

Senior lecturer to assessor: appraisal of theories related to assessment from a new lecturer perspective.

Lisa Lione
University of Hertfordshire
l.lione@herts.ac.uk

Abstract

Essay style questions and multiple response questions (MRQs) have long formed the basis of unseen examination in higher education. These standard assessment methods have proven to be valid, reliable, effective and efficient. Over the last decade, growing student numbers, reduced resources and wider availability of computer networks have led to the increased use of online MRQs as a method of assessment in higher education courses due, in part, to a perceived greater efficiency. However, the design of effective and valid MRQs can be time-consuming. In this paper, assessment methods used in the Biosciences programme at the University of Hertfordshire (UH) are evaluated from the viewpoint of a new lecturer setting examination questions (essays and MRQs) for the first time. Key theories and approaches to assessment of and for learning are critically appraised by considering why and how students are being assessed, with specific reference to a second year undergraduate module.

Introduction

There is no doubt about the importance of assessment. New lecturers may feel daunted when tasked to prepare their first examination questions, made all the more difficult by the fact that the examination questions are often required before the lectures have been prepared. The new role of „lecturer“ is rapidly re-focused to „teacher, learner and assessor“. Setting examination questions for a new undergraduate module with no precedent within the first few weeks of anyone’s teaching career is challenging but has allowed for reflection on the bigger picture of teaching, learning and assessment and how they have to be intimately linked. John Biggs has described this in depth in many of his books and often refers to 'constructive alignment' (Biggs, 2003) whereby the learner constructs his or her own learning through relevant learning activities and the teacher sets up the learning environment such that these learning activities achieve the desired learning outcomes. Why is it essential that we assess students’ learning outcomes? The student voice unequivocally states „assessment is the curriculum“ (Biggs, 2003), in other words the students will learn what they think they will be assessed on, not what is in the curriculum, or even what necessarily has been covered in lectures, workshops and practicals. If then, all components in the teaching system *i.e.*, the curriculum (programme and module) and its intended learning outcomes, the teaching methods used and the assessment tasks are aligned, the learner may then find it difficult not to learn what he or she is intended to learn.

So how does this help in preparing examination questions which form part of a high stake (in this example, 50%) summative assessment for a new module? The programme and module learning outcomes need to be the major focus. Writing eighteen MRQs each with 5 true/false responses, following protocol criterion (after Bloom, 1956; Biggs and Collis, 1982) based on related modules at this level in the Bioscience programme at the University of Hertfordshire, was resource intensive, particularly in the absence of any

lecture material.

This led to a number of specific questions:

- why and how we assess students?
- is this necessarily the right way to assess these second year undergraduate Bioscience students?
- how else are these students being assessed to measure the qualities and skills demanded of a professional scientist?

Why do we assess students?

The time and attention that goes into designing and moderating examination scripts and coursework can appear vast. It seems that both lecturer and student lives are dominated by assessment. Wakeford (2003) describes why assessment is important for two very different reasons. Firstly, assessment has to be accurate to grade students and set credible standards both internally and externally to provide quality assurance for all (Quality Assurance Agency (QAA), 2006). It is now widely accepted that for most students good assessment is the main driver of their learning (Race *et al.*, 2004) and therefore, secondly, assessment has to be an integral component of the teaching and learning system, aligning it in such a way that it focuses the student activity on meaningful learning. This is embedded in the University of Hertfordshire learning, teaching and assessment strategy for 2008-2012. By explicitly implementing transparent assessment methods that encourage meaningful learning (*i.e.* relate theory and practice) this will allow students to measure their own achievements, help them consolidate their learning and provide feedback to guide improvement for both student and lecturer (Race *et al.*, 2004).

How do we assess students?

There are two approaches to assessment that underlie educational practice; the traditional norm-referenced whereby students are graded and ranked in relation to one another and criterion referenced whereby students need to meet preset criteria that reflect their understanding of the learning outcomes, irrespective of how they are ranked in their cohort. Formative assessment and feedback inform students and lecturers on how well they are learning and teaching and how they can improve, but do not count to the final grade and are therefore low risk. Summative assessment and feedback on the other hand are high risk as they count to the final grade/attainment.

