

# [O24] Formative assessment feedback in pharmacology – encouraging engagement

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## ABSTRACT

Formative assessment feedback is viewed as an essential element in student learning (Black and Wiliam, 1998). This type of feedback was integrated into the learning experience of second year pharmacology students with the intention of improving module performance. Student approaches to study and experience of assessment and feedback were evaluated by means of appropriate questionnaires derived from the (FAST project [www.open.ac.uk/science/fdtl/](http://www.open.ac.uk/science/fdtl/)). Students responded well to the experience. There was a clear improvement in overall module performance in terms of both pass rate and quality of grades obtained. Responses to approaches to study indicated that although the students were well motivated towards achievement and demonstrated some characteristics of strategic learning they were prepared to learn more deeply as they perceived 'understanding' to be an important part of their learning. They also acknowledged the value of immediate feedback and the importance of applying that feedback to their learning.

## INTRODUCTION

Black and Wiliam (1998), Gibbs and Simpson(2003) (<http://www.open.ac.uk/science/fdtl/documents/lit-review.pdf>) and Glover (2004) ([http://www.open.ac.uk/science/fdtl/documents/SHUfinal\\_report.pdf](http://www.open.ac.uk/science/fdtl/documents/SHUfinal_report.pdf)) indicate the value of formative assessment and feedback on student progression and achievement. They refer to potential barriers to progress including the gulf in perception between academic views and student views of the use of feedback, particularly in support of learning. This pilot study was undertaken to encourage student engagement with feedback from formative assessment by sharing with students an understanding of the process within the two frameworks of Gibbs' 11 conditions under which assessment supports learning and Hughes' conditions for good feedback and applying the process to support learning (Glover 2004). The module selected for this pilot study, a year 2 module, BM2025 'Fundamentals of Pharmacology', introduces students to the impact of drugs on physiological systems. The key intention of the process was to improve student performance on the module by promoting engagement with the learning process. A direct emphasis was placed on provision of feedback for each weekly formative workshop assignment conducted throughout the module.

## METHODS

On the first day of the module, evaluation of student approaches to studying was obtained using an Approach to Study Questionnaire (FAST project [www.open.ac.uk/science/fdtl/](http://www.open.ac.uk/science/fdtl/)) which employed a standard Likert scale (strongly agree through to strongly disagree). The learning outcomes of the module were explained to students and the students received an explanation of the emphasis that would be placed on the formative feedback of assignments encountered throughout the module and its purpose in enhancing their learning. The module was conducted on the basis of three contact hours per week for thirteen weeks with a further seven hours of self-directed learning per week required of students. Each session (apart from those used for summative assessment) was conducted in the same way. The first part of the session was an explanation of lecture content which was available to students on the University virtual learning environment well in advance of the timetabled session. This was followed by an extensive session based on knowledge and understanding of the week's lecture content. The final session was a plenary feedback session where students self-marked their workshop exercises and received explanations of methods involved and process as well as required answers. In some weeks the feedback was, quite intentionally, not related to a mark scheme, in order to promote the notion of the workshop and feedback session as a learning experience. Feedback material was made available after each session on the virtual learning environment. To reinforce the emphasis of feedback on learning; students were assured that these workshops were not elements of staff judgement and students' results were not solicited. Summative assessment of student learning was achieved by two staged phase tests, one at the mid-point of the module and the other at the end of the module. At each point of assessment students completed Assessment Experience Questionnaires (FAST project [www.open.ac.uk/science/fdtl/](http://www.open.ac.uk/science/fdtl/)) in order to evaluate their views of formative feedback.

## RESULTS

Based on their responses to the Approaches to Study Questionnaire (Table 1) students demonstrated fairly positive attitudes to their study. Each score is the aggregate of a set of questions designed to assess student attitudes in terms of achieving, reproduction and meaning. Each individual question required a response on a standard Likert scale, ranging from strongly agree to strongly disagree. Many of the students on the module are reading for vocational degrees so it is perhaps no surprise that they have a high orientation towards achievement. Indeed there was strongest agreement with the statement 'It is important to me to do really well in the courses here'. Inevitably students perceive a need to reproduce information, however of the three scores this the lowest, as the response to the meaning orientation questions scores (marginally) the highest with strong agreement with the statements 'My main reason for being here is so I can learn more about the subjects which really interest me' and 'I generally put a lot of effort into trying to understand things which initially seem difficult'.

