Online Formative Feedback Assessments:

Benefits for Learning

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Rationale for Formative Assessments

• Assessment has powerful effects on what is learned, i.e. “the *de facto* curriculum” (Ramsden, 1992), as well as students’ approaches to learning (Entwistle, 1987)

• Formative assessments that provide timely, relevant and supportive feedback (not just grades) contribute to improved learning outcomes (Gipps, 2005)

• If assessment is intended to foster better learning outcomes, formative assessment could be considered the *most important* assessment practice (Black & Wiliam, 1998)

• Most higher education programs fail to provide adequate feedback to students on their learning (Gibbs & Simpson, 2004)
Rationale for Online Formative Assessments

• Paper-based formative assessments have a number of limitations:
  – invigilation may be required
  – individualised feedback is time-consuming
  – might not be feasible with large class sizes

• Web-based formative assessments offer clear advantages for staff and students:
  – flexibility in timing and location of assessment
  – feedback can contain links to learning resources
  – opportunity for repetition and interactivity
  – support equity and inclusiveness

(Velan, Kumar, Dziegielewski, Wakefield, 2002)
UNSW Medicine Case Study: Online Formative Feedback Assessments

- Integrated online formative assessments were developed in the biomedical sciences with automated individualised feedback

- Embedded in each of the sequential 8-week courses in Phase 1 of the Medicine program

- Questions based on familiar clinical scenarios, providing an authentic context for learning

- Emphasis on curriculum goals of integration between biomedical sciences, as well as integration of biomedical with clinical, social and behavioural sciences

(Velan, Jones, McNeil, Kumar 2008)
Process

• The software tool used was Questionmark Perception™ (Questionmark, UK), “best of breed” for online assessment:
  – integrates with LMS
  – wizards for a wide variety of question types, e.g. drag-and-drop
  – capacity to add high-quality graphics, audio or other multimedia to questions and/or feedback
  – enables adaptive testing
  – powerful, customisable reporting capabilities

• Mix of short answer questions and objective items used, similar to end of course (EOC) summative examinations

• Students provided with individualised automated feedback

• Students able to repeat each assessment as desired

• Continual improvement cycle: item analysis; student input
The ECG shown below was recorded on admission. Select the correct interpretation from the drop-down list.

Diagnosis: Anterior Q wave myocardial infarction

Regarding the pathophysiology of this man’s disease, indicate the site of the primary lesion and the complication that most likely precipitated his acute clinical presentation.

Site: Left anterior descending coronary artery
Complication: Mural thrombus overlying a ruptured atherosclerotic plaque

Indicate which of the following complications might reasonably be expected to occur in the first 24-48 hours of this man’s admission:
Despite treatment, the patient died on the fifth hospital day.

Drag and drop the markers over the appropriate parts of the image of tissue found at autopsy:
Blue pin - Thrombus overlying atheromatous plaque
Green pin - Left main coronary artery
Red pin - Sinus of Valsalva
Yellow pin - Cusp of aortic valve
Measures of Impact (1)

• Over two consecutive years, in all courses:
  – EOC marks for those students who completed the online formative assessment were significantly higher than for those who did not.
  – The highest online assessment score for each student was significantly correlated with their EOC mark.
Measures of Impact (2)

• Online formative feedback assessments have high rates of participation (>75%) and repetition (>40%)

• In online evaluation surveys (2009 figures shown), students agreed that these assessments:
  – were challenging (94%)
  – assisted learning in biomedical sciences (92%)
  – provided useful feedback on learning (90%)
  – helped guide study (91%)
  – were enjoyable (65%)
  – were valuable overall (96%)

• Statistically significant improvements in student evaluations
Student Evaluation (3)

- Open-ended comments by students:
  - “Provides an opportunity to correct misconceptions and actually learn/relearn concepts.”
  - “Integration of a variety of concepts learnt throughout the course”.
  - “Gives good insight into students’ current performance and areas of potential improvement which can be addressed for the actual exam.”
  - “Only real form of feedback throughout the whole course.”
  - “Feedback is tailored to which response you gave (if it was wrong), and given in detail. Labelling of diagrams (with pins etc) is fun.”
  - “I love the formative assessments. They are the best part of the course and a really good indicator of how I am going to go in the EOC exam.”
Discussion

• The data indicate that these assessments:
  – had a measurable beneficial effect on student learning
  – were perceived positively (and increasingly so) by students
  – provoked further thought and study by students

• Compared with previously published studies, our online formative feedback assessments differed as follows:
  – systematic approach to development and continual improvement
  – integrated across disciplines
  – broader in scope
  – available for a longer period of time in each course
  – embedded throughout a program of study

• Implications for course and program design
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References


• Entwistle N. Styles of Learning and Teaching. 2nd ed. Chichester: Wiley; 1987.


Student Evaluation (1)

Online Formative Feedback Assessments - Student Evaluation 2009

- Guide study: 159 Strongly Agree, 139 Agree
- Assist learning in medical sciences: 160 Strongly Agree, 141 Agree
- Provide feedback on learning: 195 Strongly Agree, 99 Agree
- Challenging: 166 Strongly Agree, 140 Agree
- Enjoyable: 131 Strongly Agree, 87 Agree
- Overall value: 219 Strongly Agree, 97 Agree

Survey Items
Student Evaluation (2)

Online Formative Feedback Assessments - Student Evaluations 2005-2009

Survey Items

# = p<0.005 compared with 2005 cohort; ### = p<0.001 compared with 2005 cohort;
* = p<0.005 compared with 2006 cohort; ** = p<0.001 compared with 2006 cohort;
§ = p<0.05 compared with 2007 cohort; † = p<0.05 compared with 2008 cohort;
‡ ‡ = p<0.001 compared with 2008 cohort.