by project team members and early adopters during the implementation of new media activities include:

- A lack of technical knowledge among students and lecturers on how to produce the media; that has stimulated us to provide guidelines and examples, as well as outlining ways for lecturers to support students in finding their own way.
- The need for suitable platforms to host student assignments; we are collating information about the major online platforms for new media publication, such as *YouTube* and *FaceBook*, to identify the best solution for each lecturer's situation (different media and formats, large/small classes, need for peer feedback, …).

- Issues of privacy and copyright when publishing student work in the public domain; options for private publication range from totally-closed institutional platforms, such as *Blackboard*, to the major sites, such as *YouTube* or *iTunesU*, using their built-in groups and privacy settings.

New media activities are likely to differ significantly from other assessable tasks that lecturers assign in their science classes. Our research indicates that methods for providing valuable, constructive feedback and for assigning fair individual or team marks for new media assessments have been slow to develop.

We recognise the need for building a 'community of practice': a network of academics using new media assignments in their science courses. Community members can share successes and pitfalls. To foster formation of the community of practice, the project team is assisting newcomers and early adopters over the coming year in adapting ideas to suit their individual classes, subject material, and desired outcomes as well as addressing problems and concerns.

Guidelines are provided and concerns addressed in our *New Media for Science* wiki (Rifkin et al., 2010) (see http://newmediaforscience-research.wikispaces.com/). Our aim is to make basic activity guides for producing, viewing, sharing and assessing new media available at the *SkillCity* website (see http://skillcity.iaaf.uwa.edu.au), which provides opportunities for peer review.

In sum, examples of how to use new media in science teaching, guidelines to address common concerns, and support for new adopters through a community of like-minded colleagues have been initiated in our project over the past year and are being built on and refined over the coming year. At the same time, we will be monitoring and measuring the impact on student learning offered by these approaches, to quantify and qualify the learning value that we have observed in our own classes over much of the last decade.

If our hypotheses on the positive impact offered by learning of such assignments are shown to be true, we would like to see more science lecturers consider new media production as an element in their assignments. One could then expect improved development of graduate attributes, with a positive impact on student employability and ultimately enhancement of scientists' communication skills and professional effectiveness.

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