Continual summative assessment starts in primary schools (SATs) and continues into secondary schools (GCSEs) forming an integral part of the United Kingdom education system. It can be argued that continual less formal assessment stimulates learning through focusing students and providing ongoing feedback, but because it is also summative it can temporarily shift both student and teacher attention to simply obtaining the right grades. Many of our students are used to this way of continual assessment but now need to adapt to become more active independent learners. A clear distinction therefore in higher education is the additional need for assessment for learning. Given the assertion that good assessment and feedback drives learning (Race *et al.*, 2004), one

way to encourage and develop the independent, proactive, critically thinking student is to ensure the right balance of methods of assessment are employed at the right stage throughout the undergraduate experience. Of course good assessment methods and prompt feedback will help drive and stimulate activity and hence learning, but are just two tools in the box and the student needs to complement these with other sources to inform their learning. The literature suggests that feedback on performance (assessment of learning) facilitates learner motivation; however this will vary across the cohort depending on the ability of students. For example, there will be group dynamic issues that affect individual motivation where a small group may have a sense of cohesion and less peer-to-peer competitive motivation (e.g. Johnson, 2008).

Chickering and Gamson (1987) describe seven principles for students and staff to improve teaching and learning, one of which is to provide prompt feedback on performance. Feedback cannot occur without some form of assessment and assessment without timely feedback contributes little to learning (Chickering and Gamson, 1987). This applies particularly to new students to guide and help them improve their performance by encouraging them to move from being surface learners to deep learners. In accordance with Chickering and Gamson (1987) one of the key messages from today's students (National Student survey (NSS)) and QAA code of practice is the need for prompt feedback which allows feedback to be as meaningful as possible (*i.e.* fresh in the students minds) as well as allowing the student to apply the feedback to inform subsequent assignments. In response to feedback from the NSS and in line with the QAA code of practice and sector norms this university has recently reduced its turnaround time for returning feedback on assessed work.

How are we assessing students in the Bioscience programme in the School of Life Sciences?

To be effective, assessment needs to be valid (appropriate), reliable (accurate and consistent) and fair for our diverse student body. Validity can be seen as having three aspects:

- face (appropriate content for level);
- construct (ensure assessment methods and Learning outcomes measure the skills they are supposed to measure);
- impact (impact that the assessment has upon the behaviour of students, largely related to students perceptions of what is rewarded and what is not (Wakeford, 2003)).

Given the „diverse“ University of Hertfordshire student body, a diverse, inclusive range of assessment methods are adopted to allow all students to have an equal and fair chance to demonstrate their learning. Wakeford (2003) discusses the advantages and disadvantages of the most common assessment methods likely to confront new lecturers in higher education, including essay questions, short answer questions, multiple choice/response questions (MC/RQs, of which there are many varieties), practical/laboratory work/reports, oral examinations and tutorials. These assessment methods along with a

final year project dissertation/viva, poster presentation and self/peer assessment are all encountered in the School of Life Sciences Bioscience programme. Of all these assessment methods, unseen examinations remain a significant means of summative assessment within the Bioscience programme and scientific disciplines in general (Overton, 2004), even though they cannot easily assess the range of qualities and skills required of a professional scientist. However, one distinctive feature of experimental science is the regular assessment (sometimes self/peer) of written laboratory reports to assess the essential development of practical application and critique.

How are we assessing our students for this new module?

The learning outcomes for this new module had been designed to provide students with an equal balance of examination and coursework (all summative) to measure both their declarative (*i.e.* „declare” what they have learned and now know, surface approach) and functioning knowledge (*i.e.* demonstrate their understanding by thinking and behaving like scientists *e.g.* learning outcomes 2 and 4, see table 1, deep approach). There is a balance of words used in learning outcomes to measure „know-how” and „know-why” and different elements of learning outcomes are reflected in the assessments.

Table 1: Learning outcomes for a second year undergraduate module in the Bioscience programme.

