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## But isn't this what you're paid for? The pros and cons of peer and self assessment

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The rise in student numbers and other factors such as the limited availability of staff time have put pressures on the assessment process. The adoption of alternative approaches to assessment can help staff respond to these pressures and may also give added value for the student. This article presents an account of the application and evaluation of peer and self-marking in three different assessment scenarios: practical write-ups, communication skills and long essays. The research was carried out with students on Pharmacology courses; at the University of Leeds however, the same principles could easily be adopted in similar scenarios in other disciplines such as Geography, Earth and Environmental Sciences courses. The data presented demonstrate that for practical write-ups and communication skills exercises the approach can be valid when compared to marking by academic staff. Furthermore, peer marking can result in an increase in learning as well as savings in staff time.

### Peer marking of practical write-ups.

This evaluation of peer assessment involved two cohorts of students. The cohorts were large classes (>100 students) of first years from two consecutive years. The teaching sessions used were a series of four practicals that involved students following a laboratory practical schedule; and collecting, processing and interpreting experimental data. Following the practical session, the students were required to write up the practical to a set format. Academic staff marked the first cohort, a process that took about twelve to fifteen hours per practical class. The following year the peer-marking cohort marked the write-ups in four one-hour sessions.

Many students believe assessment is the job of the teacher; that peer assessment is hard work and that some student markers are unfair (the title of this article is a quote from a student who had just completed a peer marking session). Nevertheless, peer marking has several educational advantages that need to be explained to students if a peer marking process is to be introduced without resentment (Figure 1) (Fry 1990). The students in the second cohort were prepared for the peer marking process in a preliminary session. Attendance at the session was 'encouraged' by penalising the mark of anyone who failed to attend.

For the peer marking session itself, the class was assembled in a lecture theatre and the practical write-ups were distributed at random. Again, attendance at the session was 'encouraged' by halving the mark of anyone who failed to attend. The marking schedule was distributed and a member of academic staff went through the schedule systematically explaining each point. The schedule was explicit and included instruction/explanation of each point. A small part of a typical marking schedule is shown in Figure 2. The students were required to assign marks appropriately, total the marks and sign to accept responsibility for the accuracy of the marking. The students were also told that a sample of the write-ups would be check-marked by staff. Anyone who felt they had been marked unfairly could have their write-up re-marked by a member of academic staff. However, less than 2% chose to do so.



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**P L A N E T**

On one occasion the same practical write-up was peer marked independently by three students to investigate whether the peer marking process would produce consistent marks. The final marks given by each student differed by less than 2% demonstrating that the results were reliable.

**Student Guide to peer Assessment of Practicals**

**Why are we doing this?**

You should get several things out of this method of assessment which may be new to you:

1. It is an open marking system; therefore you can see what was required and how to improve your work.
2. You see mistakes others make and therefore can avoid them; you also see the standard achieved by others and can set your own work in the spectrum of marks.
3. You get a full explanation of the practical and how you should have processed the data and done the discussion. Therefore your information and understanding is improved.
4. You get practice in assessing others and their work. You will need this skill quite early in a career and you will need to come to terms with the problem of bias; someone who is a good friend may have done poor work; it can be disturbing to have to give them a poor mark.
5. In assessing others you should acquire the ability to stand back from your own work and assess that as well. This is an essential ability in a scientist; an unbiased and objective assessment of the standards you have achieved in your own work. Once you are away from the teacher/pupil relationship (i.e. leave University) you will be the person who decides if a piece of work is good enough to be considered as finished and passed on to your boss.

**The method of marking adopted in this course is designed with the above factors in mind.**

Figure 1. Part of a document used in preparing students for peer marking explaining the benefits to them.

The numbers in parentheses are the marks available. You may award all or part of the available marks depending on how completely the point has been covered. For each point write the mark given and draw a circle round it on the write-up next to the item assessed. At the end add up the marks (don't forget presentation) and write the total mark and your name (legibly) in a circle at the top of the first page.

