Interactive Lecture Demonstrations: a targeted teaching technique

A project to evaluate the effectiveness of one interactive technique in teaching first year physics students.

Interactive Lecture Demonstrations

- use computers in lectures to log and display data in various ways,
- rely on carefully controlled teacher-class interactions,
- force students to think about what will happen before they see it.

Interactive Lecture Demonstrations

Stage 1: teacher describes the experiment,
Stage 2: students predict what will happen,
Stage 3: students agree among themselves,
Stage 4: teacher performs the experiment,
Stage 5: students discuss why they were wrong.

Interactive Lecture Demonstrations

- have been used in several different universities,
- claim very substantial gains in student understanding.

Correct responses (US): pre- and post-traditional

Correct responses (US): post-ILD
Evaluation of ILDs at Sydney

- First semester 1999, 1 Regular class (130 students) taught with ILDs.
- Advanced stream and other 2 Regular streams (320 students) as controls.
- Module chosen was MECHANICS.

Logistics

- Control classes had 15 1-hour lectures (5 weeks)
- Experimental class had 11 1-hour lectures plus 4 1-hour ILD sessions.
- All tested during first lecture period, and again in middle of the semester.

Correct responses: pre-instruction

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<thead>
<tr>
<th>Category</th>
<th>% Correct</th>
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<tbody>
<tr>
<td>Velocity</td>
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<tr>
<td>Acceleration</td>
<td>50</td>
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<td>Coin Acc 1st &amp; 2nd (nl)</td>
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<td>Coin toss</td>
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<td>3rd contact</td>
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<td>Energy 3rd collision</td>
<td>100</td>
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<td>Cart ramp</td>
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Gain (%)

- Relative gain: experimental and control classes

Why the poor results?

- Is there a cultural bias?
- Is an important factor missing?
- Did I do everything correctly?
Experiment repeated in 2000

- Same class numbers (roughly), same logistics.
- Only the 3 Regular classes were given the pre-test.
- All 3 Regular, and 1 Advanced, streams given the post-test (compulsory).

Experiment redone in 2001

- Same class numbers and same logistics again.
- Different lecturer.
Conclusions?

- This teaching technique seems to achieve what it claims (to a degree).
- This teaching technique requires practice and commitment to be used successfully.
- There seems to be a small fraction of students who cannot be reached.

Could ILDs transfer to other disciplines and cultures?

- If you are willing to devote time and effort to improving student learning.
- Individual teachers working alone could achieve some results.
- It probably needs a community of science teachers to do the basic research.