Cylch Dygu 3 | Teaching Cycle 3

The Challenge of Providing Fast, Effective Feedback to Large Student Groups

This Teaching Cycle of the PGCTHE portfolio has been submitted to CADAIR with the permission of the author detailed above. It is to be used as a resource for future PGCTHE candidates and other staff as part of their professional development at Aberystwyth University. If you wish to cite this work then please contact the author. Contact details can be found at http://www.aber.ac.uk/en/directory/.
Chapter 5: Academic Paper

The challenge of providing fast, effective feedback to large student groups: application of the online assessment system, “Tweek”.

Sarah J. Davies,
University of Wales, Aberystwyth.

Abstract
Providing feedback on student progress to large groups in lecture-based modules can be a time-consuming process and is often neglected as a result. In this paper, the application of Tweek, a student-centred learning environment with an online assessment function, is discussed in relation to solving this problem for a new first year geography module at the University of Wales, Aberystwyth. A mid-term multiple choice was developed, with specific learning objectives linked to each question. On completion of the assessment, the answers were not revealed, thus protecting the question bank for the assessor. Instead, students received feedback firstly as a percentage mark and secondly as a list of objectives that they need to improve on. Student feedback on the assessment indicated that the feedback was useful and timely. Whilst some time was spent on the initial assessment design, once in place, feedback was generated almost instantly. There is great potential for this software to be more widely applied in the curriculum as a tool for fostering deeper, active learning.

Introduction
Assessment of student learning can be considered to fall into two main categories: formative and summative. Whilst there are a myriad of different methods of assessment, the distinction lies in whether the main purpose of the assessment is to help the student learn through feedback or whether the assessment is placed at the end, after the learning has occurred (Gibbs, 1989). Providing swift, effective feedback to students is a cornerstone of good teaching practice (Gibbs and Habeshaw, 1989), yet is often limited or even absent in large, lecture-based modules, perhaps due to the perception that there is simply not enough time when other competing pressures such as research are considered.
The issue of feedback is a recurring item on the agenda at staff-student committees in the Institute of Geography and Earth Sciences. Although IGES has developed a policy on feedback of which students are made aware and which is adhered to by staff, it is clear that improvements and innovations that could enhance this process would be welcomed by the student body.

Students need to know what they have done well: this provides reassurance and builds confidence. Equally, they need to know what they have misunderstood so that they can revisit these areas and improve their learning (Gibbs, 1989). Key to effective feedback is its timing. In a course with no continuous assessment, the only form of assessment is an end of semester exam, by which time it is too late to act on any feedback that may be given after the event and the student may become disheartened and unmotivated.

This paper focuses on the use of a mid-term multiple choice exam in a first year course, Global Environmental Issues (GG12710), using an online assessment system. Summative assessment for the course is in the form of an end of semester exam split into two sections: multiple choice and an unseen essay. This module was chosen to pilot the online assessment as it is new and no past papers were available to aid student revision. Although sample questions were provided, this did not really give the students a realistic opportunity to evaluate their own progress. It was hoped that the online assessment would do this.

What is Tweek?

Tweek has been under development by Mark Ratcliffe, in the Department of Computer Science at the University of Wales, Aberystwyth since 1998. This is an integrated online learning system, the philosophy firmly rooted in pedagogic development and the mastery approach to learning. The system is designed to provide for frequent tests and rapid feedback within a student-oriented, interactive framework (Ratcliffe, 2004). Tweek has numerous components (see Figure 1), including assessment; objectives; attendance monitoring; content, in which lecture notes and other learning resources can be provided and coursework, which allows submission of assignments. The system is linked to the University of Wales, Aberystwyth, student record system, which enables easy access to and management of a wide range of
information. Much of the system is now in operation across the UWA network and is also available to other institutions.

![Tweek Diagram](http://users.aber.ac.uk/mbr/Tweek/tweek.htm)

**Figure 1:** The Tweek Student Centred Learning Environment (source: [http://users.aber.ac.uk/mbr/Tweek/tweek.htm](http://users.aber.ac.uk/mbr/Tweek/tweek.htm))

This paper focuses on two well-established components of the Tweek system: assessment and objectives, which are discussed in more detail below.

**Tweek Assessment**

The module in question is split into two sections; the first deals with a number of global issues relating to atmospheric, terrestrial and hydrological change, whilst the second deals with specific, research-oriented case studies. The mid-term exam was designed to coincide with the end of the first section, which would give students an opportunity to consolidate their learning on this part of the course.

The assessment function within Tweek allows multiple choice assessments to be generated and stored easily. The system has been used across UWA in both formative and summative assessments. With formative assessments, answers are provided on completion of the assessment and the students can repeat the exercise as often as they wish. If the summative option is selected, the mark recorded for the student is their
first attempt, although they can subsequently retry. Questions can include images and diagrams, providing flexibility for question styles. It is also possible to weight answers, rather than simply having one correct answer and several wrong ones.

In this particular case, images were not used and question weighting was not applied. The assessment was developed in three sections linked to the structure of the lecture programme (atmospheric change, terrestrial change and hydrological change). The summative option was chosen in order to preserve the question bank for the assessor.

Figure 2 is an example of how the assessment appeared to students.

**Question Section 2 - Section 2: Terrestrial Change**

There are 12 questions in this section.

**Weighting**: 12  
**Number Of Questions**: 12

Negative marking is turned OFF for this section.