Learning Outcome	Exam	Progress Test	Full report	Poster
Describe how disease processes affect human biological systems at the cellular, tissue, organ and systemic level of organization.	√	√		√
Explain , with examples, how human disease results in biochemical, structural and functional abnormalities at different levels of organization.	√	√	√	√
Identify tissue types and the main organs of the human body	√	√		
Demonstrate the evidence for a range of key pathological processes through the use of laboratory experiments.			√	

This module used a mixture of learning experiences including lectures, workshops, practicals, and a revision slot comprising a mock written examination and set assignments (poster group work, peer/self assessment of lab report). Four different assessment methods were used in this module (MRQs, essay questions, peer assessed laboratory

report and group poster) to help to ensure that the same students were not disadvantaged time after time by their lack of skills with just one or two particular formats. Furthermore, the assessments directly correlated to the module learning outcomes, showing a clear alignment between what is being assessed and the intended learning outcomes.

Table 2: Module assessment content.

Nature of assessment	Summative Value	Deadline	Feedback
Progress Test (MRQ)	10%	Wk 8	Wk12
Full laboratory report (peer assessed)	20%	Wk 11	Wk12
Group Poster (various titles)	20%	Wk 11	Wk12
Examination (MRQ/essay)	50%	Wk 19	By wk23
Log Book /workshops	Formative compulsory	Wk6-12	Ongoing

There was a balance of effective assessment methods aligned to the learning outcomes in this module (Table 1). Peer/self assessment of laboratory reports involved the students assessing their own and each others' work to deepen their learning, and help them to understand how to conduct assessment, in line with Nicol and MacFarlane-Dick's (2006) first principle of clarifying what good performance is. This method assesses the professional skills required of a scientist, both practical and written, and importantly the ability to engage in scientific enquiry. The poster assignment further allowed the students to engage in peer dialogue learning in small groups, choosing their topic along with preparing and presenting their poster as would be expected at a scientific conference. Formative feedback for learning was prompt for each assignment and for most groups clear learning communities had developed. Feedback from students is also crucial for any new module and this was collected in the form of a questionnaire at the end of the module. Feedback sought from students should aim to focus on why they learn, why they do not learn, and why they favour or criticise certain aspects of their learning experience in relation to the planned learning outcomes.

Unseen examination (MRQs and essays) assessment formed 50% of the summative assessment within this module. MRQs (progress test and final exam) are widely used in the Bioscience programme for first and second year undergraduates and in higher education generally. Amongst the main reasons suggested for this are growing student numbers, reduced resources and increased availability of computer networks (Nicol, 2007). MRQs do offer clear advantages over other methods in that feedback can be provided very quickly and questions can be designed to assess student knowledge of the entire module content. There are however, also disadvantages compared to other methods. Limited formative feedback can be given to true/false responses (Scouller, 1998). However, confidence based marking (CBM, Gardner-Medwin, 2006) may

encourage students to think deeply about their answer and self reflect on their own reasoning following Nicol and MacFarlane-Dick's (2006) feedback principles of self reflection/assessment and motivation. MRQ design takes time and can be problematic if answers are not necessarily completely true or false, especially when we are trying to teach our future scientists that there is rarely a single correct answer to a given problem, although this is more applicable in the final year when MRQs are not used. Nicol (2007) discusses how MRQs can be used to enhance learning by manipulating the context within which these tests are used. In the School of Life Sciences electronic voting systems are now an integral part of the first year undergraduate student learning environment; students respond to MCQs using their own handset and the responses inform the teacher to adapt teaching to students needs. This might include a recap of some of the lecture, provision of MCQs as preparatory work, peer instruction to work in groups to discuss with one another whether or not they have the correct answer („just in time teaching“ Novak *et al.*, 1999). Furthermore, one way to include MRQs in final year undergraduate assessments would be to base MRQs or CBM on case studies or research papers for data interpretation and critique purposes, or to task students to construct MRQs that encourage peer assessment (Fellenz, 2004).

Essay questions are perhaps more appropriate for second year undergraduates, as they measure higher level cognitive skills such as collating and critiquing new ideas or theories, all essential skills for a professional scientist. There are limitations however, since it may be difficult to permit enough essay questions in the time frame to cover the entire module content. As Biggs (2003) describes, students will always second guess the assessment task, and then learn what they think will meet those requirements, *i.e.* revise only the topics they need to (Biggs 2003). Essay questions also need to be carefully worded for the appropriate level (Bloom, 1956; Biggs and Collis 1982) and to ensure the question is unambiguous and therefore interpreted in the same way by all students.

