The students find this method of 'marking' much easier to cope with as they are simply making a judgement on which piece of work is best; they are not trying to use a numerical scale or mark against an absolute scale. This came out clearly in the module evaluation. It also means that they are focussing on a smaller number of posters and therefore more likely to learn and remember the content. One added advantage is that the mark sheets can be used directly as feedback to the groups.

WHAT DO THE STUDENTS THINK?

There is little doubt that peer-assessment is a valuable experience and is appreciated by students. In a previous peer tutoring and assessment exercise (Cook and Rushton, 1995) where Year Two students taught information technology skills (MS Word and Excel) to Year One students and then assessed them, the comments of the student tutors were very supportive of peer-assessment:

"Showed me how lazy and careless people could be with their work."

"Makes me reconsider and reassess my own work and the way I do it."

"It taught me ... how much better and assignment can look and read when more time is spent on it."

It would seem therefore to be a worthwhile exercise. However, it should not be seen as just an alternative to tutor marked assignments but should have clear, non-assessment outcomes — in this case, the development of critical faculties. As Biggs (1999) points out "Peer-assessment [is] not so much an assessment device, but a teaching-learning device."

ACCOMPANYING MATERIAL

The accompanying website to this guide (http://www.heabioscience.academy.ac.uk/TeachingGuides/) contains an extended version of this case study and the following additional material:

- notes on the assessment of posters;

- poster marking sheets.

Peer-assessment of group work in a large class — development of a staff and student friendly system

BARBARA COGDELL, ANDREA BROWN & AILSA CAMPBELL

BACKGROUND AND RATIONALE

The first year biology course at the University of Glasgow is divided into two modules. Part of the assessment (20%) for the module in the second half of the year is a "Lifestyle Assignment". The subject specific aims are to investigate and evaluate the lifestyles of (a) species other than humans and (b) humans in other parts of the planet. A portion of the assessment is individual written work, but the majority of the marks are for the group work element of the Assignment.

There are two tasks for the group work, a debate and the manufacture of a poster. The debate is based on Darwin's dilemma. The students are required to argue the case for eliminating a species of their choice whose lifestyle is too damaging to the planet. Then they also argue the case for the preservation of another species chosen by another group. The second task is to produce a poster which compares the lifestyle of people in Britain with that of people in another country.

There are between 600 and 700 students taking the module. They are divided into 14 laboratory classes with roughly 48 students in each. Each of the lab classes is further divided into six groups of eight students — a total of 84 groups. The students have already worked together in the lab during the previous semester as they are always required to sit in the same lab position and they have already participated in a group discussion exercise. The groups meet both in scheduled lab sessions and in their own study time so that they can research their topics. Though the scheduled lab sessions are run by members of staff, the staff cannot monitor what happens when the students meet outside their lab sessions. The groups are encouraged to monitor themselves. Therefore they

are required to elect a group leader and he/she is asked to make notes of who attended the sessions and who did what within the group.

The Lifestyle Assignment replaced a previous group work activity which was based on the theme of AIDS. There were continuous complaints that staff did not assess the group work that was required for the debates. Also group members did not like carrying non-contributors. During the last couple of years of the AIDS project, this resulted in a high proportion of the students failing to contribute to the debates.

It was decided in the Lifestyle Assignment to mark the group work to ensure motivation. It was also felt to be important to introduce a method of distinguishing individual contributions, i.e. to introduce peer-assessment. The method of peer-assessment has evolved over the three years of the Assignment's existence. Part of this has been enabled by the availability of appropriate technology.

Before the introduction of this peer-assessment to our Level 1 course our only experience of peer-assessment had been in a Level 2 Biology module. This had involved a much smaller number of students, 140 versus 650. Although the method of peer-assessment had been very successful it was considered unsuitable to be scaled up to a larger group. Therefore we looked for a system requiring less administrative time.

YEAR 1 — KEEP THE ADMIN SIMPLE

Two members of staff gave each group a mark out of 100 for their debate and poster. The mark was multiplied by the number of members in the group. The group was told their total marks and they then had to divide the marks between themselves. So if the group had eight members and they were given a mark of 60, this gives a total mark for the group of 480. If they decided that they had all worked equally hard they could each get a final mark of 60% for the project. However if they decided two members of the group had worked particularly hard they could have more marks and if one person had done nothing they could agree to give that person 0. This might result in two members of the group getting 90%, five members getting 60% and one getting 0. A constraint was put that nobody could have over 100%.

The students allocated their marks together in a group in a scheduled lab session. Each group was given a single form with the full names and matriculation numbers of each of the members and a space to write their marks. At the end of the session the lab leader handed in the completed list of marks as communally agreed. Many groups agreed to share the marks equally amongst themselves.

