

Investing in assessment: The role of formative assessment in teaching psychological research methods

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The role of formative assessment is widely acknowledged to promote student learning, provide teachers with an early indication of student performance (Boston, 2002) and has direct links to student retention (Yorke, 2001). The dominance, however, of summative assessment in higher education (Milton, Pollio & Eiuson, 1986) frequently prevails. This paper investigates the role of formative assessment in teaching psychological research methods to undergraduate students both as a method of increasing deeper learning and as a vehicle to reduce anxiety, and build confidence in a traditionally challenging area of teaching. An idea for engaging students with research design and affording the opportunity to provide formative feedback is presented alongside initial student feedback.

Keywords: *summative assessment, formative feedback, research methods and statistics, student engagement and teaching, research methods in psychology.*

THE TEACHING of research methods and statistical skills remains core to many psychology undergraduate degree programmes with successful completion of such modules a pre-requisite for the Graduate Basis of Chartered Membership (GBC) with the British Psychological Society. Nevertheless, such modules are problematic for teachers and students alike. Teachers are faced with heterogeneous groups of students varying in experience and ability (Porter, Cartwright & Snelgar, 2006), and students frequently report anxiety and stress towards such modules (Bessant, 1992; Snelgar, Porter & Cartwright, 2005). Numerous research orientated texts vie the shelves of book shops and dominate University libraries in an attempt to help coach students thorough the complexity of research design and statistics, for example, Coolican, 2009; Dancey and Reidy, 2008; and Field, 2009, however, teaching and engaging students with such modules remains a difficult but nonetheless important task. Batanero (2004), argues the importance of examining the issues associated with teaching and learning of statistics. In part, this could be attributed to the fact

that many students fail to perceive the topic as associated with their chosen degree (Paxton, 2006; Ruggeri et al., 2008a) and hold negative attitudes towards statistics (Blalock, 1987; Ruggeri et al., 2008b).

In attempting to engage, reluctant, anxious and varying-ability students, Field (2009) argues for the benefits of adopting a 'humorous' approach to teaching research methods and statistics. In adopting a more active approach with material Field (2009), reflects best practice across the educational sector, where the importance of active teaching sessions affording students the opportunity to reflect upon and engage with material is widely recognised (Biggs, 2003; Race, 2001), in part because this prevents rote learning of material at a surface level, and promotes application rather than simple retrieval. Importantly, learning strategies are intrinsically linked to levels of (knowledge) retention, with higher levels of retention amongst students who have learnt following deep rather than surface learning strategies (Bacon & Stewart, 2006). Conway et al. (1991), suggests that knowledge retention in students immediately declines following

completion of their degree programme, however assessment techniques such as exam based essays only serve to promote cramming and hinder retention, whereby coursework based essays facilitate students in both actively using material and promoting learning at a deeper level. It is of equal importance, therefore, to adopt relevant assessment criteria promoting deeper approaches to learning (Elander, 2002), which in turn may increase retention of knowledge and subsequently reduce performance anxiety in students (Connors et al., 1988). Students should be encouraged to understand and 'work' with presented material rather than undergoing a simple process of rote encoding and retrieval (Marton & Saljo, 1976). Furthermore the process of assessment should not dominate a student's learning experience (Synder, 1971; Sambell & McDowell, 1998), nor should it place them under such coursework-related pressure that their enthusiasm for learning is hindered by the stress of balancing various assessments (Race, 2002). Of equal importance is the skill set that psychology graduates take to employers, Radford (2008) suggests Psychology graduates are attractive to employers because of their literacy and numeracy skill set. However, in order to display an 'attractive' numeracy skill set, students' need both an awareness of those skills (Dean, 2008) and need to be able to display such skills at a seemingly proficient level, therefore requiring a more in-depth understanding.

The role of assessment

In suggesting the *Taxonomy of Educational Objectives*, Bloom (1956) proposes that students develop a repertoire of cognitive skills including knowledge (recall of information), comprehension, application, analysis, synthesis and evaluation. Each of the identified skills can be assessed at any point in time using either formal assessment (summative assessment) or informal assessment (formative assessment) or a combination of the two (Cowan, 2002). Connor-Greene (2000), suggests that there is significant research into

the teaching methods that enhance the higher level thinking stages (application, analysis, synthesis and evaluation) of Bloom's (1956) taxonomy but the process of assessment which also plays an important role in student learning is less well researched. Assessments that reinforce memory rather than critical thinking result in last-minute student preparation and lower perceived student learning (Connor-Greene, 2000). If rote memory learning is being assessed it is reasonable to assume that this encourages 'surface' rather than learning at a deeper level (Elander, 2002).

