Using Cultural Capital to Drive Change

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What is the Issue?

Developing and Maintaining good lecture practices with Active Learning

› Active Learning works

Off side • Hesitant/sceptical

Wanting to be on side • Lacking time and other resources

On side • Having influence and ensuring sustainability
Why Lectures?

What we know and what we discovered:

› Online lectures: ‘traditional’ vs. ‘innovative disruption’ Innovators are ‘moving forward’ while others ‘slow to move’

› Changing format but distinguishable as place where:
  - group of students share physical space and time making meaning with assistance of an expert in the field

› Lectures are ubiquitous, economical & straightforward in terms of administration

To address different audiences & aims, Fellowship focused on three aspects:

**Case Studies**
- Identification and dissemination of practices
- Collating similarities and differences

**Peer Review of Teaching**
- Support for beginning lectures
- Assistance for instigating change
- Disseminating of good practices amongst established lecturers

**Concept Surveys**
- Provision of data/evidence to support changes to curricula/programs
- Provide direction to shape the change
Concept surveys

- Validated diagnostic tool designed to evaluate student understanding of a scientific concept.

What do they tell us?

- Which concepts prove difficult to master?
- Is there/what is the learning progression?
- Why are some misconceptions more robust than others?
- Is there a difference between female and male concept development?

**Force/Motion Concepts Survey (FMCE): 43 Questions**

Questions 8-10 refer to a toy car which is given a quick push so that it rolls up an inclined ramp. After it is released, it rolls up, reaches its highest point and rolls back down again. Friction is so small it can be ignored.

Use one of the following choices (A through G) to indicate the net force acting on the car for each of the cases described below. Answer choice J if you think that none is correct.

- A: Net constant force down ramp
- B: Net increasing force down ramp
- C: Net decreasing force down ramp
- D: Net force zero
- E: Net constant force up ramp
- F: Net increasing force up ramp
- G: Net decreasing force up ramp

8. The car is moving up the ramp after it is released.
9. The car is at its highest point.
10. The car is moving down the ramp.
## Sample and Concept Surveys

### Chemistry Concept Survey (CCI)
- **Five** Aust. HE institutions *(GO8, rural, NSW, VIC, SA, WA)*
- **3000** + pre and post-test responses
- Semester 1 - 2014

### Force/Motion Concept Survey (FMCE)
- **Five** Aust. HE institutions *(GO8, NSW, VIC, ACT)*
- **5000** + pre and post-test responses
- Semester 1 and 2, 2013-2014

### Thermal Concept Survey (TCS)
- **Two** GO8 Aust. HE institutions *(NSW)* and one Thai institution
- **2000** + pre and post-responses
- Data from Semester 1 2012-2014
(Very) Preliminary results

› Pre-test CCI from four representative institutions
› Pre and Post-test results from one institution
Figure 8-5 Pre-test scores vs. Normalized gain for the four streams. Lines demarcate areas of Hake’s Low, Medium and High Gain areas (1998)
Some general conclusions

› Challenge was not convincing people *to change*, it was ensuring what they were *changing to* was constructive

› Universally, resources were scarce, but initiative was plentiful

› Made easier by:
  - Strong institutional support
  - Teaching focused roles
  - Critical mass (longer term and more experienced sessional staff)

› Issues with sustainability: technology and evaluation
Office for Learning and Teaching (OLT), The University of Sydney, School of Physics, Sydney University Physics Education Research (SUPER) group, Participating universities and individuals across Australia & Support staff and students


