

Using Cultural Capital to Drive Change

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Developing and Maintaining good lecture practices with Active Learning

› Active Learning works



Off side

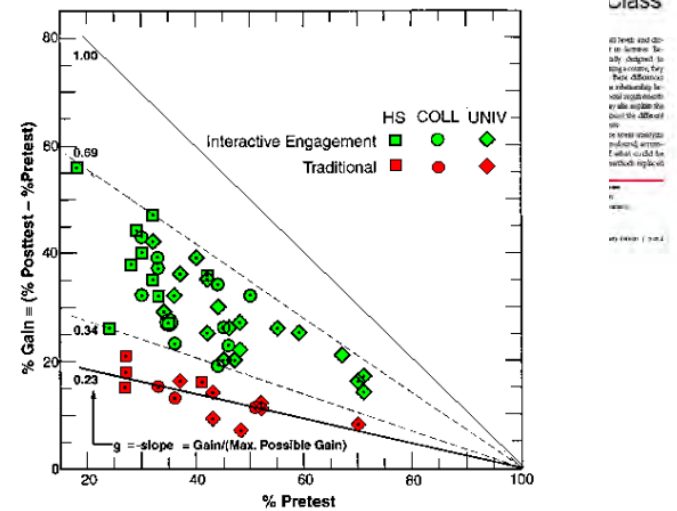
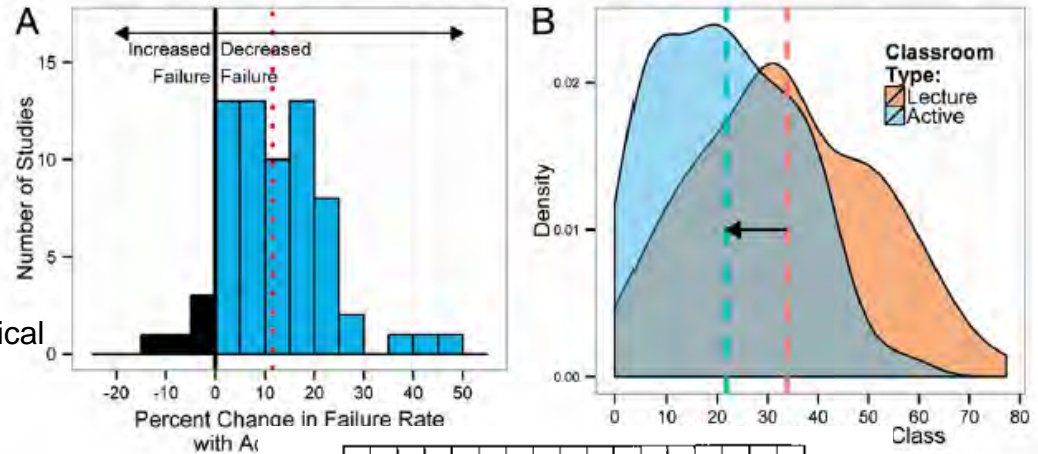
- Hesitant/sceptical

Wanting to be on side

- Lacking time and other resources

On side

- Having influence and ensuring sustainability



What we know and what we discovered:

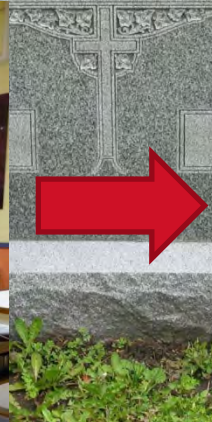
› Online lectures: ‘traditional’ vs. ‘innovative disruption’ Innovators are ‘moving forward’ while others ‘slow to move’

› Changing format but distinguishable as place where:

- group of students sharing the learning with the assistance of an expert



› Learning
ad



com 2010

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 lecturers

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

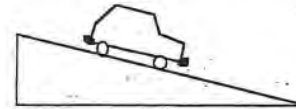
- › Validated diagnostic tool designed to evaluate student understanding of a scientific concept

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 | (E) Net constant force up ramp |
| (B) Net increasing force down ramp | (F) Net increasing force up ramp |
| (C) Net decreasing force down ramp | (G) Net decreasing force up ramp |
| (D) Net force zero | |