Assessment plays an important role in the teaching and learning experience for teachers and students alike. Race (2002) suggests that the reasons to assess include; classification or grading of students, student progression, to guide and gauge improvements in students and to provide feedback to teachers regarding the effectiveness of their teaching. Wininger and Norman (2005) suggest that assessment is the process of providing feedback to both student and teacher about learning progress with the goal of improving learning in the student, and instruction in the teacher. Furthermore, assessment should promote competence in students (Mentowski et al., 2000) and improve educational practice through offering benchmarks of performance against which teachers can measure student learning (Astin, 1993). Cowan (2002) refers to such benchmarks as criterion-referencing as it provides students and teachers with a clear set of benchmarks against which work can be compared and an appropriate grade provided. As previously identified the process of assessment can either be formal (summative assessment) or informal (formative assessment), however, benchmarking students work against criteria is often reflective of the former. Summative assessment has a long history in higher education (Milton, Pollio & Eiuson, 1986) as it enables differentiation among students with regard to level of achievement and whether a student 'passes' or 'fails' a particular element of a course and at what level. The

methods utilised for formative assessment (examinations, portfolios, essays, thesis and presentations) are not devoid of criticism. Halonen et al. (2003), suggest assessment pressures promote the adoption of traditional objective testing strategies that may minimise more subtle aspects of knowledge, and that quantitative measurements (examinations for example) may encourage teachers to 'teach to the test' rather than disseminating wider knowledge and its application. Authentic assessment techniques (portfolios for example) offer an alternative to quantitative measurements, and are praised for enabling engagement in meaningful 'real world' activities and allowing evaluation of the entire process required for completion of a product, therefore providing a stronger basis for validity (Wiggins, 1990). Although authentic assessment strategies are increasing in popularity (Strong & Sexton, 1996), they remain summative in nature.

Formative assessment affords teachers with the opportunity to assess how students are learning and change instruction accordingly throughout a course or module (Boston, 2002). Importantly, Black & William (1998), argue that assessment is any activity that students and teachers undertake to get information that can be used diagnostically to alter teaching and learning. However, assessment becomes formative when the information is used to adapt teaching and learning to meet student needs. Crucially, formative assessment provides a mechanism for teachers to provide feedback to students about their learning and understanding without necessarily contributing towards a final mark. Formative assessment aids student learning through helping students to consolidate and reflect on their learning, identify gaps in their knowledge and encourages the identification of transferable skills. Bangert-Drowns, Kulick & Morgan (1991), suggests the provision of specific comments about errors and suggestions for improvement, encourages students to focus their attention on the task rather than striv-

ing to obtain the 'right' answer, and this is more helpful than feedback that simply guides the student to the 'right' answer. Such feedback is seen as particularly important for 'lower-achieving' students as it provides specific guidance about how and where improvements can be made rather than focusing purely on the negative aspects of their work (Boston, 2002). Higgins, Hartley & Skelton (2002) suggest that the quality, quantity and language of comments in written formative feedback can affect whether students read and value the comments made by teachers. Further they suggest that students seek feedback that helps them both to engage in their subject and engage in a 'deeper' way. Such use of formative feedback therefore may be particularly pertinent when considering the heterogeneous nature of students studying psychological research methods.

Although students do value formative feedback (Boston, 2002, Higgins et al., 2002), such feedback needs to add value to the students 'learning experience'. Weaver (2006) suggests that although students do value feedback they also believe that provided comments could be more helpful. Specifically, students report that comments are too vague, lacked guidance, only focused on the negative or were unrelated to the assessment criteria and learning outcomes. Students also report that ensuring feedback is timely would greatly improve the value of the feedback (Baume & Baume, 1996; Weaver, 2006).

In practice it is likely that a combination of summative and formative assessment takes place, however it is important to ensure that assessments maintain construct validity facilitating the process of constructive alignment (Biggs, 2003) and face validity (transparent assessment material and marking criteria; Elander, 2004) so that students know what is expected and the criteria against which they will be assessed. Ensuring assessment validity is one of eleven charter points outlined by the Quality Assurance Agency (QAA) for Higher Education (2006), other charter

points include assessment reliability, equitability, and that assessments are demanding but efficient and manageable (QAA, 2006). Clearly therefore when designing summative assessments to assess a student's progression it is important to ensure each of the charter points are taken into consideration and where possible provide students with appropriate, constructive and timely formative feedback to enhance deeper learning.

