# FORMATIVE ASSESSMENT USING CAA: AN EARLY EXPLORATION OF THE SLIM PILOT PROJECT

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# Abstract

Supporting Learning in Mathematics (SLIM) pilot project: Can the research on formative assessment be applied to the use of a computer aided assessment (CAA) tool to enhance student learning?

The pilot project consisted of an initial online questionnaire and five 'study sessions' using QuestionMark Perception (QMP) with the BEd year 1 cohort at the University of Aberdeen. This short paper intends to stimulate a dialogue about how to meet the professional challenge of changing learner expectation and, in particular,

- (a) How to design 'rich' questions
- (b) How to provide meaningful feedback in a computer mediated environment.
- by using a preliminary exploration of the data from the pilot project.

#### Introduction

There is an increasing concern about the level of what has been termed 'numeracy skills' in undergraduate students, not only within Initial Teacher Education (ITE) (Murphy (2005), Thwaites *et al* (2005)) but across academic disciplines in Higher Education Institutions (HEI) throughout the UK (Pidcock *et al* (2004), Agnew (2000)).

On a more global level, the increasing numbers and diversity of students entering Higher Education can lead to an acute pressure on resources (Sadler, 1997) and is forcing a critical and creative re-evaluation of how we respond to learner's needs. The associated increase in marking workloads and reduced contact time between staff and students can make it difficult to provide students with effective, regular and timely feedback on their performance. In this paper, the use of formative online assessment is explored as a means of enhancing students' learning by providing regular, detailed and constructive feedback on their learning. This approach is strengthened by the recognition of 'formative assessment' as a means to raise standards within the school context (Black & Wiliam (1998), ARG (1999), Black *et al* (2002)) which has resulted in an unusual confluence of theory and practice in Scottish Education. It is further supported by evidence within Higher Education from authors such as Hounsell (2003) and Schmidt *et al* (1990). In order to try to clarify what is meant, in this paper, by 'formative assessment' a working definition is given below:

"Any process/activity which promotes learning by generating feedback information that is of benefit to students [and teachers] whilst engaged in the task itself; which enables the student to monitor continuously the quality of what is being produced and to develop their understanding / skills."

The emphasis is on ipsative-referenced assessments to encourage students to become more self-regulating (Yorke, 2003) rather than the preoccupation of marks / grades in order to compare or rank students where there is rarely an opportunity for the student to receive and act on feedback (Black & Wiliam (2003), Sadler (1989)).

The particular aspects of the research into formative assessment which seem to apply to the use of CAA are questioning techniques (QCA, 2003) and meaningful feedback (Sadler, 1998) since the other aspects are inextricably linked to synchronous dialogue. This dialogue between teacher and pupil is not easily transferred into an HE environment with the structure of large lectures, minimal contact time and reduced staff.

Wiliam (1999) refers to both 'rich questioning' and 'rich questions' although the former implies a dialogue between teacher and student where there are further exploratory questions, depending on the student's response, to elicit the underlying concepts. Within a computer mediated environment it is perhaps more appropriate to talk about 'rich questions' i.e. ones which 'illuminate aspects of student thinking rather than just measure attainment' (Black & Wiliam, 2003) where the responses and feedback provide the student (and teacher) with what they 'can do' as well as a diagnosis of errors in concepts and finding ways to address these. Watson & Mason (1998) are particularly interested in how to reframe questions to allow pupils to demonstrate higher order thinking skills and continue to develop a framework for effective questioning in mathematics in school classrooms specifically.

Feedback has the potential to improve learning and self-esteem however this is not always the case (Hyland, 2000). To be meaningful it should be more than a transmission of correct/incorrect with a worked solution provided. According to Sadler (1998) it should be specific to the task and the student's response to that task. It is not so much the quality of the feedback itself but rather the impact it has on the student; does it cause thinking?

The SLIM project outlined below is focused on formative assessment and, in particular, questioning and feedback.

# Background

The pilot project (SLIM) commenced in Jan 2005 with BEd 1 students in mathematics. This collaborative project with the Learning Technology Unit (LTU), University of Aberdeen is intended to develop an online formative assessment tool, using QuestionMark Perception, which would allow students to develop their confidence and competence in Mathematics.

Our aims are to

- contribute to the development of a wider range of effective assessment in order to support our students;
- improve accessibility and feedback of formative assessment, especially in terms of the range of methods of assessment, in a manageable and practical way;
- support students to develop a level of independence and responsibility for their learning.

#### Outline

The pilot project consisted of an online questionnaire and five 'study sessions', each of which had 20 questions covering a variety of maths topics as well as some theoretical questions linked to the course inputs. The last question in each session was an opportunity for the students to provide feedback to the developers. The questioning techniques were influenced by the work of Wiliam, Watson and Mason as well as the particular functionality of the software used although the latter had a profound effect on the development of the questions.

Week 30	31 <sup>st</sup> Jan	Initial Questionnaire
Week 31	7 <sup>th</sup> Feb	Session 1
Week 32	14 <sup>th</sup> Feb	Session 2
Week 33	21 <sup>st</sup> Feb	Session 3
Students away for 7 weeks		
Week 41	18 <sup>th</sup> Apr	Session 4
Week 42	25 <sup>th</sup> Apr	Session 5

Involvement in the project was voluntary and anonymous;

# Discussion

'We cling to the familiar, like a much-loved old garment, even when, sometimes, it is long past its best and ought to have been discarded long ago'

(Broadfoot, 2001)

Perhaps what we should be working towards is 'constructivist assessment' (Roos & Hamilton (2005), Shepard (2001)) where the assessment is embedded within and an integral part of learning and teaching; where feedback is provided which supports the student's own construction of an understanding.

'If arguments in favour of formative assessment are to survive and prosper they must be articulated more fully and explicitly, and be built on more than taken-for-granted assumptions about what constitutes "good practice"

(Torrance, 1993)

How can we meet the professional challenge of changing learner expectation?

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