

How to use formative feedback to help students achieve better marks in summative assessment.

Overview

Assessment and feedback are key aspects of teaching and ones that students would like us to do better across the Faculty of Science and Engineering, as reported in course unit surveys and the National Student Survey (NSS).

The overall purpose of this document is to assist course unit leaders and others to use appropriate formative feedback (also known as ‘assessment for learning’) for their courses and students, and ultimately to help students achieve better marks in summative assessment.

This document combines practical advice and selected supporting evidence from the literature for different approaches to formative assessment and feedback, allowing you to focus on the sections most relevant for you and your course unit(s). For example:

- Automatically marked **Multiple Choice Questions (MCQs)** in Blackboard
- **Classroom response systems** (e.g. ResponseWare)
- The potential value of **testing/retesting**, compared with study/revision
- **Audio feedback** and its benefits over written feedback
- **Feedforward** and what it can offer for course units with high-stakes final assessments at the end of the semester
- **Peer feedback**

Contents

Introduction	
• checklist for reviewing feedback opportunities in your course	2
Assessment and Feedback	
• Principles of Good Assessment (11) and Feedback (7)	3
Automatically marked Multiple Choice Questions (MCQs) in Blackboard	
• Question types & limitations, writing good questions, questions for critical thinking	6
Classroom response systems (e.g. ResponseWare)	
• Uses, evidence from literature	9
The potential value of testing/retesting, compared with study/revision	
• Evidence from literature and implications for practice	9
Audio feedback and its benefits over written feedback	
• Student perceptions & impact on use of feedback, time savings for instructors	10
Feedforward	
• 2 quick examples that can be implemented quickly	11
A case for Peer Feedback	
• Evidence from the literature and possible tools for implementation	12
References & Bibliography and eLearning Training opportunities	14
Appendix: Audio Feedback template	15
About the author	15

Introduction

“Effective assessment and feedback equips learners to study and perform to their best advantage in the complex disciplinary fields of their choice, and to progress with confidence and skill as lifelong learners, without adding to the assessment burden on academic staff.” (JISC, 2010: 8)

Biggs (Biggs and Tang, 2009) argues that deep learning happens when the curriculum is '**constructively aligned**' - put simply, **students learn more deeply when the learning outcomes are aligned with teaching and assessment** (Mathieson, 2009).

The NSS has “consistently reported lower levels of satisfaction with assessment and feedback than with other aspects of the higher education experience” (*JISC, 2010: 8*). Representatives of the student body have stated:

“We would like to see all universities and colleges implement a systematic policy to enhance traditional teaching methods with new technologies [and] leverage technology to provide innovative methods of assessment and feedback.’ *National Student Forum Annual Report 2009*” (*ibid.*)

The following checklist can help identify a focus for formative assessment and feedback within a course unit or programme:

1. Ensure you have appropriate **learning outcomes** for your course unit.
2. Check that the **summative assessment measures only these learning outcomes**.
 - a. Even better: review how well your summative assessment reflects principles of good assessment, e.g. the REAP project – [see below](#).
3. **Review course content** to confirm that everything needed for students to achieve the learning outcomes is included and that only minimal, clearly identified additional / stretch content is present.
4. Does your course unit signpost sufficient **further resources/sources of help for students who may be struggling?**
5. What provision is made for **good feedback practice** within the course unit? How could this be improved ([see feedback principles below](#))?
6. For final year, undergraduate course units: Review your course unit against assessment and feedback related NSS questions. For 2017, these are:
 - The criteria used in marking have been clear in advance.
 - Marking and assessment has been fair.
 - Feedback on my work has been timely.
 - I have received helpful comments on my work.

Assessment and Feedback

JISC (2010: 10-11) suggests four broad perspectives on learning, each of which “makes different assumptions about the nature of learning and suggest different approaches to assessment and feedback”, as summarised in this table.