Assessing Introductory Research Methods and Statistics

Since the rise of Behaviourism (Thorndike, 1874–1949; Watson, 1878–1958) in the early 19th century, experimental methods in psychology have been increasingly popular. One aspect of teaching psychological research methods is encouraging students to understand the process, design and implementation of experiments (Dodd, 2000; Nadelman, 1990). One approach to this problem is to allow students to design and implement an experiment of their own design on a topic of their choice (Chamberlain, 1988), however, such implementation requires significant staff resources and the monitoring of student work to ensure it is conducted correctly (Addison, 1996) and adheres to the ethical principles and code of conduct of both the University and the British Psychological Society. An alternative to actually carrying out the research is research proposal writing. This method has the advantage that students are free of the execution of the experiment and can, therefore, be more creative in their design (Addison, 1996), however this advantage can sometimes result in students ignoring the ethical or practical considerations resulting from implementation of the design.

The first assessment adopted for the Introductory to Research Methods and Statistics module at the University of Gloucestershire, is a 1000-word research proposal, for a simple one independent and one dependent variable experiment. This assessment contributes towards ~20 per cent of the overall module mark and provides students

with the opportunity to propose an experiment without having to consider the practical constraints of execution. Carroll (1986), acknowledges the difficulty of designing and completing a full experiment in a relatively-short module, suggesting research proposals as a viable alternative to actually conducting an experiment. Lectures were supported by practical sessions where students worked on different aspects of experimental design from hypotheses testing to participant recruitment. In turn each of these aspects was explicitly examined in the summative assessment and through the process of benchmarking (Astin, 1993; Cowan, 2002) this enabled identification of students who had not understood a particular concept and where areas for improvement in the teaching strategy could be made (Race, 2002; Winger & Norman, 2005).

The process of experimental design, however, is beyond simply getting something 'right' but understanding and justifying the design process. Therefore, it seemed particularly pertinent to be able to provide specific comments regarding errors, suggestions for improvement and encouragement to students about the task (Bangert-Drowns, Kullick & Morgan, 1991) in an environment where discussion about the proposals could occur. Such formative feedback prior to completing the assignment may also be highly beneficial to lower-achieving students or those anxious about the assignment (Boston, 2002).

To formatively assess students a task was designed during one of the practical sessions where students worked in groups to design an experiment of their choice and pitch their experiment with the aid of a poster to several members of the psychology staff team. The task was akin to the BBC2 series *Dragons' Den* and at the end of each presentation the psychology team decided to either 'invest' in the experiment or decline the student's pitch. The importance of the task was two-fold, firstly the task reflected the formal assessment as students were required to produce an idea for an experiment and convey their

experimental design to each other and the panel (however, students worked on this task in teams rather than individually) therefore providing constructive alignment between presented lecture material and the summative assessment. Secondly, and arguably most importantly the session afforded the opportunity to provide formative assessment of students' work and formative feedback to students (both in groups and individually).

Assessment evaluation

Students were encouraged to informally feedback on the process of the *Dragons' Den* exercise through qualitative feedback (Figure 1).

As Figure 1 demonstrates, the task was well received by students with comments including:

