Chapter 12
Online Assessment:
Informing Practice in Tertiary Science Education

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ABSTRACT

This chapter reports the findings of a study which investigated the learning processes, expectations and perceptions underpinning undergraduate science student's use of online assessment. The aims of the study were to: review the way students interact with online assessments within the context of their studies; examine how this interaction was shaped by their preparation and prior experience with online tools; explore the prominence of test anxiety and the extent to which the student's anxieties influenced their interaction with the technology and the learning approach employed; and analyse the student's perspectives on the use of online assessment in higher education and, in particular, in their discipline-specific courses.

BACKGROUND

Rapid developments in the field of e-learning are altering the educational landscape, with evidence emerging that e-learning tools and techniques are being mainstreamed at all levels of higher education (Macdonald, 2004). Proponents of e-learning point to the enhancements in information technologies and the new methods of learning, teaching and assessment as reasons behind this expansion in use. Critics argue that the development of e-learning in

higher education has largely been driven by senior managers' misplaced desire to achieve the efficiencies and cost savings promised by educational technology (Weller, 2004). Online assessment is becoming particularly prevalent across the sector, with studies locating the majority of activity within science-based disciplines (Bull & McKenna, 2000; Bull & McKenna, 2004). The growing prominence of online assessment among the science community indicates a need for science educators to demonstrate awareness of the practical and pedagogical issues surrounding the use of formative and summative online assessment. Specifically, these issues should

be considered from the perspective of the end user; the students who engage with online assessment in the course of their studies. Research focussing on the student experience of e-learning however, has largely been neglected (Creanor, Trinder, Gowan & Howells, 2006), while research into student's experiences of online assessment is limited (Walker, Topping & Rodrigues, 2008). Research focusing on the relationship between assessment and student approaches to learning has long been identified as an area demanding further investigation (Hofer & Pintrich, 1997) with effect, experiences and expectations of online assessment pinpointed as areas prime for exploration (Northcote, 2003).

METHOD

Students drawn from four course modules in Biology, Chemistry, Medicine and Nursing at the University of Dundee formed the cases within the sample. A mixed-methods research design drew on both quantitative and qualitative techniques to facilitate in-depth exploration of student experiences of online assessment. The research design was influenced to an extent by methodological approaches use by others (see for example, Creanor *et al*. 2006; Cassady and Johnson, 2002) to support an interpretative phenomenological analysis approach. Methods involved the collection of objective and quantifiable data through screen capture of student completion of a formative online assessment task, and interpretative analysis of interview data to gain an insight into the students' experiences of these tasks. The interpretative results were subjectively negotiated and emerged through a process of interpretation which sought to establish the meaning that specific experiences or events held for individuals within the sample (Smith & Osborn, 2003). In order to cast some light on the impact of online assessment on student levels of cognitive test anxiety, a modified version of the Cognitive Test Anxiety Scale created

by Cassady and Johnson (2002) was utilised with the limited alterations allowing comparison of results with previous findings. Importantly, the instruments selected and the approaches adopted have been adapted to provide as rich an insight as possible into the intentions behind student actions during online assessment events and the impact of online assessment on their learning.

Participants

Four science-based modules made up the sample:

- two first year modules in biology and chemistry from the School of Life Sciences
- one first year module from the School of Medicine
- one second year module from the School of Nursing and Midwifery

Table 1 below presents an indication of the students who participated in the study. The gender imbalance within the sample is to an extent representative of the gender balance of the students enrolled on the modules with females making up approximately 60% of the students studying on the Medicine, Biology and Chemistry modules rising to 86% in the Nursing module.

Procedures and Analysis

Data was gathered from those participants who consented to their participation in this study via the following methods:

- A paper-based questionnaire presented to participants at an initial face-to-face meeting.
- Participant's completion of a formative online assessment recorded using screen-capture software.
- A modified version of Cassady and Johnson's (2002) Cognitive Test Anxiety

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