Conclusion

Previously many teachers may have focused on teaching, assuming students are skilled at learning activities such as note-taking, researching, essay writing and revision. It is clear we need to involve students as much as possible with assessment in order to provide them with the student-lecturer interaction that they request (Time Higher Student Experience Survey, 2009) as well as to enhance their learning.

This reflective account has considered the differences in assessment for a specific module at second year undergraduate level in the Biosciences programme at the University of Hertfordshire. There was a clear balance of unseen examination and coursework within this new undergraduate module in line with the Biosciences programme. Coursework increases the assessment load for lecturers but provides a reliable assessment of student capabilities over time as well as the continual opportunity for detailed feedback for learning. In contrast, unseen examinations eliminate plagiarism, but encourages rote learning (Entwhistle, 1984), favouring those students that perform better under acute stress but often narrowing the range of learning outcomes that can be measured, particularly in the case of essay questions. Increasing the use of different

formats of MRQs not only allows all learning outcomes to be measured but also encourages a deeper approach to learning.

References

- Biggs J. B. (2003). *Teaching for Quality Learning at University*. (2nd edn) Buckingham: Open University Press/Society for Research in Higher Education.
- Biggs J. B. and Collis, K. (1982) *Evaluating the Quality of Learning: the SOLO taxonomy*. New York: Academic Press.
- Bloom B. S. (1956). *Taxonomy of Educational Objectives*, Handbook I: The Cognitive Domain. New York: David McKay Co Inc. Brown S. and Glasner S.
- Chickering, A. W. and Gamson, Z. F. (1987). *Seven principles for good practice in undergraduate education*. American Association for Higher Education Bulletin.
- Entwistle, N. J. (1984). *Contrasting perspectives on learning*. In F. Marton, D.J. Hounsell, and N.J.
- Entwistle (eds) *The Experience of Learning*. Edinburgh: Scottish Academic Press.
- Fellenz, M. (2004) Using assessment to support higher level learning: the multiple choice item development assignment, *Assessment and Evaluation in Higher Education*, 29(6), 703- 719.
- Gardner-Medwin A. R. (2006) Confidence-based marking: towards deeper learning and better exams, in C.Byran and K.Clegg (Eds) *Innovative assessment in higher education* (London Taylor and Francis).
- Johnson M. (2008) Grading in competence-based qualifications-is it desirable and how might it affect validity? *Journal of Further and Higher Education* 32(2) p175-184.
- Nicol, D. J. and Macfarlane-Dick, D. (2006) *Formative assessment and self-regulated learning: A model and seven principles of good feedback practice*. Studies in Higher Education.
- Nicol, D. (2007) E-assessment by design: using multiple-choice tests to good effect. *Journal of Further and Higher Education* 31(1) p53-64
- Overton, T (2003) Chapter 18 Key aspects of teaching and learning in experimental sciences and engineering p255-277 in: Fry, H, Ketteridge, S, and Marshall, S. (2nd edn). *A handbook for teaching and learning in higher education enhancing academic practice*. London.
- Routledge Falmer QAA (2006) Section 6: Assessments of students. The Quality Assurance Agency for Higher Education.
<http://www.qaa.ac.uk/academicinfrastructure/codeOfPractice/section6/default.asp>
- Race, P., Brown, S., Smith, B.(2004) *500 Tips on Assessment*, (2nd edn) London , Routledge Falmer.

Scouller, K. (1998) The influence of assessment method on students' learning approaches: multiple choice question examination versus assignment essay, *Higher Education*, 35, 453-472

The Times Higher Student Experience Survey (2009) Retrieved May 11th 2009, from <http://www.timeshighereducation.co.uk/story.asp?storycode=404989>

Wakeford R. (2003) Chapter 4 Principles of student assessment p42-61 in: Fry, H, Ketteridge, S., and Marshall, S. (2nd edn). *A handbook for teaching and learning in higher education enhancing academic practice*. London. Routledge Falmer