Perspective on learning	Assumption	Assessment	Feedback
Associative	Learning as acquiring competence Learners acquire knowledge by building associations between different concepts. Learners gain skills by building progressively complex actions from component skills.	Concepts and competencies frequently assessed at micro level and in combination through macro-level tasks.	<ul style="list-style-type: none"> ■ Expert feedback focusing on weaknesses in skills and conceptual understanding ■ Interactive environments for knowledge and skills acquisition
Constructivist	Learning as achieving understanding Learners actively construct ideas by building and testing hypotheses.	Assessment by means of experimentation, discovery and inquiry-based tasks.	<ul style="list-style-type: none"> ■ Self-generated feedback arising from reflection and self-assessment ■ Interactive discovery environments with opportunities for self-testing
Social constructivist	Learning as achieving understanding Learners actively construct new ideas through collaborative activities and dialogue.	Collaborative and cooperative tasks involving shared expression of ideas. Participation by learners in the design of assessment tasks.	<ul style="list-style-type: none"> ■ Peer feedback arising from collaborative activities and dialogue ■ Interactive environments that support sharing and peer feedback
Situative	Learning as social practice Learners develop their identities through participation in specific communities of practice.	Holistic assessment in authentic or simulated professional contexts. Participation in social practices of inquiry and assessment.	<ul style="list-style-type: none"> ■ Socially produced feedback from multiple sources ■ Feedback derived from authentic real-life tasks ■ Interactive environments that simulate professional practice

Table 1: Perspectives on learning and approaches to assessment and feedback

Formative assessment refers to activities that enable learners and practitioners to monitor learning, and to use the information generated to align subsequent learning and teaching activities. (JISC 2010)

Principles of Good Assessment

The Re-Engineering Assessment Practices (REAP, see Nicol 2007) principles of good assessment and feedback, developed during 2005–2007, provide a framework for discussing how assessment and feedback can benefit learning.

Assessment design should:

"empower"

1. Engage students actively in identifying or formulating criteria
2. Facilitate opportunities for self-assessment and reflection
3. Deliver feedback that helps students self-correct
4. Provide opportunities for feedback dialogue (peer and tutor-student)
5. Encourage positive motivational beliefs and self-esteem
6. Provide opportunities to apply what is learned in new tasks
7. Yield information that teachers can use to help shape teaching

"engage"

8. Capture sufficient study time and effort in and out of class
9. Distribute students' effort evenly across topics and weeks.
10. Engage students in deep not just shallow learning activity
11. Communicates clear and high expectations to students.

Adapted from [Nicol and Macfarlane-Dick \(2006\)](#) and [Gibbs and Simpson \(2004\)](#)

Source: JISC, 2010

Principles of Good (Formative) Feedback

Across decades of research (for example, see Kulhavy, 1977 and Nicol and Macfarlane-Dick, 2006), feedback has been recognised as valuable both for “the acquisition of basic skills and higher mental processes”. (Riccomini, 2002: 215)

In their evaluation of research on the form and content of feedback, Kulhavy and Stock (1989) categorise feedback elaboration as *task specific* (taking material only from the assessment), *instruction based* (including material from the lesson) or *extra-instructional* (including material not covered in the lesson or the assessment). **They suggest that to be most effective, feedback should be tailored according to the learner’s performance and perception.**

In 2006, Nicol and Macfarlane-Dick re-interpreted the research on formative assessment and feedback within a model of ‘self-regulated learning’. Their work identified seven principles of good feedback that, if implemented, would encourage learners to regulate their own learning – for example by monitoring, evaluating, generating feedback on, and making judgments about, their work:

1. Helps clarify what good performance is (goals, criteria, expected standards);
2. facilitates the development of self-assessment (reflection) in learning;
3. delivers high quality information to students about their learning;
4. encourages teacher and hear dialogue around learning;
5. encourages positive motivational beliefs and self-esteem;
6. provides opportunities to close the gap between current and desired performance;
7. provides information to teachers that can be used to help shape the teaching.

Source: Nicol and Macfarlane-Dick, 2006

Automatically marked Multiple Choice Questions (MCQs) in Blackboard

Types of quiz questions in Blackboard

Many question types are available in Blackboard, most are automatically marked and 5 are simple and easy to use – other types, where appropriate, can be used with caution (and advice from the eLearning Team). See the table below for more information.

