

Short Communication

## Summative Assessment with Formative Feedback: An Intervention in a Small Bioscience Cohort

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One of the guiding principles in curriculum design is the need to achieve constructive alignment between intended learning outcomes, learning activities and assessment (Biggs, 1999). Indeed studies carried out in the 1970s (Snyder, 1971; Miller and Parlett, 1974 cited in Gibbs and Simpson, 2004) reported on the 'hidden curriculum'; it was not in fact teaching but assessment that played the largest part in guiding students' learning. Students dedicate more hours to their learning in weeks when assessment is due (Brown *et al* 2003); and is further emphasised by Boud (1986) who noted that 'assessment methods and requirements probably have a greater influence on how and what students learn than any other single factor'. Nicol and Macfarlane-Dick (2006) argue that the key to constructive alignment is ensuring that lecturers and students form a partnership in which dialogue through feedback is fundamental to learning and teaching activities. Many tutors see the best opportunity for open communication to be around formative assessment 'it can be argued that giving learners feedback is just about the most important dimension of the work of teachers in post-compulsory education ... but perhaps all told, formative feedback is *the* vital dimension, as given at the right time and in the best possible way it can lead learners steadily towards successful achievement in summative assessment contexts' (Race, 2005, p. 97) and there is a considerable weight of opinion in the academic community encouraging increased emphasis on formative feedback to enhance learning (Dearing, 1997; Park and Crook, 2007).

In response to the need to open dialogue around student assessment we carried out a pilot study in a small bioscience module (14 students were registered on the module but due to medical deferrals only 10 completed all 3 practicals within the normal timeframe) in which our attention was focused on constructive feedback. Students carried out a range of assessments in the module; these assessments included three practical write ups which were at the beginning of the module; no other assessments were running in parallel. Each practical report linked to a two week block of activity, each on a different element of biology but of comparable complexity in terms of the material and skills base. Temporal submission of reports was designed to ensure that feedback and directed feed forward were linked into the next submission.

The weighting of practical 1 was reduced to make it 'low stakes' 5% of the overall module grade, practical 2 was then of higher weighting (10%) whilst practical 3, linked to two feedback/ feed forward interventions was high stakes (20%). Before each practical submission students were given general guidance on constructing a practical report. The format of the report followed a standard structure; the word count on each assignment was limited to 800 words, the assessment criteria were also standard for course and level. One week after submission written feedback was supplied; each student was then given a 15 minute appointment window with a module tutor during a scheduled teaching session approximately two weeks after submission of the written work. To remove marker bias all practical reports were assessed by one marker involved in the study; feedback was focused around learning; each student was provided with

information about their own progress towards their goals; new targets were set with both tutor and student being proactive in suggesting how the next practical assignment might be tackled. Tutors ensured that during the discussion each assessment criterion was addressed in turn in relation to both the current and the forthcoming assignments.

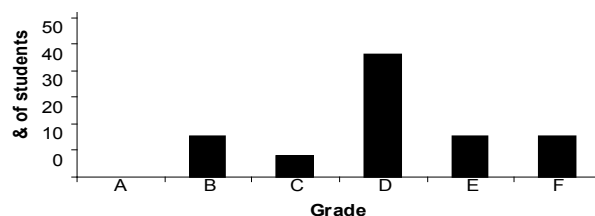
It was interesting to note that when offered the opportunity to engage in personal dialogue about their work, students largely responded positively. This somewhat contradicts perceptions in academia that students are at times driven by grades rather than reflective practice (Dweck and Elliot, 1988) but supports the findings of the three year long study reported by Higgins *et al.* (2002, p. 53) in which students valued formative feedback as a means of 'engaging with their subject in a deep way'.

Many students used the individual appointments to ask fundamental questions about referencing, formatting tables, scientific writing style and interrogation of data. The majority specifically asked how they could use their feedback to enhance their performance; staff noted that students were confident in asking quite basic questions that would not have been raised in a more open forum. Many students commented that they were 'glad' the first piece of assessment was almost 'worth almost nothing' and that their 'poor performance' in the first submission could be overcome in more heavily weighted pieces. Qualitative comments from students gleaned from interviews included:

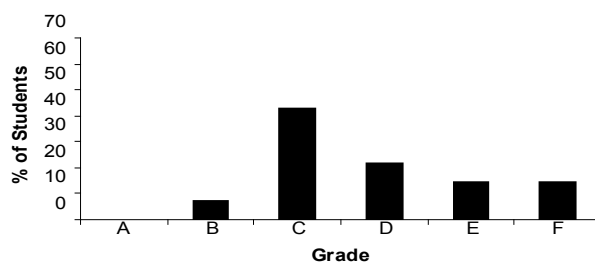
*"we go to academic tutors for explanation of feedback and to achieve best grades possible"*

*"there is a common goal (with academic tutor) to achieve good academic grades"*

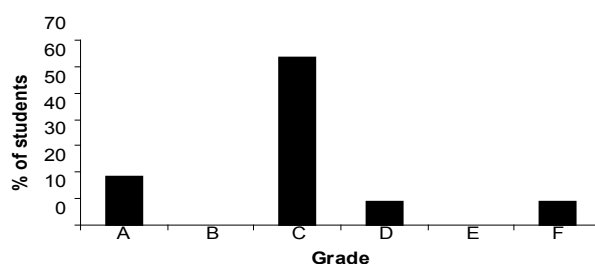
Students have many problems in understanding the nature of scientific inquiry (Hounsell and McCune, 2002) and therefore find laboratory practicals difficult to write up. In this study overall student achievement for practical 3, after two feedback interventions, was significantly improved when compared to practical 1 (repeated measures ANOVA,  $p = 0.001$ ).



**Figure 1a**  
Achievement for Practical 1



**Figure 1b**  
Achievement for Practical 2



**Figure 1c**  
Achievement for Practical 3

**Figure 1** Grades achieved by students submitting all three practicals ( $n = 10$ )

Sears and Wood (2005) reviewed the ‘aspects and ways of thinking and practicing in biology’ model developed by Hounsell and McCune (2002); in this model it is recognized that students develop ‘first order’ skills that are akin to mastery of the basics of the bioscience language and its understanding. The higher order skills of application, interconnectivity, critical evaluation and reflection develop from these basic principles. In order to begin to understand students’ response to feedback in relation to first and second order skills we deconstructed the final mark awarded into its individual assessment criteria. We used a paired t-test to compare achievement in practical 1 to practical 3; achievement in assessment criteria relating to ‘structure’ ( $p = 0$ ), ‘aims’ ( $p = 0.046$ ) ‘data’ ( $p = 0.45$ ) and ‘application’ ( $p = 0.008$ ) significantly improved in response to feedback ( $df = 9$  in all cases) but did not in areas of ‘referencing’, ‘discussion’ and ‘academic writing’ (although there was a tendency toward improvement noted in these criteria). These findings, although relating to a small cohort and therefore somewhat tenuous until supported by a larger scale study, provide us with evidence that this practice can be used to significantly improve achievement both in first and second order skills.

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