**Up to (20) marks are available for presentation; assess neatness, clarity, legibility etc as you go through.**

1. Is it dated. All work should be. (1)
2. Is it named. (1)
3. It should have a *title* (1) and a heading of *introduction*. (1)  
[points 4 and 5 omitted]
6. Is there a graph of response/concentration of carbachol?
  - a) it should be titled (2) CARBACHOL CONCENTRATION / RESPONSE RELATIONSHIP (or equivalent).

b) y axis should be labelled RESPONSE (2) with units (e.g. mm; cm; inches; anything will do [even squares] but the unit must be stated) (5)

c) x axis should be labelled CONC CARBACHOL (2) with units in moles/l (M). NOT DOSE. UNITS should be correctly abbreviated (m; m/l; little m and big L are NOT correct abbreviations). Units in moles/ml (never abbreviate moles to m) are just acceptable but you are strongly advised NOT to use this presentation as it causes confusion (8).

d) correctly calculated? volume (0.1 ml) of solution of concentration  $5 \times 10^{-6} \text{M}$  gives amount of  $5 \times 10^{-10}$  moles. This is added to a volume (ml) of 20 ml therefore  $5 \times 10^{-10}$  moles in 20 ml therefore  $2.5 \times 10^{-8} \text{M}$ . NO partial marks - MUST get this completely right (20).

[rest of schedule omitted]

Figure 2. Example of part of a marking schedule used in a peer marking session. The schedule provides an explanation, followed by the marks available for this part of the write-up.

**Peer marking improved student marks**

The two cohorts obtained similar marks for the first practical write-up, suggesting that they were of similar ability, but for the following write-ups the cohort using the peer marking process obtained consistently better marks (Figure 3). A sample of peer marked write-ups from the third practical check marked by academic staff gave a mean mark that did not differ significantly from that awarded in the peer marking process. This indicates that peer marking continued to maintain standards compatible with that of staff marking (Figure 3).

It appears that the students who were in the peer assessment cohort were learning how to improve their practical write-ups through participating in the peer assessment process. The following year the 'experiment' was repeated with the first practical being self-marked and the following three being peer marked. Again, the self-marked/peer-marked cohort obtained consistently better marks in the second, third and fourth practicals (data not shown).

**Peer Marking vs Staff Marking for Four Practical Write-ups**

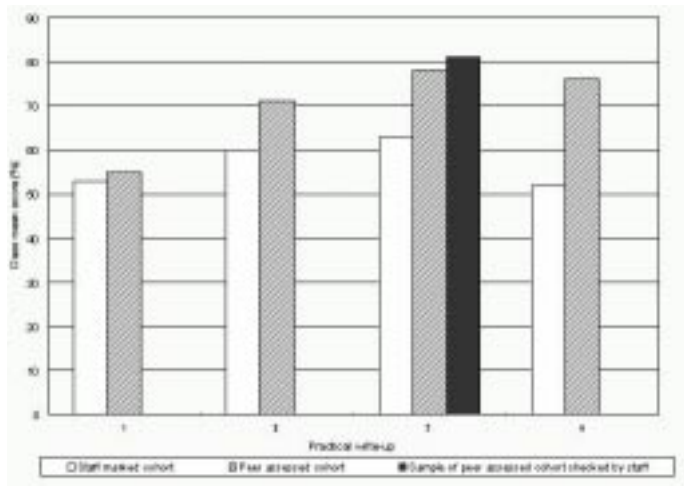


Figure 3. The introduction of peer marking increased the class mean mark over a series of four practicals. The columns show the class mean mark for each of four successive practical write-ups marked by academic staff (open; first cohort) or through the peer marking process (solid; second cohort). The black column shows the data for a sample of the peer marked write-ups which were checked marked by academic staff.

**Peer marking of verbal communications skills**

In the final year, students give short talks on the topic of their project which are assessed for presentation by several academic staff who sit through every talk. When peer marking was introduced the advantages were explained to the students earlier in the year and the class developed an agreed marking schedule. This consisted of 10-15 items characterising good presentation (e.g. audibility, varied expression, suitable body language etc.) each graded out of 5 or 10. Both academic staff and students used this marking schedule and the comparative results show a good correlation (Figure 4). The students were slightly harder markers than academic staff. The high correspondence between staff and students in the assignment of presenters to the top or bottom quartiles of the class was highly comparable (Table 1).