Question Types	Recommendation	Method of Marking
Multiple Choice	Simple and easy to use - see notes	Automatic
Opinion scale / Likert	Simple and easy to use - see notes	Automatic
True / False	Simple and easy to use - see notes	Automatic
Either / Or	Simple and easy to use - see notes	Automatic
File response	Simple and easy to use - see notes	Manual
Quiz bowl	Use with care - see notes	Automatic
Fill in the blank (single)	Use with care - see notes	Automatic
Fill in multiple blanks	Use with caution - see notes	Automatic
Essay	Use with care - see notes	Manual
Multiple answer	Use with care - see notes	Automatic
Hot spot	Use with care - see notes	Automatic
Jumbled sentence	Use with care - see notes	Automatic
Matching	Use with care - see notes	Automatic
Ordering	Use with care - see notes	Automatic
Short answer	Use with care - see notes	Manual
Calculated numeric <u>without</u> exponential numbers	Use with care - see notes	Automatic / Manual
Calculated numeric <u>using</u> exponential numbers	Not recommended for use - see notes	Automatic / Manual
Calculated Formula	Use with caution - see notes	Automatic / Manual

Source: FSE eLearning Training Materials (2017)

Some people have concerns that multiple choice questions cannot robustly test deep learning or critical thinking. While not all multiple choice questions will achieve this (some are designed to test knowledge recall), the information below can help in designing robust questions to assess your students appropriately, saving you marking time and offering your students immediate feedback.

What makes a good question?

1. start with the stem of the question
2. write the correct answer
3. write the alternatives/distractors
4. limit the number of answer options to three, four, or five.

Some techniques for writing multiple-choice items that demand critical thinking:

Premise-consequence: students must identify the correct outcome of a given circumstance. To increase the difficulty, provide more than one premise.

Example: If nominal gross national product (GNP) increases at a rate of 10% per year and the GNP deflator increases at 8% per year, then real GNP:

- a) Remains constant.
- b) Rises by 10%.
- c) Falls by 8%.
- d) Rises by 2%.

Analogy: students must map the relationship between two items in a different context.

Example: Email is to an unmoderated listserv as office hours are to:

- a) Class lecture.
- b) Class discussion.
- c) Review sessions.
- d) Tutorials.

Case study: a single, well-written paragraph can provide material for several follow-up questions.

Example:

Alice, Barbara, and Charles own a small business: the Choc-Full-o-Goodness cookie company. Because Charles has many outside commitments and Barbara has a few, Alice tends to be the most in touch with the daily operations of Choc-Full-o-Goodness. As a result, when financial decisions come down to a vote at their monthly meeting, they have decided that Alice gets eight votes, Barbara gets seven, and Charles gets two - with nine being required to make the decision.

- A. According to minimum-resource coalition theory, who is most likely to be courted for their vote?
 - a. Alice
 - b. Barbara
 - c. Charles
 - d. no trend toward any specific person.
- B. In this scenario above, according to minimum-power coalition theory, who is most likely to be courted for their vote?
 - a. Alice
 - b. Barbara

- c. Charles
- d. no trend toward any specific person.

Incomplete scenario: students must respond to what is missing or needs to be changed within a provided scenario.

Note: when using a graphical image, try to lay it out differently from the way the students have seen it in class or recommended texts. This is equivalent to using new language to represent a familiar concept and prevent students from using rote memorisation to answer the question.

Example: use the diagram below to answer the following questions.

- a) What belongs in the empty box in the upper right corner of the diagram?
 - 1. Hardware devices
 - 2. Client services the NetWare
 - 3. Logon process
 - 4. Gateway services to NetWare
- b) if the application is resided below the heavy black line, they would:
 - 1. be open to hackers on the network.
 - 2. compete with the OS for memory.
 - 3. be pre-emptively multi-tasked.
 - 4. launch in individual NTVDMs.

Problem/solution evaluation: students are presented with a problem and a proposed solution. They must then evaluate the proposed solution based upon criteria provided.

Example: A student was asked the following question: “briefly list and explain the various stages of the creative process.”

This student gave the following answer:

“The creative process is believed to take place in five stages, in the following order: orientation, when the problem must be identified and defined, preparation, when all the possible information about the problem is collected, incubation, when no solution seems on site and the person is often busy with other tasks, elimination, when the person experiences a general idea of how to arrive at a solution to the problem, and finally verification, when the person determines whether the solution is the right one for the problem.”

How would you judge this student’s answer?

