

Case Study of using students as topic 'gurus' to provide teaching materials for their peers on an 'Engineering in Society' module

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This case study has been developed from data gathered through an observation of the teaching component; interviews with the tutor; and student questionnaires and focus groups.

Background

All students in the School of Engineering at the University of Exeter study 'Engineering in Society', a compulsory module in the first semester with 3rd and 4th Year students attending from across all disciplines including civil, mechanical, electrical and electronic engineers. There are about 50 students in the morning lecture slot, who are then split into two groups for timetabled tutorial slots later that day. The module covers a number of elements relating to the wider responsibilities of being a professional engineer.

The lecture series features guest speakers who discuss the wider human resources, quality and health and safety factors in relation to their engineering discipline. Wherever possible the follow-up tutorials in the afternoon are on a related topic. The tutorial starts with a 10 minute input and scene setting from the tutor on the discussion topic for the day, including videos or slides of real case studies, for example, an aeroplane ejector seat test site. The students are then split up into groups and given a role within the scenario. The groups have 20 minutes to discuss the scenario from their character's point of view. There are 2 tutors in the room who circulate between the groups. The groups produce a single OHP slide and a representative from each briefly presents the summary of the discussions to the whole class in the last 10 minutes of session. Other students are chosen to offer feedback on the presentations. The tutor, collects the OHP slides and photocopies them to be given as handouts in the following weeks tutorial.

Alongside the lecture/ tutorial programme, the students select a 'Guru' topic, related to their discipline (for example transport of hazardous chemicals), on which they must write a Health and Safety Review. Over the 12 week course the students were given the task of collecting newspaper articles, abstracts, websites etc. and selecting 10 on which to write a précis which can be submitted weekly and reviewed by the tutor and returned for comment. The student then selects 5 to submit alongside their Health and Safety Review. All Health and Safety Reviews submitted, with written feedback, are bound as a workbook and a copy given to each student. Through this the tutor hopes that the 'guru' knowledge can be shared between disciplines and that this will workbook will form a useful tool in the student's career.

The students must also submit an essay which is marked and the feedback returned prior to the students completing an end of module essay style test. Details of all formal assessments components of the module are distributed at the start of the semester.

Reasons for introducing this teaching method

The department felt that the module was becoming 'stale' and that it should be a more rounding module to complement the technical elements of the course. It was felt that there was a need for students to put into practice some of the lessons they were being taught through the lectures and utilise the extensive industrial and consultancy experience of the tutors for the module.

Students' Perspective

All of the students who returned questionnaires were happy that the tutorials helped them learn about 'Engineering in Society' and that they added to what they learnt from the lectures. They thought the use

of real world case studies and short focussed presentation opportunities were effective and that the tutorials worked well within the course. Skills which students felt that the tutorials aimed to develop included 'presentation', 'communication' – in terms of both conveying and understanding ideas, 'group and team work' and 'analysing data'. The majority of students agreed that the strength of the tutorials were that they were 'enjoyable' and 'more interesting' and actually caused students to "...think during lectures".

Some individuals expressed a concern that the module aims were sometimes a bit vague, a very broad range of topics were studied and they were not really sure what to expect from the assessment of this module. Overall the students within the focus group agreed that this was especially difficult because most of the other modules studied were so well defined and structured. This module caused them to question "why are we learning about this?" and their opinions on the tutorials had a lot to do with "personality and how you perceive the module".

Issues

"The tutorials definitely need an icon" and this needs a large resource bank of videos, images and or presentations on a range of topics to suit the multi-disciplinary group. The tutorials and small group work require the sessions to be time-tabled in a flat room, preferably where the chairs can be re-arranged and there are projector and video equipment available.

If this type of activity is new to the students and, in the case of most engineering students, less formal than many of the other modules they study, then it does take a few weeks for them to engage with the exercises.

Benefits

The introduction of this interactive tutorial method has improved the students' involvement with the module and the tutor hopes that the students are participating in their own and the learning of their peers. The weekly set tasks encourage the students to engage with the material outside of time-tabled slots. In addition to the work required for assessment, students have approached the tutor with anecdotes they have found and which they think will be of interest to the tutor or the group. Students have also asked questions about the topics which are beyond the scope of the tutorial exercises set.

The real world examples provide a context to the subject and the use of short, snappy exercises keeps the students focused on the tasks and engaged with the work. The presentations provide an opportunity to demonstrate participation with the task as a group as well as allowing students to practise communication skills without feeling pressured by assessment. As other students are asked to comment on the presentations both the presenters and other group members can pick up pointers from the exercise.

Reflections

Students think this method works because of the tutor involvement and this allows them to develop a good relationship with the tutor. There is currently good industry involvement through the participation of guest lectures but some students felt that the context of this module could be enhanced through the scheduling of a field trip or visit to a local company.

Students who took part in the focus group exercise felt that overall the tutorials had helped to improve group dynamics and that they could see the benefits of similar tutorial opportunities being offered in the first year.

"When the material is lectured to you and you have a set of notes in front of you its like, right I can read these later, I'm going to switch off now, but because the material is taught in this way you are actually involved in it."