

Increasing connectedness and motivation amongst first year biology students through an authentic group work project

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Abstract

This project is based on results generated from a pilot study conducted in 2010 in a large (471 students) first year biology subject, Biol103, at the University of Wollongong. Students completed structured group work research projects and presented their findings via a written poster/booklet and an oral seminar. The task was designed to promote deeper learning through group work and the contextualisation of lecture content. We aimed to increase relevance, interest and motivation by situating student knowledge. Results indicate that a positive impact on engagement, community and communication was achieved for both staff and students.

Nature of the Problem

A lack of strategies to stimulate engagement had resulted in the dominance of passive learning among students. Biol103 (student enrolment up to 500) is a core first year subject for a large number of degrees in the Science and Health and Behavioural Science Faculties at the University of Wollongong (UoW). Biol103 is often referred to as a ‘service’ subject, and therefore can be viewed by many students as peripheral to their learning. Thus, there is a high risk that students become passive and uninvolved, adopting attitudes consistent with ‘surface’ learning (Brown and Atkins, 1988). Most educators consider that learning-by-doing is the basis for developing “authentic learning” experiences which improve student engagement and participation (Lombardi and Oblinger, 2007). The need for realistic experiences has been advocated as a means to ensure that university graduates obtain deep conceptual knowledge to equip them as experts in their chosen field (Ramsden, 2003). To date there has been a lack of authentic learning tasks in Biol103. Rather, the theoretical content of the subject has been delivered via “a transmission of content” approach (Schank and Cleary, 1995). Additionally, central to a positive first year experience is the engagement of students in learning and the interconnected aspects of university life (Kift, 2010). Large student numbers in Biol103 have worked against the development of a sense of community through engagement with staff and fellow students.

Objectives of project

A group work research project was piloted in Biol103 in 2010 and aimed to:

1. promote a greater sense of student community, a positive FYE and an environment more conducive to widening participation on several levels: firstly, through participation in group work and presentations, student to student interaction was increased; secondly, through establishing smaller classes (40 students and 2 staff) for the design and presentation of the assessment tasks, staff to student interaction was increased and a more supportive community within the subject could be achieved.

2. promote deep learning by using authentic learning tasks for scientific professionals, i.e. researching and reporting science via posters and seminars. Current scientific applications of theoretical concepts were investigated to achieve contextualisation of lecture content, thereby situating knowledge to increase relevance, interest and motivation.
3. develop communication skills (a UoW graduate quality) by promoting teamwork in both the preparation and evaluation of posters and oral presentations.

Project Methodology

The task

Authentic learning tasks were designed with reference to the framework for authentic task design (Herrington and Oliver, 2000). Tasks aimed to develop: (i) **Knowledge creation skills** through research and analysis. Throughout the Biol103 lecture series students were presented with a vast amount of biological information, much of which forms the theoretical foundation for future learning. The assessment involved the group researching a particular lecture topic covered in Biol103 and identifying a current scientific application in a practical or 'real world' setting. (ii) **Effective communication skills** through actively learning from collaboration and contextualisation. As a group, they disseminated their research via posters and seminars, as do scientific professionals in the workforce. This composed 10% of their final grade. The assessment mark was broken down to 6% for the poster or seminar and 4% for group self-assessment, as all students were required to assess their group members' contributions to the tasks. (iii) **Sessional staff assessment and feedback skills**. Resources were utilised to create a framework for sessional staff to assess and provide feedback effectively to all students.

In the first Biol103 practical laboratory class, students seated themselves at a laboratory bench in groups of four. It was within these groups that the students completed the group work assignment as well as all practical class work. In 2010 three 'dry practicals' were added to the subject. These classes focused on the group work research project and were half the duration of traditional practical classes, with half the student numbers. In the first 'dry prac' (week 5) students chose their research topic, planned, strategised and assigned group tasks. Emphasis was placed on planning methods of group communication as well as developing strategies to manage problems that can be associated with group work. In the weeks following, the group conducted their research and communicated outside of class time. However, the students did continue to see each other in weekly practical classes, during which time they had access to staff for project enquiries. In the second 'dry prac', (week 9) the groups presented a written assessment item in the form of either a poster or booklet (A3 size or equivalent) in a conference-style poster session. Verbal feedback was supplied at this time from both staff and students. Questioning and active participation from all students was encouraged. Students received written feedback and a grade within the following week. The groups then utilised feedback to prepare, on the same topic, an 8-minute oral seminar, to be presented in the final 'dry prac' (week 12). A two minute question time was assigned to all groups following the presentation and all students were encouraged to ask and answer questions. Seminars were graded, and verbal and written feedback, were received at the conclusion of the seminar.

Preparing students for group work

Icebreaker exercises were used in the very first practical to allow students to get to know each other before venturing into group work. In the first dry practical students were also provided with a rationale behind group work and this was discussed in detail. This highlighted the importance of becoming an effective communicator as part of the UoW graduate qualities and the importance of this skill for their work-life beyond university.