____ 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

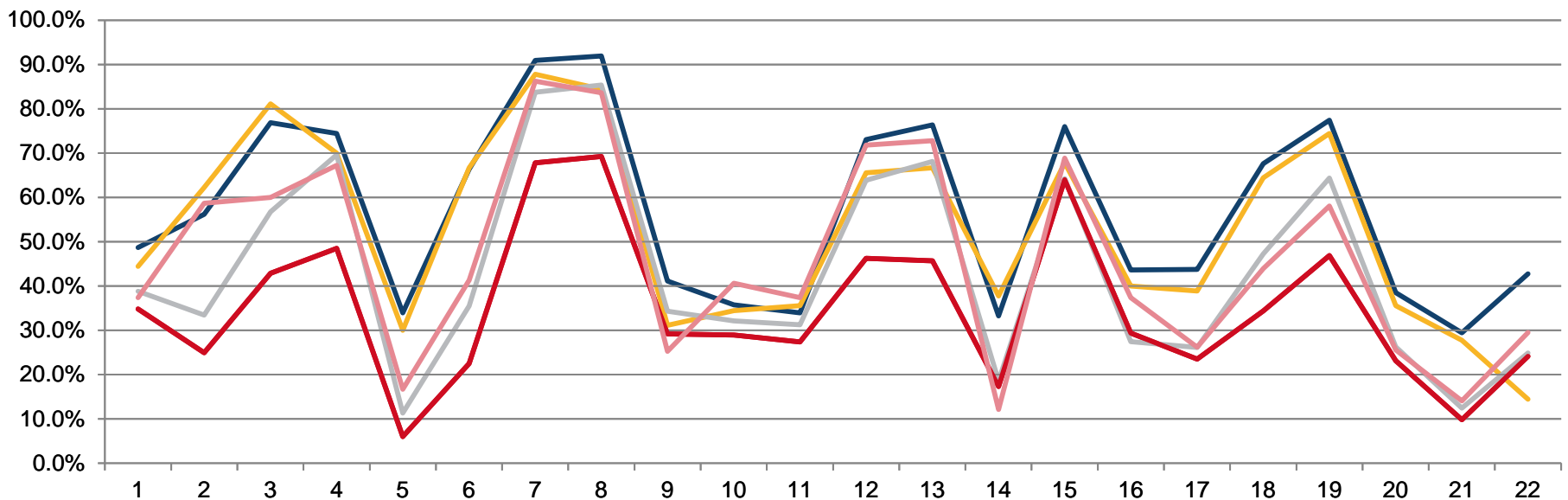
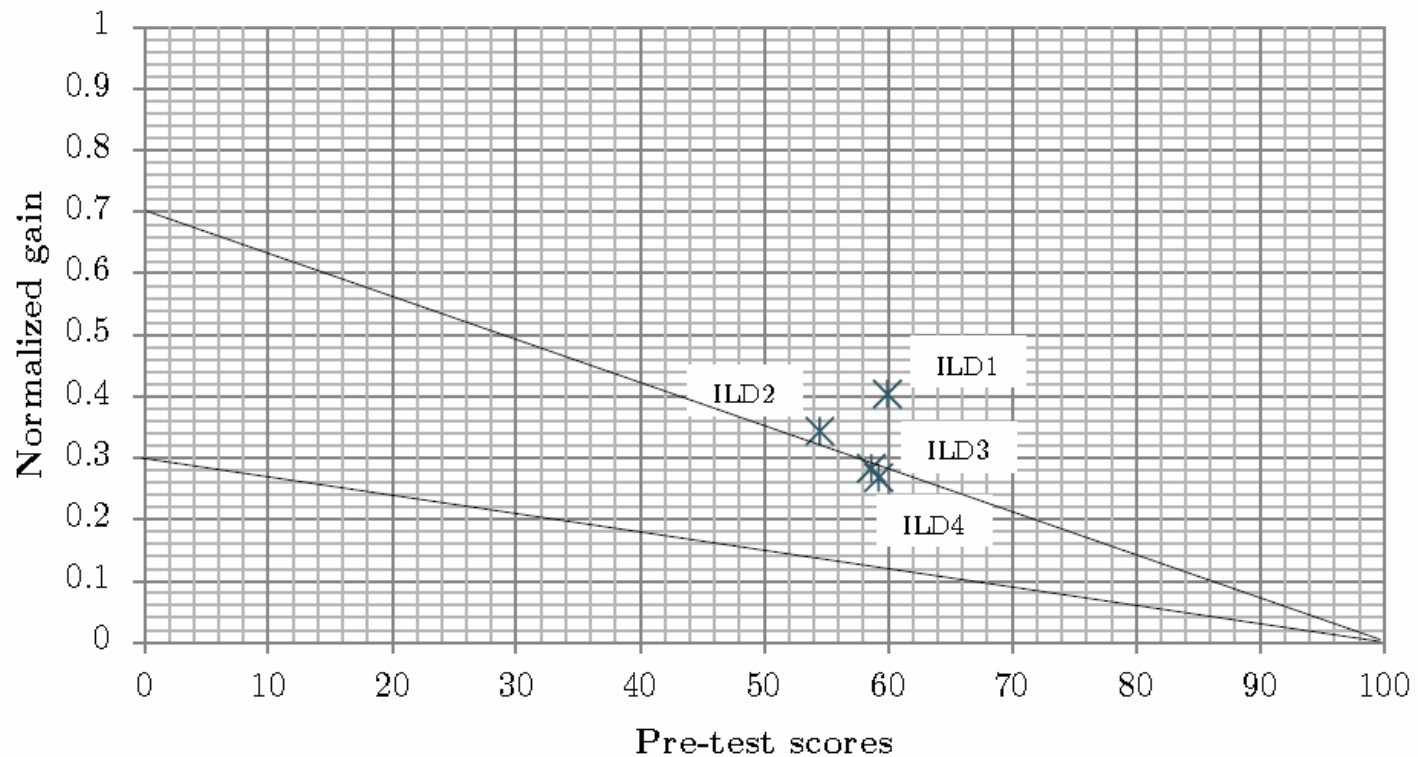


Figure 8-5 Pre-test scores vs. Normalized gain for the four streams. Lines demarcate areas of Hake's Low, Medium and High Gain areas (1998)



- › 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

Acknowledgements & References

- › 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
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