Enhancing the Student Learning Experience Through Lecture Flipping

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Flipped lectures
What is lecture flipping?

- Also known as "lecturing without lectures" or "inverting the classroom"

- Interactive teaching delivery approach which inverts traditional lectures, often using technology-enhanced learning and teaching
In advance of the face-to-face sessions:

- Lecture content is delivered pre-lectures usually through screencasts or directed reading.
In advance of the face-to-face sessions

- Often accompanied by short online quizzes to assess students’ knowledge prior to lectures and short answer questions for students to identify areas of difficulty ("Just-in-Time Teaching" approach*)

During the face-to-face sessions

- **Face-to-face time** used for focussing on areas which **students** have identified as being difficult
During the face-to-face sessions

- Interactive problem solving e.g. clicker questions (using “Peer Instruction”)* and practice questions

Flipped lectures in Chemistry
Inorganic Chemistry for Biochemists

- Flipped course for 77 first year Biochemistry students traditionally taught as 8 lectures

- Flipped 7 out of 8 lectures (first was interactive quizzes on A Level material)

- Produced 20 videos (using Camtasia, 5-10 mins, WMV, Flash and MOV) 3274 hits (post exam 4354 hits = 345 h)
- Generated 7 pre-lecture quizzes (MCQ + short answer)
- Used face-to-face sessions as class tutorials
- Went over points of difficulty, clicker quizzes and went through 6 past paper questions
Student feedback

- “Seeing the video before the lecture really helps me to understand the content and allows me to ask any questions during the lecture”

- “Really like how we follow the lectures online first and then go over problems in class”

- “The pre-lecture videos are really good, and the class tutorials are interactive and a good reinforcement to our learning”
Staff perspective

- Felt as though delivering personalised teaching sessions ("Just-in-Time" teaching)

- Totally interactive so students engaged — "class tutorial"

- Many more thought-provoking questions asked

- "Peer Instruction" worked well
Flipped lectures in Biology
Flipped lectures in Cell Biology and Microbiology

- Challenges compared with Physics & Chemistry
- Pre-lecture studies e.g. textbook, scientific papers/reviews, screencasts, pre-recorded lectures
- Examples of class activities:
  1. Clicker session on microscopy
  2. Data interpretation session
  3. Essay plan
What type of microscopy?

A. Bright field microscopy
B. Scanning microscopy
C. Transmission microscopy
D. Fluorescence microscopy
What cell component/organelle is labelled?

A. Golgi apparatus
B. Plasmamembrane
C. MT cytoskeleton
D. ER

- C. MT cytoskeleton
# Results of “Peer Instruction”

<table>
<thead>
<tr>
<th>% correct answers-before</th>
<th>% correct answers-after</th>
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<tbody>
<tr>
<td>78</td>
<td>90</td>
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<tr>
<td>65</td>
<td>80</td>
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Data Interpretation

- Students write a paragraph describing and interpreting the results.
- They then compare notes in small groups.
- This is followed by a class discussion.
Essay plan

- Topic based on pre-lecture material
- Students work individually on the essay plan
- Followed by discussion in small groups
- Followed by class discussion
STEM Education Centre
Research Project
Enhancing the Student Learning Experience Through Lecture Flipping
Research Aims

- To investigate student engagement, experience and learning using a flipped teaching approach for first and second year undergraduate Bioscience students.
Objectives

- To use a flipped teaching approach (incorporating “Just-in-Time Teaching” and “Peer Instruction”) in two modules and to monitor student engagement, student experience and learning.

- Data will be analysed with respect to a number of factors e.g. students’ prior education, gender, home / international status, preferred learning style (VARK™)

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Curriculum Review

- Transforming Teaching Delivery Strand
Acknowledgements

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