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Enhancing the Student Learning Experience Through Lecture Flipping

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Flipped lectures

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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**

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In advance of the face-to-face sessions

- **Lecture content is delivered pre-lectures usually through screencasts or directed reading**

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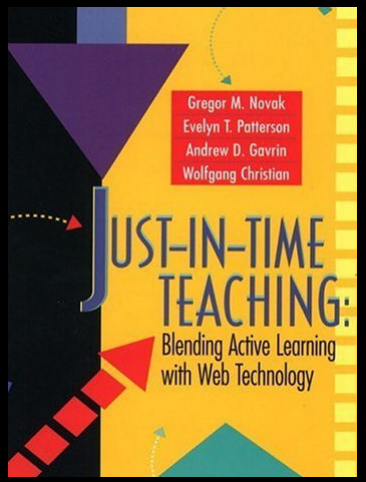
In advance of the face-to-face sessions

- 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*)



** "Just-in-Time Teaching: Blending Active Learning and Web Technology"* G.M. Novak, E.T. Patterson, A.D. Gavrin and W. Christian, Prentice–Hall, Upper Saddle River, NJ, 1999

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During the face-to-face sessions

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

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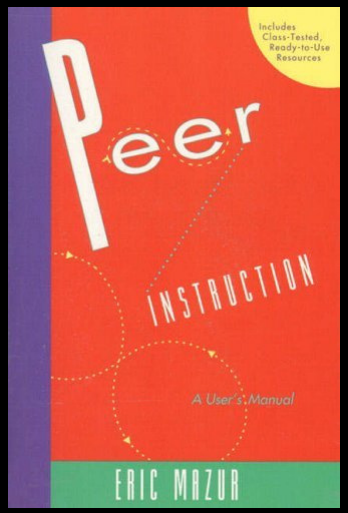
During the face-to-face sessions

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



* ***"Peer Instruction: A User's Manual"*** **E. Mazur, Prentice–Hall, Upper Saddle River, NJ, 1997**

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Flipped lectures in Chemistry

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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)

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- 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

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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"*

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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

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Flipped lectures in Biology

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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

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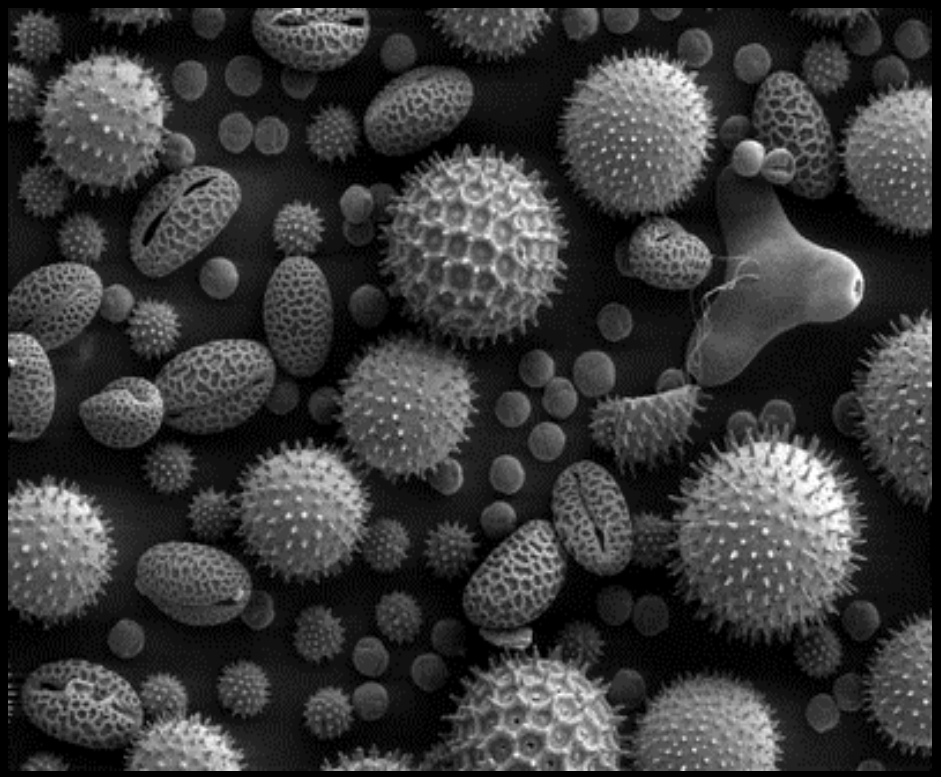
What type of microscopy?

