

FORMATIVE ASSESSMENT IN SCIENCE TEACHING: FAST

WHAT IS FAST ABOUT?

If you are under a lot of pressure then you will just concentrate on passing the course. I know that from bitter experience. One subject I wasn't very good at I tried to understand the subject and I failed the exam. When I re-took the exam I just concentrated on passing the exam. I got 96 per cent and the guy couldn't understand why I failed the first time. I told him this time I just concentrated on passing the exam rather than understanding the subject. I still don't understand the subject so it defeated the object, in a way."

(Oceanography MSc student)

Any interview with a student about their studying will reveal very quickly that assessment dominates students' experience of learning and that many of their decisions about what to study, and in what depth, are framed by their perceptions of 'what counts'. Things we spend much of our time on as teachers, in the belief that they are valuable to students, may turn out not to be very cost-effective. For example students may not even read your feedback on assignments, particularly if it is not returned almost immediately.

"The assignments arrived back to me after the next assignment was due to be handed in."

Open University student

Feedback may be so specific to an assignment, justifying a grade or following a detailed marking scheme, that there is nothing generic that can be carried forward to the next assignment.

"In a science subject, where the subject material varies considerably as the course progresses, it is very difficult for feedback on one assignment to relate to the next. There is no link to make the understanding clearer. (feedback) on force and motion does not make answering questions on quantum theory any more understandable."

Open University student

Other students crave more feedback on their progress than they receive:

"Assignments which did not contribute to the score I got for the course, but which provided feedback would have been useful: often I didn't know whether I understood something correctly if it wasn't covered in the [assignments]"

Open University student

Students can be 'selectively negligent', missing out things they suspect will not be assessed. Some students are 'cue-seekers', going out of their way to identify what is likely to be assessed while others are 'cue deaf' and whatever you tell them about what really matters goes straight over their heads. Students may 'fake good' and go to considerable lengths to cover up what they do not know or understand, rather than using assignments as learning opportunities. In some contexts students only put study time into assignments that carry marks and do no other studying at all, resulting in a very uneven study pattern across the course.

In contrast, students can find some forms of examination revision an effective learning opportunity:

"I find an examination... forces me to revise and restudy all the course which aids understanding and brings it together more effectively."

Open University students' response to feedback from their tutors is overwhelmingly positive (as it ought to be given the resources allocated to it) but financial constraints are obliging us to look closely at our effectiveness. The FAST project is about how assessment supports, or obstructs, student learning, and how you can redesign patterns of assessment, assignments, exams and feedback, to improve learning. It is not about measuring learning and nor is it about any particular assessment method (such as self assessment or computer based assessment). It will borrow assessment methods from other projects where it seems likely that they can address particular learning problems that have been identified.

WHAT FAST IS DOING?

The FAST project, based at the Open University and Sheffield Hallam University, has been evaluating the way students respond to patterns of assessment, and to feedback on assignments, in fifteen courses in Physics, Chemistry, Bioscience and Astronomy. These evaluations have used a questionnaire developed by the project. The AEQ (Assessment Experience Questionnaire) measures, for example, the extent to which students pay attention to and use the feedback on their assignments. The questionnaire is based on a literature review, which identified eleven ways in which assessment influences student learning, and on open-ended interviews of Open University Science students.

At the Open University the results of using the AEQ with 1,050 students has identified two issues to explore in more depth and two parallel research and development projects are now in operation:

1. *How students respond to examinations:* in terms of the way they orient their study behaviour during the course, and in terms of the depth of their approach to studying, as a result of their expectations about what will be assessed in the exam and what will count in terms of marks. This is of particular interest on courses where, for example, course evaluations have shown that a higher proportion of students than normal feel unprepared for the exam, or where course work marks do not correlate highly with exam marks. The aim will be to understand what is going on sufficiently well to be able to redesign exams and communicate their demands more clearly. The study will involve tutors interviewing students, followed by a questionnaire survey, on six courses. The impact of changes to examinations on student learning will be measured by re-administering the AEQ.

2. *How students use tutors' feedback on assignments:* the main course delivery cost at the Open University is paying tutors to write extensive feedback on regular assignments so it matters a great deal what kinds of feedback students make most use of. A group of tutors will analyse the feedback provided by other tutors using a detailed coding system to categorise what tutors have written, and then students will be interviewed to find out how they respond to and make use of each category of feedback. The study will also explore the usefulness of specimen answers as feedback. The aim will be to brief tutors to re-focus their efforts towards those categories of feedback that students find most helpful and act upon, and to modify the use of specimen answers. The impact of changes will be monitored by a re-examination of the feedback tutors provide and the use students make of it.
3. *Multiple sources of feedback:* at Sheffield Hallam University the focus is rather different. Results from surveys of Science courses using the AEQ showed that students felt they were receiving less written feedback than they would like. However, lecturers believe that they provide comprehensive oral feedback in class and informally. A follow-up study is exploring students' perceptions of, and use, of the variety of formal and informal, written and oral feedback that students receive. The aim is to make sure that students make maximum use of the expensively provided feedback and that feedback effort is well targeted.

HOW TO GET INVOLVED

A Special Interest Group (SIG) on Formative Assessment in Science is being set up, supported by both LTSN Bioscience and LTSN Physical Sciences. The SIG will have access to substantial funding over three years to:

- » meet and discuss formative assessment issues and practices;
- » carry out a cycle of evaluation, development and re-evaluation of formative assessment in SIG members' own courses;
- » collate and disseminate case studies of effective practice in formative assessment;

- » support other Science departments in carrying out similar evaluation-led improvement processes.

The SIG met for the first time on 18 September, 2003 to plan its activities. To join and receive updates on activities, contact: Evelyn Brown, email: j.e.brown@open.ac.uk

OUTCOMES

The FAST project will produce:

- » a conceptual framework for making sense of the way students respond to assessment, identifying all the main influences on student learning;
- » an evaluation tool for finding out the extent to which positive influences of assessment on learning are evident on a particular course;
- » evaluation tools for exploring specific assessment issues in more depth: at present this consists of a coding system for different kinds of feedback on assignments; a questionnaire about students' perceptions of different forms of feedback, and a questionnaire about students' perceptions, of and study responses to, exams;
- » case studies of using these evaluation tools to diagnose problems and of making changes to assessment to improve student learning;
- » a framework for linking potentially helpful assessment tactics to problems: for example using two-stage tests with the first stage formative and the second stage summative, so that students pay attention to the feedback provided on the first stage. This will be designed to enable teachers to say – 'if my course is suffering from this problem then this is a potential solution.'

CONTACT

If you would like further information on the FAST project please contact Evelyn Brown, email: j.e.brown@open.ac.uk or visit our website at: <http://www.open.ac.uk/science/fdtl/index.htm>

Professor Graham Gibbs
The Open University
g.gibbs@open.ac.uk

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