CAN CREATING PODCASTS BE A USEFUL ASSIGNMENT IN A LARGE UNDERGRADUATE CHEMISTRY CLASS?

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ABSTRACT

Creating a three-minute podcast about a fundamental chemistry concept was set as a minor assignment in a large university introductory chemistry class with an enrolment of 352. Students were divided into groups of three and assigned the topic of either acids & bases or oxidation & reduction. Students worked as teams to produce a podcast and load it onto the class's WebCT site as an attachment in a discussion thread. Students were expected to listen to six podcasts produced by teams from their own laboratory class and evaluate the podcasts using an online quiz based on criteria from the marking rubric. Student comments on WebCT and the anonymous class survey questions indicate that students considered this assignment a positive experience. It was done with minimal need for technical tuition on the part of the unit coordinator or demonstrators. These preliminary results encourage the authors to recommend similar assignments in other large, introductory science classes as a means of developing graduate attributes while maintaining development of content knowledge.

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INTRODUCTION

Communication skills are recognised as an important graduate attribute irrespective of discipline (Crebert, Bates, Bell, Patrick & Cragnolini, 2004). Scientists' ability to communicate effectively is vital to their employment prospects, to their contribution to society and to society's reception of science (Australian Council of Deans of Science, 2001; Jasanoff, 1998; Wellcome Trust/ MORI, 2000). Group work and interpersonal skills are also important graduate attributes. It is essential that scientists are able to work in collaboration with a diverse range of people across multidisciplinary fields, both within their organisation and the wider community (Towns, 1996, Towns, Kreke & Fields, 2000).

This project is a product of the ALTC grant, 'New media to develop graduate attributes of science students' (Rifkin, Longnecker, Leach & Davis, 2010). Aims of the grant include identifying and developing teaching strategies and resources suited to large classes in science, such as creation by students of 'new media' like podcasts. Many of these new media have emerged as part of the shift from web 1.0, the informational web, to web 2.0, the social web, which involves active production rather than simply passive reception of media. There is considerable potential to link new media with contemporary learner-centred pedagogical approaches, where students learn through active engagement with content and with peers (Pegrum, 2009a; 2009b). Furthermore, new media have increasing relevance professionally and engage university students in authentic tasks and work-integrated learning (Rifkin et al., 2010).

Podcasting requires a digital voice recorder and software to upload the recordings onto a suitable web page. Thus the basic technology is cheap, easy to use and portable. Apart from organisation, the podcast assignment described in this paper required little input from the unit coordinator or demonstrators and thus could be considered an efficient use of limited teaching resources.

CHEM1105 Introductory Chemistry is a unit at The University of Western Australia with an enrolment of 352 in 2010. It is designed for students with little or no background in chemistry who wish to gain an understanding of basic chemistry. Students in this unit are enrolled in courses across all faculties at UWA, although most are associated with the Faculties of Engineering, Computing and Mathematics, Life and Physical Sciences and Natural and Agricultural Sciences. Hence, in order to motivate and engage students enrolled in this unit it is essential that students can be exposed to the

multidisciplinary applications of chemistry, including the relevance of chemistry to their specific courses of study.

The unit is based on the Western Australian Tertiary Entrance Examination Chemistry course, and the entire content of the Year 11 course is taught in the 13-week semester. The large amount of material covered means there is a rigid lecture schedule and it is fairly inflexible in terms of deviating from the content during class contact hours.

This paper details the development and implementation of a group podcasting assignment in the *CHEM1105 Introductory Chemistry* class. This assignment gave the students an opportunity to explore a chemical concept further or to explore different applications of that concept relevant to their chosen course of study. It is possible that students who develop an explanation of a fundamental concept will have a better understanding of that concept.

IMPLEMENTATION

The group podcasting project was run over four weeks starting after the mid-semester break. Students were briefed about the project in a lecture and provided with an assignment handout via WebCT. The assignment handout detailed the podcast requirements and directed students towards websites on how to make podcasts. The unit is taught across two campuses, the local Crawley campus (metropolitan Perth) and the Albany campus (400km south of Perth) and all students enrolled in the unit completed the assignment. Albany students were able to download the assignment handout from WebCT, and listen to the lecture briefing through Lectopia.

An example podcast on the topic of ‘atoms and chemical bonds’ was created and placed on the unit WebCT site so that students could listen to it and get ideas. ‘Atoms and chemical bonds’ is the first topic taught in the unit.

Students were placed into groups of three by the unit coordinator based on their assigned bench in the practical laboratory class. Groups of three were chosen to ensure that if one person didn’t carry their weight for the assignment there was still a team of two to work on it. Because students in any group were in the same lab class, this ensured they had shared timeslots to work together on the project in the weeks when lab sessions weren’t scheduled. When it came time to upload the podcasts onto the unit’s WebCT page, each group was assigned a group name. To give students the perception that the assignment was meant to be a bit of fun, and also to help preserve the anonymity of the students, group names were based on characters from a commercially available chemistry card game, Elementaurs™ (e.g. Princess Neo).

A new discussion thread, ‘Podcast related’, was set up on the unit WebCT page so that students could communicate with their peers whilst doing the assignment, report any technical problems, and discuss any issues related to the assignment. WebCT was also used to post regular announcements and reminders as well as to supply students with detailed instructions on all the project requirements.