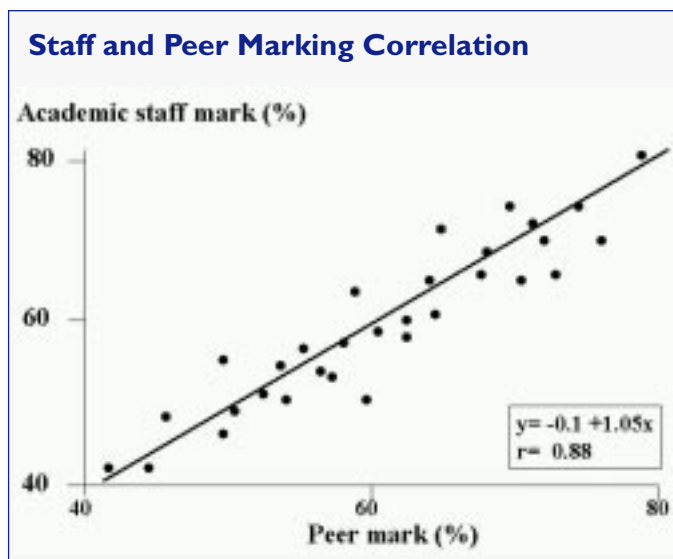


Figure 4. Relationship between marks given by academic staff and by peer markers for presentations skills in verbal communication.

	Marking method	
	Staff marked	Peer marked
Class mean mark	63.2 ± 7.8	60.2 ± 6.1
Top quartile mean mark	77.2 ± 4.8	74.1 ± 5.6
Bottom quartile mean mark	48.2 ± 7.8	44.1 ± 3.9

Table 1. Comparative marks (m±s.e.) awarded by academic staff and by peer markers for verbal communication skills for a sample of 44 student presentations. The correspondence between the academic staff and peer markers to the top and bottom quartiles of the class is also shown.

**Self marking of long essays**

Long (3000 word) essays written by 250 students were marked by academic staff and then self marked by the student author using a set of general criteria (e.g. adequately referenced, well introduced, papers critically assessed etc.). The resulting data is shown in Figure 5. Clearly in individual cases there are major differences between the academic and the self mark and the distribution of marks shows little tendency to correspond to the ideal line. Therefore, the evidence for the validity of this kind of marking is poor. The major difference between this situation and that of the practical write-up is that the latter case used a detailed and explicit marking schedule which was not available for the essay as each was on a different title. While there may be formative value in the self-marking of long essays, the process as used here does not provide evidence of its validity as a summative assessment. The students were generally not able to produce reliable assessment scores on their own essays.

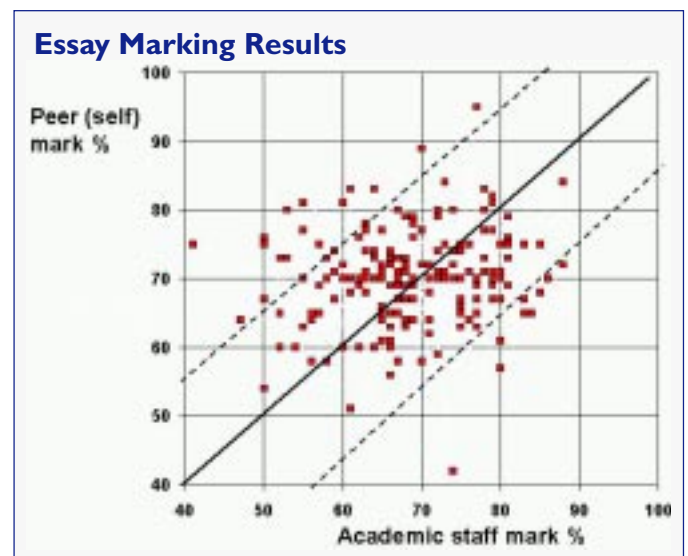


Figure 5. Scatter graph of the mark awarded by academic staff and that awarded by peer (self) marking of a long essay. The solid line represents ideal fit and the broken lines are positioned ± 15% from this line.

**Conclusion**

The peer assessment of practical reports (and to a lesser extent verbal presentations) can be successfully undertaken with the aid of a written marking schedule. This provides a standard of assessment similar to that employed by academic staff and results in a large saving of staff time. Moreover, in the practicals, the introduction of peer marking was accompanied by an increase in the standards achieved by the students. Peer marking may have other educational advantages for the students beyond improving performance (Fry 1990, Figure 1) but this is harder to assess quantitatively. The use of peer assessment in the way outlined above will have applicability in other disciplines and may increase the efficiency of learning and assessment and release academic staff time.

**Note**

The data from the first two examples has been presented in more detail in other papers (Hughes and Large, 1993a; Hughes and Large, 1993b; Hughes, 1995).

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