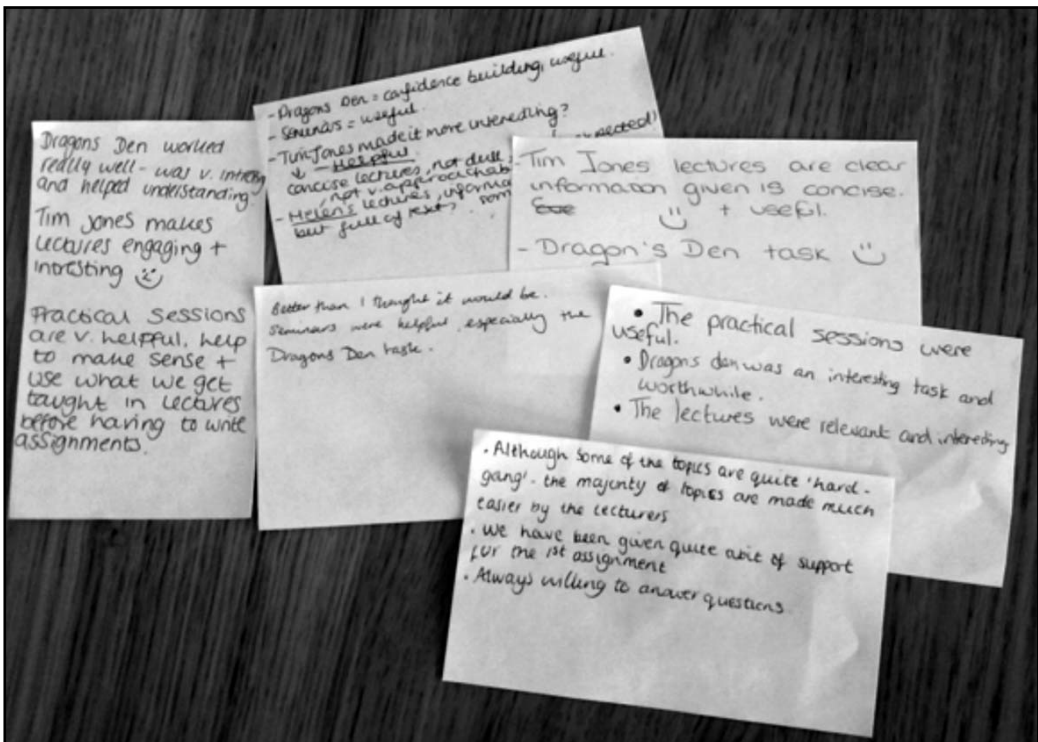
'Dragons' Den worked really well – was very interesting and helped understanding.'

'We have been given quite a bit of support for the first assignment.'

'Dragons' Den = Confidence building and useful.'

Feedback suggests that students enjoyed the additional support that the formative feedback provided, and that the quality and quantity of feedback was appropriate, helping to ensure that students remained engaged with the subject and in a 'deeper' way (Higgins, Hartley & Skelton, 2002). As students were also able to respond to questioning and participate in a two-way communicative process during the formative assessment, this could have helped to avoid comments being too vague, lacking guidance or being unrelated to the assessment

Figure 1: Qualitative feedback received from students.



criteria or learning outcomes (Weaver, 2006). Additionally, feedback was also provided immediately, thus ensuring that students were able to obtain appropriate timely feedback (Baume & Baume, 1996) required to help them with their summative assessment. Importantly the task also helped to build confidence which is important for a topic associated with high levels of anxiety and stress (Snelgar, Porter & Cartwright, 2005).

In response to Halonen et al. (2003), the dual assessment process adopted starts to move beyond the traditional testing strategies that may minimise the more subtle aspects of knowledge and deeper understanding. As a presentation element was required as part of the formative process this encouraged collaborative work, provided students' with some of the skills required for oral examinations and interviews and enriched transferable skills (Race, 2002). The importance of collaborative working should not be overlooked, as increasing social contact amongst students can foster feelings of belonging and aid student retention (Yorke & Longden, 2004). Students also identified that they had been provided with a lot of support for the first assignment. A note of caution, however, is that students' may have been simply engaging with the process to glean the 'correct' answer. This should be avoided, however, as this directly opposes the principles and recommendations of formative assessment (Bangert-Drowns, Kullick & Morgan, 1991). The combination of assessment processes has actively encouraged Bloom's (1956) higher level thinking stages to occur, because as students were asked to present their experiment ideas and answer questions, this required the processes of application, analysis, synthesis and evaluation, therefore making their learning experience both deeper and richer.

A number of students' did comment, however, completing the task was a significant piece of work (working in groups to design an experiment, convey and present the idea and reflect on staff comments), in the absence of any formalised marking. Although it is important that students do not only focus on the assessed aspect of a course or module (Synder, 1971), it is important that the entire assessment process is efficient and manageable (QAA,2006). Therefore, as formative assessment and feedback helped to influence the quality of the summative assessment it may be beneficial to include formalised marking as part of the activity, albeit without distraction from the formative quality of the task.

The importance of introducing formative assessment into teaching research methods and statistics is two-fold. Firstly students are afforded with an opportunity to work with material, build upon ideas and build confidence in using new terminology, this in turn may reduce anxiety and promote engagement. Secondly, students can be assessed earlier in the module and where significant learning deficits are exposed these can be addressed and integrated in subsequent taught sessions. Of equal importance, however, is that an activity such as *Dragons' Den* builds humor (Field, 2009) into a research module, and affords staff the opportunity to work with students' in smaller groups or individually, a luxury frequently hindered by traditionally large class sizes.

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