**Question 1 - Multiple Choice (10570)**

The aridity index is defined as:

1. Potential evapotranspiration divided by precipitation
2. Precipitation divided by temperature
3. Temperature divided by Precipitation
4. Precipitation divided by potential evapotranspiration

**Figure 2**: A sample of the Tweek assessment for GG12710. This is the view that the students see, note that the marks available for answering this question are visible.
The issue of providing effective feedback if the question bank is to be preserved, rather than simply a percentage mark, is addressed through the embedding of learning objectives into the assessment.

**Embedding learning objectives for effective feedback**

Tweek provides for a hierarchical arrangement of learning objectives relating to the course. These were developed in line with the lecture structure, incorporating at the highest level the three principal sections: atmospheric change; terrestrial change and hydrological change (Figure 3). Objective titles are then described in more detail by specific learning objectives (note example of Species extinctions highlighted in bold).

![Tree diagram of learning objectives]

**Figure 4**: The hierarchical arrangement of learning objectives within Tweek.

Once the ‘tree’ of learning objectives is established, it is then possible to link objectives to specific questions when editing the multiple choice assessment. More than one objective can be attached to a particular question. When the assessment is completed, marking is done automatically with one click on the mouse. A percentage result and a list of objectives that need further work (identified as ‘areas needing attention’) are generated. Marks are available online but can also be emailed to students. So, within four clicks on the mouse, feedback is generated to more than one hundred students.
Implementation and evaluation of the assessment

The summative multiple choice assessment consisting of 36 questions was made available to students for one week following the end of the first section of the course. They were able to complete the assessment on any of the UWA networked computers or on their own PC in their own time. They were reminded that to get the most out of the assessment, they should not use their notes.

A total of 98 students sat the exam. The mark statistics and individual responses are immediately available to the assessor after marking. These help to identify any problems that occur. Several students received a mark of 0%, but when their responses were checked, it appeared that they had not entered any responses. They did not report any problems, but may well have inadvertently registered their submission without intending to. The average mark of 46% was low, due to the number of zero marks. There were a small number of very high marks over 80%, the highest being 91%. To be able to see all of this information instantly was extremely valuable. Not only do students get feedback on their learning, but the assessor can also obtain feedback on both the effectiveness of the overall assessment and individual questions. For example, questions which generate very few or no correct responses can be reviewed to see whether they are unclear or ambiguous.

Feedback and reflection

Student feedback was elicited through module evaluation forms and informal discussions with tutees. During one particular discussion, a student commented that doing the Tweek assessment had allowed them to see what level they were at prior to doing any revision. This was both reassuring, that they at least got some questions right and also served to jolt them into action with regard to revision planning. I had specifically asked for comments on the Tweek exam on the module evaluation forms. Examples of feedback include:

"Tweek exam was v. helpful in preparing for final exam + knowing what to expect."
"Tweek exercise was useful and feedback was good."
"Tweek assessment was helpful, maybe two different ones rather than just one" (I had made the assessment available for a second time after the Easter vacation).
"Tweek assessment was very useful and handy"
"The Tweek assessment is a good idea as it gives you an idea of what areas of the course you need to work on before you start revision. It would be useful if the assessment can stay up till the exam so you can check you are improving..." This would be possible by making the assessment formative and will be considered for the future.

Only one negative comment was recorded in relation to the Tweek assessment. It related to the specific nature of the questions and the respondent felt that this was too much to expect early on in the course. Development of effective multiple choice questions is something I intend to work on in the future. This was my first attempt at writing a multiple choice exam and I did not find it easy. As Race and Brown (1998) point out, “It is harder to design good multiple-choice questions than it is to write open-ended questions.”

Whilst Tweek assessment is increasing in use across UWA, the incorporation of learning objectives has not been taken up. I understand that I am the first person to use this function other than the person that developed the software (Ratcliffe, pers. comm.). A general perception exists that to set up learning objectives is a lengthy process. Yes, it does take some time, but once established, it can be refined and developed with relatively little effort. One shortcoming in my own use of this application was that I had not written the objectives before writing the questions, so the objectives became question focused within the three sections, rather than directly organised around the structure of individual lectures. This is something I intend to develop further.

Conclusions and considerations for future development
The application of the Tweek online assessment system provides an opportunity to give rapid feedback to students on their progress. It encourages students to adopt an active learning approach through the identification of areas of their learning that need attention. With the use of embedded learning objectives, students are able to reflect on their own learning. The feedback from students involved in this study indicates such tools are highly valued. Similarly, the detailed information on assessment responses provides an opportunity for the assessor to reflect on the effectiveness of both the
overall assessment and individual questions, leading into a deeper engagement with one’s own learning and teaching development.

The assessment function with Tweek has only been applied at a fairly basic level in this study and there are many opportunities for further development in the context of my learning and teaching, for example through weighting marks and incorporation of images into assessments. There are also a number of other applications in addition to assessment, which I intend to explore further. The outcome of this pilot study has illustrated the benefits of this software to both student and teacher. I hope that this positive experience will encourage colleagues to take up this opportunity to provide feedback to our students.

Acknowledgements
I am grateful to Dr. Mark Ratcliffe for his helpful advice on the application of the Tweek assessment system. Thanks also to the Tweek Team who have also helped to answer my technical questions. I would also like to thank the students in my GG12710 class who participated in the assessment and provided me with feedback on its effectiveness as an aid to their learning.

Postscript: Although I have not discussed this with him as yet, I would like to consider revising this article with Mark Ratcliffe and submitting it as a jointly authored paper to Planet, the LTSN-GEES journal.

References
Gibbs, G., Certificate in Teaching in Higher Education by Open Learning, Module 3, Assessment, Oxford Centre for Staff Development, Oxford Polytechnic (handout provided at LTSN workshop).