- a) EXCELLENT (all stages correct in the right order with clear and correct explanations)
- b) GOOD (all stages correct in the right order, but the explanations are not as clear as they should be)
- c) MEDIOCRE (one or two stages are missing OR the stages are in the wrong order, OR the explanations are not clear OR the explanations are irrelevant)
- d) UNACCEPTABLE (more than two stages are missing AND the order is incorrect AND the explanations are not clear AND/OR they are irrelevant)

Note: Draper (2009) offers six possible learning designs based on MCQs that can be utilized for what he terms electronic voting systems (EVS). He further suggests a new function for e-assessment, that of “catalytic assessment, where the purpose of the test questions is to trigger subsequent deep learning without direct teaching input” (Draper, 2009: 285).

Question limitations in BlackBoard

- equation editor
 - limited in terms of question complexity
 - other systems available for complex maths subjects: Maple TA, LaTeX, MathML
- question types
 - some easier to create than others
 - images in question only

For further assistance with question limitations, please consult the [FSE eLearning Team](#).

Classroom response systems (e.g. ResponseWare)

Classroom response systems, such as ResponseWare, can be used with PowerPoint to provide in-class (informal) tests of students individually, or in groups; this can be used to check comprehension, for revision, and for peer teaching, among other approaches.

Fies and Marshall (2006) provide a review of the literature about Classroom Response Systems. Additionally, (as mentioned above...) Draper (2009) offers six possible learning designs based on MCQs that can be utilized for what he terms electronic voting systems (EVS). He further suggests a new function for e-assessment, that of “catalytic assessment, where the purpose of the test questions is to trigger subsequent deep learning without direct teaching input” (Draper, 2009: 285).

The potential value of testing, compared with study/revision

Studies have suggested that taking a test not only assesses current knowledge, but supports later retention – the ‘testing effect’. Roediger and Karpicke (2006: 249) report that “prior testing produced substantially greater retention than studying, even though repeated studying increased students’ confidence in their ability to remember the material”.

In 2010, further work indicated that:

“(1) repeated testing enhances retention more than did taking a single test, (2) testing with feedback (restudying the passages) produced better retention than testing without feedback, but most importantly (3) there were no differences between expanding and equally spaced schedules of retrieval practice.” (Karpicke and Roediger, 2010: 116)

Audio feedback and its benefits over written feedback

Several studies have reported benefits of audio feedback in terms of learner perception and engagement. Ice et al (2007) reported four themes arising from semi-structured interviews with students that account for their preference for embedded asynchronous audio feedback:

- 1) Student perception that audio feedback is more effective at conveying nuance
- 2) Feelings of increased involvement/enhanced learning community
- 3) Increased retention of content
- 4) The perception that the instructor cared more about the student

Lunt and Curran (2010: 759) report not only that “students are at least 10 times more likely to open audio files compared to collecting written feedback” but also that students follow up with the tutor about disappointing audio feedback.

Ribchester et al (2007) suggest that by concealing the final mark until the end, students engage more deeply with the feedback. Strikingly, analysis reported by Ice et al (2007: 3) showed that:

“students were three times more likely to apply content for which audio commenting was provided in class projects and there was a significant increase in the level at which students applied such content.”

Audio feedback can be much quicker for instructors to provide. Ice et al (2007) report a mean feedback volume of 129.75 words for text (taking 13.43 minutes for the instructor to provide) and 331.39 for audio (taking 3.81 minutes). This matches the suggestion from Chan et al (2006) of a limit of three to five minutes for audio feedback prevents too much feedback being given to the students.

Audio feedback can be provided relatively easily to individual students using Turnitin assignments, or you could record an audio file and upload it as a file in Blackboard, which is suitable for whole-cohort feedback (and potentially for individual or groups of students, albeit with a little more administration).

For the best audio quality, it is recommended that you use a headset when recording audio feedback - i.e. headphones with microphone.

See the [Appendix](#) for an audio feedback template.

Feedforward

“Good results may also be obtained when learners apply assessment criteria to examples of completed work before producing their own assignments,” (JISC 2010: 13), thus providing a more active use for (anonymous) former students’ work in individual and group work in classes or tutorials.