SUBMISSION

WebCT was used for podcast submission. Folders for each laboratory class were set up on the discussion board and each group was required to post their completed podcast as a .wav or .mp3 file in their group’s folder, using their group name as the file name. Both the Albany and Crawley students posted their podcasts on the WebCT class site. Because each group had to submit their podcast as an attachment to a discussion post, there was the option to include a message. Several of the students added messages like ‘Enjoy! ☺’. Other humorous messages, such as ‘no backing tracks were harmed in the making of this podcast’, indicate that students found the assignment enjoyable and motivating.

The podcasts were placed on the class’s WebCT discussion board during the final week of semester and were available for students to listen to during study week. Students were required to listen to six podcasts (that is, their own and five others) from their laboratory class group and comment on them.

TOPIC CHOICES

The topics of 'acids & bases' and 'oxidation & reduction' were chosen as they are two of the major topics covered as part of the unit content. Also, past examination performance and anecdotal evidence suggested that students find these topics difficult and have common misconceptions. For example, students often confuse the relationships between oxidising agents and reducing agents, and oxidation and reduction processes. In the area of acids and bases, students often have trouble understanding the concept of acid strength as a measure of dissociation rather than concentration.

Half of the groups in each laboratory class were assigned the topic of 'acids & bases' and the other half were assigned 'oxidation & reduction'. The groups were given creative licence with the actual content of their podcast. They were told there were no strict guidelines on what they covered in the podcast as long as it was related to their allocated topic. They could choose to take one aspect of the topic from the lectures and explain it, develop an analogy to explain it, or they could find an application from their course of study, discuss it and explain how it related to their topic.

ASSESSMENT PROCESS

The project was worth 5% of the overall unit mark. The remainder of the unit assessment comprised a final exam worth 50%, six laboratory sessions contributing 20% and 10 WebCT-based online quizzes as a form of continuous assessment worth a total of 25%. Although it was not worth much compared to the other assessment tasks, 94% of students completed the podcast assessment and, indeed, put a lot of effort into it.

Students were required to complete a teamwork assessment, evaluating individual contributors to group assignments, and to submit this to their laboratory demonstrator during their last practical session. Only a few groups reported that one of the team members did not contribute to the assignment. Students were asked to sign a digital publication authorisation form to allow the podcasts to be published on *iTunesU*. Most students agreed to this and submitted the form with their assignment, but a few did not agree to having their podcasts made public in this way.

The podcasts were assessed using a marking rubric. The five marking criteria were: 1) how well the introduction set the scene; 2) clarity, accuracy and relevance of content; 3) whether the conclusion provided a clear summary of the main points; 4) the structure and flow of the podcast and 5) technical sound quality (volume and clarity). Bonus marks were also awarded for creativity. The podcasts were marked by the unit coordinator.

The marking rubric was turned into a WebCT-based online quiz and students were required to use this to assess a total of six podcasts from their laboratory class. They were required to self-assess their own podcast against the marking criteria, and also five other podcasts from their laboratory group. This included a total of three 'acids & bases' podcasts and three 'oxidation & reduction' podcasts. Students had 10 days to complete the peer assessment quiz. The open dates for the quiz fell during study week. Although completing the peer assessment quiz was voluntary and did not contribute any marks/weighting to their final mark for the podcast, 91% of the students who submitted a podcast completed the quiz.

The marks given by the unit coordinator will be compared to the marks given by students with a view to using peer assessment as the sole form of assessment in the future.

STUDENT FEEDBACK

In addition to the peer assessment quiz, some students replied to various podcast posts with written comments. These were always positive. Examples include: *"That was one heck of a podcast! I really hope [the coordinator] chooses yours as an example! Great Work!"; "Wow!! Loved it loved it loved it!!!";* and *"Genuinely entertaining. I've had a listen a few times just for another laugh. Great job!".*

In addition, students made posts about the podcast assignments in the other discussion board threads, encouraging their peers to listen to specific podcasts which they considered to be outstanding. For example, one student wrote: *"I just stumbled upon the most awesome podcast! Check out Wed 2-5 Lab group, Alum4 AB, it will seriously be worth your 3 minutes!".* This post received a reply: *"Yeah big respect to this one...takes an uppercut!! Lol".*

CONCLUSION

The authors are currently compiling student comments, feedback from an anonymous survey, and examination results for questions related to the podcast topics. These results will be analysed, written up and submitted for publication. Preliminary observations of the exam results indicate an improved understanding and learning of the 'acids and bases' and 'oxidation and reduction' concepts with an increase in the average exam mark compared to previous years.

Student feedback has been positive enough to recommend use of this type of podcast assignment in other large science classes. The assignment required minimal effort on the part of the unit coordinator and demonstrators and so was an efficient use of limited teaching resources to provide an engaging learning opportunity for students.

The assignment appears to have motivated students to develop an explanation of some aspect of a fundamental topic and to share their insights with their peers. As an engaging, learner-centred task, it fitted well with contemporary pedagogical approaches. Assessment of the podcasts using criteria such as clarity of expression and relevance was meant to explicitly emphasise the importance of specific graduate attributes.

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