Institiúid Teicneolaíochta Cheatharlach
INSTITUTE of TECHNOLOGY CARLOW
At the Heart of South Leinster

Assessing for learning and quantitative literacy on a first year business quantitative techniques module

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Issues addressed

A primary concern was how to address the challenges of teaching business quantitative techniques in a large lecture environment. Also, the learning outcomes of a traditional module are calculations focused, with students focussing on learning the mathematical steps in producing a numerical answer.

- We sought to increase the focus on quantitative literacy (the ability to know when and how to work with numbers in particular contexts, as well as to critically evaluate and communicate the results) by broadening the assessment approach to include elements to promote quantitative literacy, in particular by using **written assignments**.
- We also sought to encourage meaningful engagement in a large lecture setting, including the piloting of **clickers**.
- Finally, we piloted the use of online activities and support, such as **online quizzes** and **online presentations**.

What we did
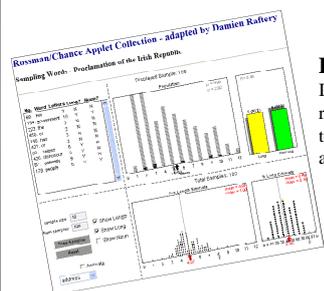
**Promoted quantitative literacy:**
Introduced three **written assignments**, requiring students to write short reports to critique a graph, to comment on an article and to use one of two online statistical applets to develop an understanding of a statistical issue (averages or sampling).

Encouraged meaningful engagement in a large lecture:
Used in-class activities with peer discussions, including piloting activities based on student generated data using **clickers**.

Piloted use of online quizzes and online presentations:
Developed and piloted an **online quiz** on investment maths and a number of **online presentations** incorporating explanations, interactions, videos and quiz elements.
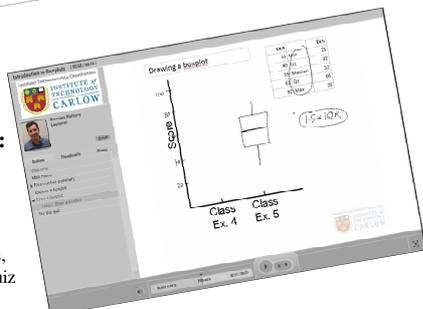
Results

The results below are based upon a short online survey of all students, with 68 respondents (over 25% response rate).

Written assignments:
The majority of respondents agreed that the assignments helped them *understand what statistics is really about*. Over half found the assignments interesting and agreed that they helped the students learn the relevant module content. Comments indicated that the students found the assignments hard work, and that they felt the assignments should be worth more marks.


How useful do you find the use of clickers in lectures?
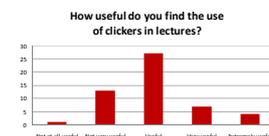
Clickers:
Students enjoyed using the clickers and found them particularly useful when combined with peer-discussion time.

Online quiz:
The majority of respondents preferred doing the online quiz compared to an in-class test and felt it helped them learn the relevant module content. Overall students performed better on the online quiz compared to an in-class test.

The online quiz helped me learn the relevant module content
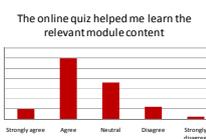
Online presentations:
Students found the online presentations useful, with over three quarters finding useful the online videos showing handwritten solutions with audio explanations to questions. A comment from a mature student – "this type of learning style is very useful."

Conclusions and next stage

It is worthwhile continuing to use the written assignments and clickers, and to develop more online quizzes and online presentations. We plan to:

- refine the written assignments, sharing the assessment rubric with students prior to submission of the assignments
- to continue to pilot the clickers, focusing on integrating into further topics in a way that enhances peer discussion
- develop more online quizzes, responding to the suggestions from students.
- create more online presentations, incorporating interactive elements

Ongoing evaluation of each of these will be undertaken.

Research literature consulted

Wide literature on quantitative and statistical literacy, and on teaching mathematics and statistics including:
- Articles from *Teaching Statistics* and other journals
- Materials from AIMS project (Adapting and Implementing Innovative Material in Statistics) and Garfield and Ben-Zvi (2008)
- On use of clickers, Boyle and Nicol (2003) and King and Robson (2009)

HEA Higher Education Authority An tÚdarás um Ard-Oideachas

NDP National Development Plan 2007 - 2013

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