Resources were provided via the subject online eLearning site. These included resources on topics and potentials areas for research, referencing guidelines, marking schemes, example poster and a discussion forum open between students and staff. This space allowed one avenue for group communication and a space to seek feedback from staff and other students outside their group.

Assessing the task

Students were given the marking criteria for the poster and seminar in advance of the task. They were also supplied with an example poster that adhered to the marking guidelines in order to help them prepare for the written submission. The poster and seminar each constituted 5% of the final assessment mark for Biol103. In both assessment tasks, 3% was graded by a staff member utilising the marking criteria, and 2% from a group self-assessment component. Group members anonymously assessed each others contribution to the tasks. This was designed to provide an opportunity to acknowledge group members who had shown good collaborative and teamwork skills, and to penalise those students who had failed to contribute adequately to the group work.

Project outcomes

Three casual and two academic staff were involved with the supervision of students on the group work project. Data from the casual staff experience was collected through written feedback. The student experience was evaluated through questionnaires. Additionally semi-structured focus group interviews were conducted with twelve willing students at the conclusion of the project. Human research ethics approval was granted for all aspects of the evaluation process (HE10/297).

Positive staff outcomes

Groups of 20 students were supervised by 1 staff member for all three dry practicals. Typical practical classes in Biol103 consist of 80 students. Having fewer students in the lab during 'dry pracs', allowed the relationship between the staff and students to improve. Staff also felt they were able to take on a different role with the students due to the research nature of the task. Quotes taken from written feedback from casual teaching staff are provided below.

"I appreciated the opportunity to interact with the students in an environment that was about research so there were no right answers to the questions; it was more of an exploration together."

"The collegiality and collaborative learning displayed by the students through the group work initiative lent itself to establishing an easy and open approach between the students and staff."

"My participation gave me an opportunity to see the different strengths of students outside the normal practical aspects of class. The classes seemed to have a relaxed, non-critical atmosphere and the students generally supported each other well."

Positive student outcomes

The evidence from student experiences, collected through student questionnaires post-project and interviews, overwhelmingly shows that students feel the group work project: 1. fostered a greater sense of student community by increasing connectedness between students (91% agreeance); 2. helped maintain a more positive attitude to the subject (64% agreeance) 3. increased motivation to perform (61% agreeance); 4. increased the relevance of the key biological concepts learnt in Biol103 (74% agreeance) and 5. enhanced their communication skills (78% agreeance). The students achieved contextualisation of lecture content, thereby situating knowledge to increase relevance, interest and motivation. They also recognised that the research skills learnt will be beneficial beyond just this subject. Quotes from student questionnaires and interviews are included below.

“Once we went into depth in our topic area we could really see the relevance of the key ideas taught in Biol103.” (Biol103 student, interview, 2010)

“This research project teaches you how to take a situation and find out the best course of action to get the results you need.” (Biol103 student, interview, 2010)

“(Group work) means I try harder so I don’t let the team down.” (Biol103 student, questionnaire, 2010)

“The project drew clearer connections to course content.” (Biol103 student, questionnaire, 2010)

“Interaction with other people in the course is increased (with project) which helps me maintain a more positive attitude to this subject.” (Biol103 student, questionnaire, 2010)

Preliminary results from student questionnaires conducted post-project (Table 1) are particularly significant as Biol103 is a large service subject in which students can be difficult to motivate as they often take a surface approach to learning. The group work project increased motivation and fostered a deeper approach to learning among students. This in turn contributes to a positive first year experience for those students transitioning to university life.

Post-project Questionnaire			
Q1 Has undertaking group work in Biol103 helped you feel more connected to your fellow students?			
yes	no	unsure	
91%	7%	2%	Total respondents = 437
Q2 Does group work help you to maintain a more positive attitude to the subject?			
yes	no	unsure	
64%	18%	18%	Total respondents = 437
Q3 Has the group research motivated you to perform better in Biol103?			
yes	no	unsure	
61%	21%	18%	Total respondents = 437
Q4 Has undertaking the research project in biol103 helped you discover the relevance of the subject to your field of study?			
yes	no	unsure	
74%	14%	12%	Total respondents = 437
Q5 Has undertaking the research project in biol103 helped you develop your communication skills?			
yes	no	unsure	
78%	12%	10%	Total respondents = 437

Table 1 Results from student questionnaires (post-project)

Nuts and Bolts Session Outline

After a 15 minute presentation on the design, implementation and results from the group work project, session attendees will be encouraged to comment on the project. The following issues will also be discussed:

- Do you encounter similar motivational problems in your case?
- What measures do you use to motivate large student groups?
- Have participants considered or would consider implementing similar initiatives within their own institutions?
- Are there any suggestions on performing fair group self-assessment?
- What weighting of a group assignment should be self-assessment?

References

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