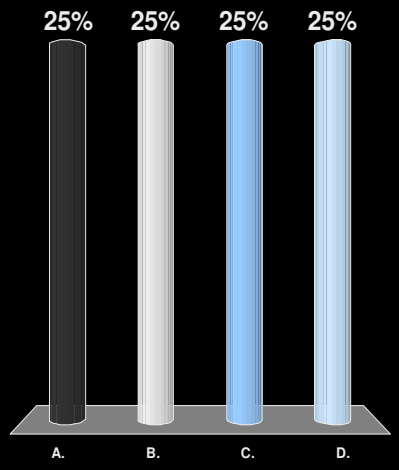
A. Bright field microscopy

B. Scanning microscopy ✓

C. Transmission microscopy

D. Fluorescence microscopy





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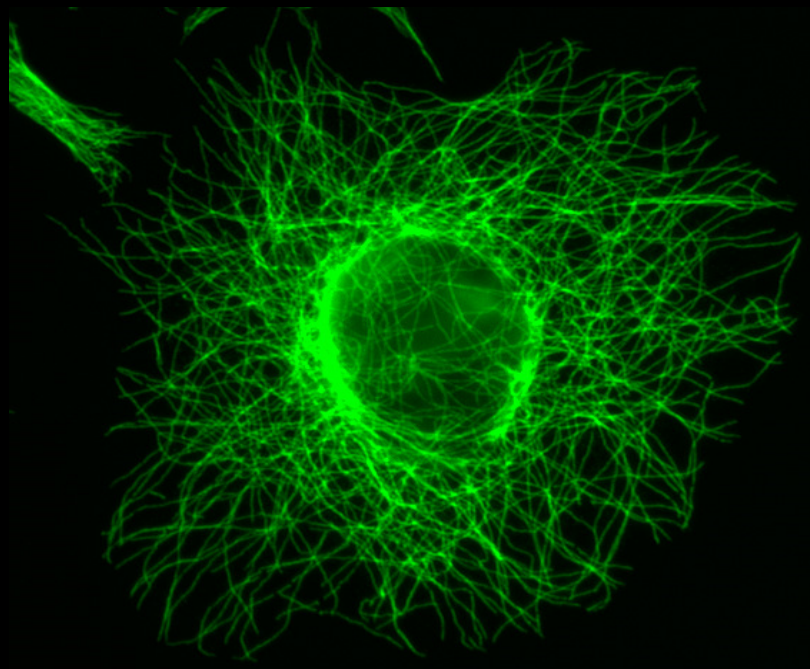
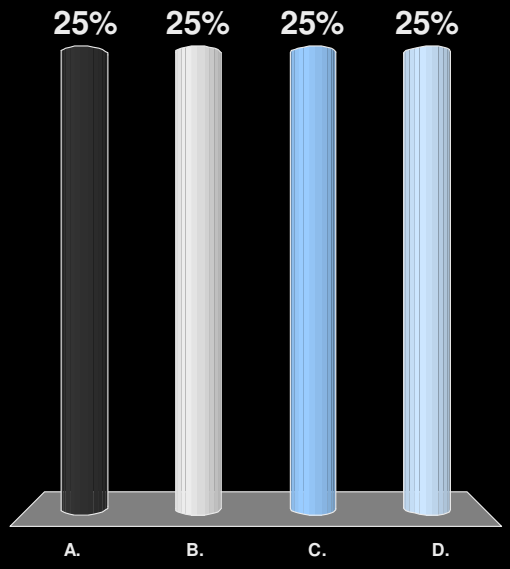
What cell component/organelle is labelled?



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



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Results of *"Peer Instruction"*

% correct answers-before	% correct answers-after
78	90
65	80

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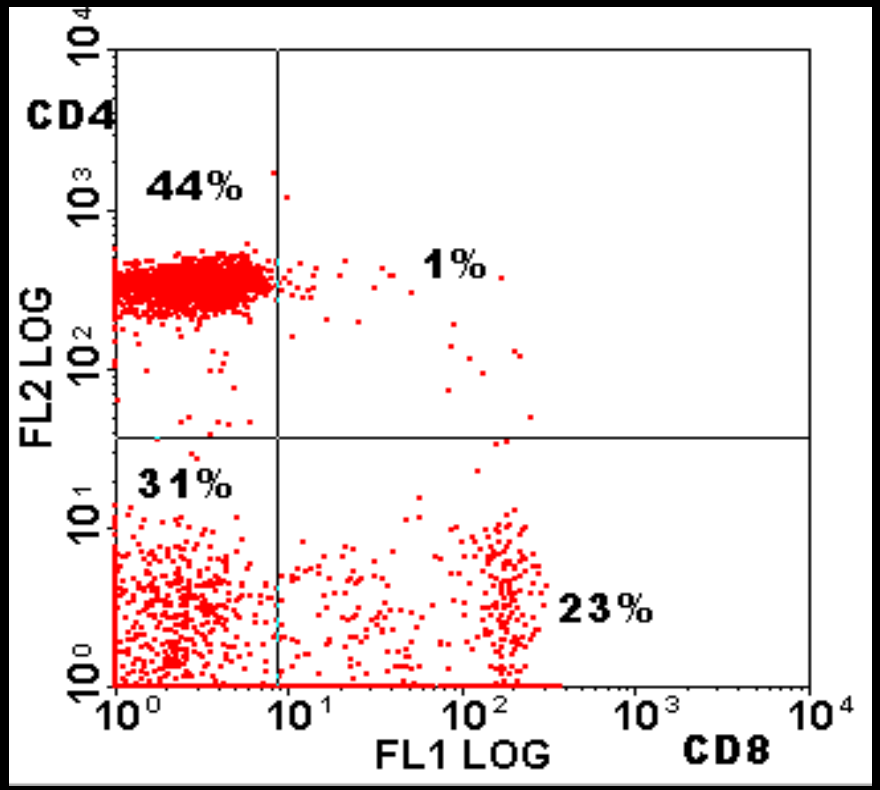
Data Interpretation

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



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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

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STEM Education Centre Research Project

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Enhancing the Student Learning Experience Through Lecture Flipping

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Research Aims

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

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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™*)

* © Neil D. Fleming, Christchurch, New Zealand

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Curriculum Review

- **Transforming Teaching Delivery Strand**

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