Staff were encouraged by the initial responses received from the Approaches to Study Questionnaire and subsequently found that a majority of students engaged well with the learning experience on the module. Attendance improved from an average of 65% and 55% in the two previous iterations of the module to over 85%. Use of material from the virtual learning environment was also increased with an 80% engagement. Figure 1 reveals markedly improved module performance by the 2004-2005 cohort of students in terms of average module grade. This cohort averages a grade equivalent to a mid 2.2 whilst the previous cohorts posted the equivalent of third class grades. This distinct improvement is further highlighted by the spread of grades achieved by the 2004-2005 cohort with more students gaining A, B and C grades. Fewer students failed the module in comparison to the two previous years (Table 2)

**Table 1: Approaches to study questionnaire**

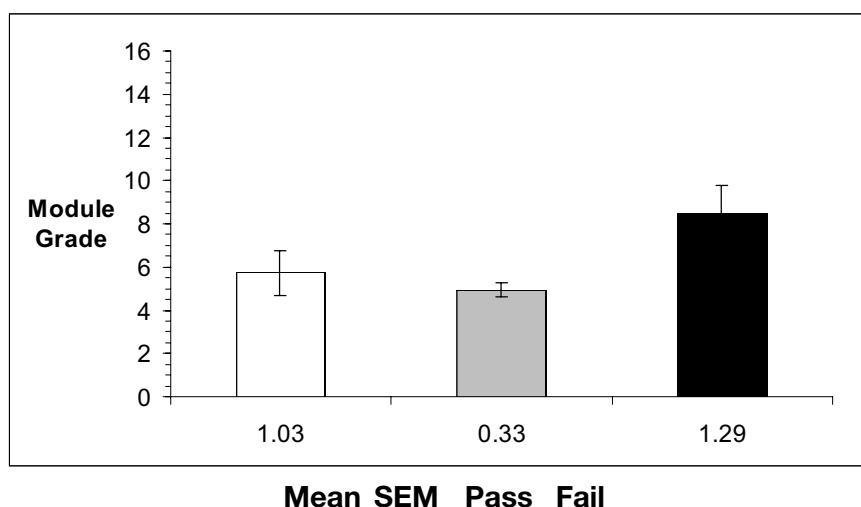
	BM2025	Social Science	National All Subjects
<b>Achieving Orientation:</b> Score out of 24 indicates competitiveness, well organised study methods and hope for success.	17.3	12.7	12.8
<b>Reproducing Orientation:</b> Score out of 24 indicates a surface approach to learning. Students who score high on this scale attempt to memorise and reproduce subject matter and have a desire to accumulate knowledge. They tend to keep narrowly to the syllabus as laid down in the course descriptions and not follow up interests on their own.	15.1	13.7	13.5
<b>Meaning Orientation:</b> Score out of 24 indicates a deep approach to learning, an intention to make sense of the subject, an interest in the subject itself and a desire to learn. Students who score high on this scale follow up their own interests even if outside what is assessed.	17.5	14.2	14.3

and the final results are likely to be improved following resit opportunity later in the year. Whilst cohort comparison from year to year is somewhat equivocal, it should be noted that similar students populate the module each year. It will be useful to compare their performance in this module, set against other modules studied at the end of the second year. Nevertheless, student performance on the module does indicate that encouraging engagement through the medium of formative feedback has been effective in improving student performance.

Students completed an Assessment Experience Questionnaire at two points in the course of the module, immediately after the two summative assessment experiences. The results in Table 3 indicate that there was relatively little difference in student perception between the two different times of completing the questionnaire. In each category relatively high scores are observed, certainly commensurate with those reported by Gibbs,

Simpson and Macdonald (2003) for two other institutions. In terms of amount and distribution of study effort, although effort was expended during the weeks of the module students indicated that there was an increase in effort immediately prior to summative assessment with strong agreement with the statement 'In weeks when assignments are due I put in many more hours'. These assignments were perceived by students to be clear and challenging. In a sense this is important as the phase tests experienced by the students are based in style on the format of the workshops that they have been completing each week. The intention was that the summative assessment should reflect the manner of learning and the style of formative assessment encountered through the module. Students recorded strongest agreement with the statement 'Tackling the assignments really makes me think' which was gratifying as staff had designed the assessment to elicit this approach rather than requiring a regurgitated answer.