Alternatively, students can be briefed on the key mistakes students made in last year’s assessments –possibly followed by formative assessment and feedback, to help them learn from previous cohort(s) errors. This approach has been used successfully elsewhere at the University, for example in Geography teaching, as reported at the January 2013 Humanities eLearning Showcase:

“Intercohort feedback: effects on student performance and evaluation scores, Jeff Blackford (School of Environment and Development)

For short courses, especially those with large numbers, the options for ‘feedback’ (defined here as students getting constructive and useful information about how to improve their work) are limited. Typically, Blackboard based quizzes are used, and perhaps responses to individual questions in discussions...

Feedback from exams is via tutorials in the next semester or even the next academic year, when to some extent it is too late; at least for the purposes of the evaluation questionnaires for that course unit. In addition, students make the same mistakes year on year- rather than a gradual improvement, especially in assessed field and practical work.

To address both of these issues, a trial has been undertaken using explicit ‘inter-cohort feedback’- passing the feedback from the previous group on to the next year group, before they embark on any assessment. This was implemented in 4 courses over the years 2010-11 and 2011-12, two courses in year 1, one second year course and one third year option.

Different modes of delivery have been tried, including lecture based ‘do’s and don’t’s’ slides, documents on Blackboard, small-group discussions and paper handouts. ‘How and when’ remain issues to discuss, however.

Results are a small increase in some ‘feedback’ scores, but more significant increases in the consistency of- and average higher grades for- coursework, which may be partly due to this feedback. Discussions with randomly selected small groups of students the following year suggests that they are not aware of or don’t remember the intercohort feedback from their courses the previous academic year!”

A case for Peer Feedback

We tend to think of feedback as something a teacher provides, but if students are to become independent lifelong learners, they have to become better at judging their own work.

Students learn not by listening to transmitted information, but by actively constructing their own understanding of that information and deriving meaning from it. If I, as a teacher, deliver feedback to you, what do you have to do with that feedback? First of all, you have to decode my feedback, then you have to internalise it and then use that information to make a judgement about your own work. All these activities are acts of self-evaluation, so why are we spending so much time trying to improve the quality of teacher feedback?

If you really want to improve learning, get students to give one another feedback. Giving feedback is cognitively more demanding than receiving feedback. That way, you can accelerate learning.

David Nicol Professor of Higher Education, University of Strathclyde
(JISC 2010:13)

Technologically, peer feedback can be implemented using a PeerMark Assignment in Turnitin. Other options may also be available – please contact the eLearning Team (elearning@manchester.ac.uk) for further information and guidance.

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An academic's guide: Blackboard MCQs for formative assessment

<http://www.elearning.eps.manchester.ac.uk/blog/2017/an-academics-guide-blackboard-mcqs-for-formative-assessment/>

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See also: <https://www.research.manchester.ac.uk/portal/David.Spendlove.html> and <https://davidspendlove.wordpress.com/>

eLearning Training Courses and Bespoke Support

You can book eLearning training courses about Assessment via the Training Catalogue (<https://app.manchester.ac.uk/training/default.aspx>) – search “EPSELT” and click the course you are interested in – for example:

EPSELT004 Blackboard basics - assignments and quizzes

EPSELT011 Blackboard quizzes for formative assessment

To book a bespoke support session with an eLearning specialist (typically 1-hour, in Sackville Building or elsewhere on request):

<http://www.elearning.eps.manchester.ac.uk/bookings/>

Appendix: Audio Feedback template

Duration: 3-5 mins

- 1) Intro:
 - a) Acknowledge learner's work
 - b) State what will be covered:
 - i) Components of concepts
 - ii) User tips
 - iii) PAUSE
 - 2) Components of concepts
 - a) Intro
 - b) Explain
 - c) What will be next
 - d) PAUSE
 - 3) Something else
 - a) Intro
 - b) Explain
 - c) What will be next
 - d) PAUSE

[Repeat 3 as necessary]

 - 5) For next time...
 - a) Intro
 - b) Explain
 - c) What will be next
 - d) PAUSE
 - 6) Summary
 - a) Overview of what I've said

About the author

Kayla is an Assistant eLearning Manager in the Faculty of Science and Engineering. A qualified teacher, trainer, training designer and educational technologist, in 2015, Kayla was awarded an MA Educational Technology and Teaching English to Speakers of Other Languages from the University of Manchester.