This scheme was fairly simple to run as there was only one sheet of marks per group for staff to enter into the assessment spreadsheet. Checks were made to ensure that the students had made correct calculations. Any queries could be sorted by consultation with the group leader. Students awarded zero by their group were investigated by staff for extenuating circumstances such as illness.

However the students did not like this scheme at all. They did not like hammering out the marks in a group setting. They did not like giving low marks to colleagues face to face. Consequently non-contributors would get the same marks as everyone else and the rest of the group would feel resentful. Alternatively the group would mark a member down and this person would complain vociferously. In the worst cases groups split into two or three factions (this only happened on two or three occasions).

It is always to be expected that some groups will be dysfunctional. However with the large number of groups involved, and as the mark counts towards their final module mark, it is unrealistic to tell the groups that they should sort things out by themselves. The students have to be given marks, so this scheme resulted in a lot of extra work for the staff trying to monitor these problems.

YEAR 2 — MAKE THE MARKING CONFIDENTIAL AND AUTOMATE THE MARKS CALCULATION

In the second year of the Lifestyle Assignment the department was fortunate to acquire an Intelligent Character Recognition (ICR) system. This machine will read forms with text entries. With the use of this technology it became feasible to get each student to submit a form with marks for each of the other members of their group. The forms are read automatically and marks entered into a spreadsheet. Then the subsequent calculations can be made automatically. Using individual forms meant we could change the peer-assessment protocol so that the students could give their marks for the other members of the group confidentially.

Each student was given a hard copy form with their name and matriculation number at the top. Below was a table with the names and matriculation numbers of the members of their group, not including themselves. The forms were generated using the mail merge function of Microsoft Word and Excel. Extra spaces were provided in case an extra student had joined the group without the teaching staff's knowledge. This could happen if a student was absent when the groups were formed or had completely failed to get on in an original group.

As before the debate and poster together were

given a mark out 100. Again this mark was multiplied by the number of students to give the total group marks. The students were asked to enter a mark out of 10 on their forms for each of their colleagues in the group. The forms were read by the machine and an average peer mark (out of 10) was calculated for each student. All the average marks for the whole group were added together to give a sum of peer marks for the whole group. This was then used to calculate the proportion of peer marks that each student had obtained. The final mark for each student was then calculated as this proportion of the total group marks. Although it is possible to get over 100% with this formula we will cap any one student's mark to this maximum. So far this situation has not arisen.

A major advantage of this scheme is that it takes into account whether the students are harsh or lenient markers.

Obviously the system will not work if students fail to return their forms. Consequently the students were told that they would get no marks for their project if they failed to hand the forms in — there was a very high return rate of forms.

The students were much happier with this scheme. The students appreciated being able to reward hard work and penalise freeloaders. There were favourable reports from both the end of module evaluation questionnaires and the staff-student committee meeting. Some of the students with low grades complained but because the group leaders had been instructed to keep attendance registers it was relatively easy to point out to them that they had contributed very little and they usually agreed without further complaint.

This second scheme solved the problems as far as the students were concerned, but there was still a major administrative problem for us relating to the reading of the forms. Although the ICR system was very efficient it relied on the students using legible script and filling all the boxes in correctly. In particular problems occurred when a student failed to give an absent student 0 rather than leave the form blank. Each time the forms were illegible or filled in wrongly, they had to be checked by the operator. With the large numbers of students involved this became very onerous.

YEAR 3 — MOVE THE ADMIN ONLINE

As a result of the problems we have changed the system again this year. This time the students are required to enter their marks for their colleagues using a web-based form. The web forms have built in validation so that they cannot be submitted with any blank fields. Each student is sent an email giving them a unique URL code which has been generated from their matriculation number and name. This URL gives them access to their own individual website which has a web form with a list of their other group members and spaces to enter their marks.

The system is currently working well. It is important to emphasise that we have only been able to cope with running a successful peer-assessment scheme for such a large class, because we have had the assistance of a dedicated IT specialist and suitable technology. The programming required for generating the web forms and using Excel to calculate the marks is not extremely advanced. It can be done in a number of ways, but does require someone with suitable experience.

FURTHER DEVELOPMENT

One factor that perhaps could be improved is what we tell the students about how their final grade is calculated. In their instructions for the Lifestyle Assignment they are told:

"You will be allocated a mark according to the overall group performance (i.e. a mark for the poster and the debate) *and* to how your own group has assessed your contribution to the group tasks".

This seems to be perfectly adequate but there are always a few students who like to know precisely how their mark is calculated. On reflection following writing up this case study, in future we will use the explanation given here as information on the students' Level 1 Biology website.

5

Peer-assessment of practical write-ups using an explicit marking schedule

IAN HUGHES

BACKGROUND AND RATIONALE

This method of peer-assessment was introduced into a first year pharmacology programme with 50–160 students per year and has also been used with 2nd year medical students (275). Many of the learning