Figure 1: Module results – mean grade derived from an alphanumeric scale

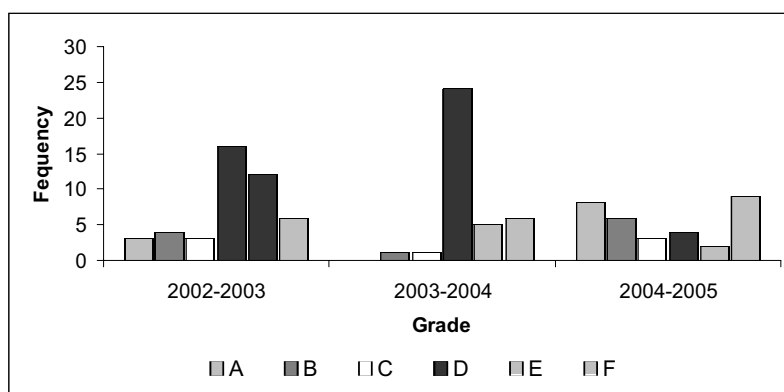


	Mean	SEM	Pass	Fail
2002-2003 (n=44)	5.73	1.03	26	18
2003-2004 (n=37)	4.94	0.33	26	11
2004-2005* (n=32)	8.5	1.29	21	11

\*Formative feedback introduced

Footnote: 2002–2003 and 2003–2004 data includes resit retrieval. 2004–2005 resits yet to be taken

Figure 2: Grade distribution of students on the module



**Grade Distribution**

Year	A	B	C	D	E	F
2002-2003	3	4	3	16	12	6
2003-2004	0	1	1	24	5	6
2004-2005	8	6	3	4	2	9

**Table 2: Overall performance of students expressed as number and (percentage)**

Year	n	Pass	Fail
2002-2003	44	25 (57%)	19 (43%)
2003-2004	37	17 (46%)	20 (54%)
2004-2005*	32	21 (66%)	11 (34%)

\* Formative Feedback introduced

Although a reasonable score is noted for the quality and timing of feedback, students were more uncertain in their responses. Feedback was seen to be immediate and that it provided guidance. Students also agreed strongly with the statement that 'I would learn more if I received more feedback'. In terms of overall quality of feedback, students agreed strongly with the statements 'The feedback helps me to understand things better', 'The feedback shows me how to do better next time' and 'Once I have read the feedback I understand why I got the mark I did'. More importantly for this study the response to questions on what students did with the feedback were gratifying in that they clearly used the feedback to guide their learning. It appeared that students valued the feedback in this context and the fact that it was provided with a strong measure of student independence through the process of self assessment concurs with similar finding by Taras (2003) in a study involving language students. Strong agreement was recorded with the statements 'I read the feedback carefully and try to understand what the feedback is saying', 'I use the feedback to go over what I have done in the assignment'. The phase test themselves were seen as a positive influence on the quality of learning, students disagreed with the statement 'In the exam you can get away with not understanding and still get good marks'.

In the course of this pilot study, staff have aimed to fulfil Gibbs' (2003) 11 conditions for feedback in that:

1. Assessed tasks capture sufficient study time and effort
2. These tasks distribute student effort evenly across topics and weeks
3. These tasks engage students in productive learning activity
4. Assessment communicates clear and high expectations to students
5. Sufficient feedback is provided, both often enough and in enough detail
6. The feedback is provided quickly enough to be useful to students
7. Feedback focuses on learning rather than on marks or students themselves
8. Feedback is linked to the purpose of the assignment and to criteria
9. Feedback is understandable to students, given their sophistication
10. Feedback is received by students and attended to
11. Feedback is acted upon by students to improve their work or their learning

The module team has altered class practice by moving from a fairly instructivist approach to a more constructivist approach which places the student at the centre of the learning experience and affords them more autonomy. At the same time an attempt has been made to reduce the emphasis on summative assessment though the cohort of students is fairly strategic in its approach in that it does focus on preparation for summative testing. Nevertheless the students clearly recognised that assessment did require deeper learning. Formative self-

**Table 3: Student response to the Assessment experience questionnaire**

	<b>Week 6 after Phase Test 1</b>	<b>Week 13 after Phase Test 1</b>
<p><b>1 Amount and distribution of study effort</b> Score out of 30. A high score indicates that students study evenly across weeks and across topics, and feel that they have to in order to do well. A low score indicates that students study effort is allocated narrowly to assessed topics and those weeks where assessment takes place, and feel they can get away with this and still do well.</p>	19.2	19.1
<p><b>2 Assignments and learning</b> Score out of 30. A high score indicates that students see assignment requirements as clear and challenging, requiring understanding. A low score indicates that assessment demands are perceived as unclear and that assignments are seen as unchallenging and as not requiring understanding.</p>	21.9	24.4
<p><b>3 Quantity and timing of feedback</b> Score out of 30. A high score indicates that students perceive that they get plenty of feedback fast enough. A low score indicates that students perceive the feedback to be insufficient to support their learning, and too late to be useful.</p>	19.9	22.9
<p><b>4 Quality of feedback</b> Score out of 35. A high score indicates that students find the feedback understandable and useful, explaining both grades, misunderstandings and how to improve. A low score indicates that the feedback is neither comprehensible nor useful, and only indicates how well the student is doing in relation to others.</p>	21.1	21.7
<p><b>5 What you do with the feedback</b> Score out of 35. A high score indicates that students use the feedback to guide follow-up learning, to tackle subsequent assignments differently, and to revise. A low score indicates that the feedback has little impact on subsequent studying and learning.</p>	23.5	23.9
<p><b>6 The examination and learning</b> Score out of 35. A high score indicates that the perceived exam demands had a positive influence on the quality of learning undertaken during the course and during revision and that the exam itself was a learning experience. A low score indicates that the perceived exam demands encouraged memorisation and subsequent forgetting.</p>	22.7	20.9

assessment and noting of the feedback by students was perceived by staff as key to encouraging engagement with the process. Black and Wiliam (1998) clearly state that self assessment is an essential component of formative assessment. During the early part of the module staff took time to explain the process of self assessment and offered guidance to indicate how the feedback related to the assignments. To some extent the process of learning included the formative feedback so that it was not considered as a separate entity, as recommended by Orsmond, Merry and Reiling (2005).

Whilst this pilot study has be effective in achieving its aims, the module team will be reviewing the feedback currently given in order to extend its scope in terms of subject content and, perhaps more significantly its value in feeding forward. The study has served as a pilot for a larger study on a first year module in Human Physiology where an additional element of reflective diaries has been added in order to support the students' engagement on that module with the feedback given.

## CONCLUSIONS

The introduction of dedicated formative feedback which was integrated into the students' learning experience has had a positive influence on student performance on the module. More effective engagement with the learning process has been noted and students indicate a positive view of their experience of formative feedback.

## REFERENCES

- Black, P. and Wiliam, D.** (1998) Inside the blackbox: Raising standards through classroom assessment. *Phi Delta Kappan* 80 pp139-148.
- Gibbs, G. and Simpson, C.** (2003) (<http://www.open.ac.uk/science/fdtl/documents/lit-review.pdf>)
- Gibbs, G., Simpson, C. and Macdonald, R.** (2003) EARLI Conference Padova <http://www.open.ac.uk/science/fdtl/documents/earli-2003.pdf>
- Glover, C.** (2004) [http://www.open.ac.uk/science/fdtl/documents/SHUfinal\\_report.pdf](http://www.open.ac.uk/science/fdtl/documents/SHUfinal_report.pdf)
- Orsmond, P., Merry, S. and Reiling, K.** (2005) Biology students' utilisation of tutors' formative feedback: a qualitative interview study *Assessment and Evaluation in Higher Education* 30 pp369-386
- Taras, M.** (2003) To Feedback or Not to Feedback in Student Self-assessment Assessment and Evaluation in Higher Education 28 pp549-565