

New Ways of Teaching

Cristina Adriana Alexandru

Cristina.Alexandru@inf.ed.ac.uk

Schedule

- ▶ Motivation: disadvantages of traditional ways of teaching
- ▶ Presentations by our invited speakers:
 - ▶ Dr. Adam Carter (EPCC): Online learning
 - ▶ Prof. Judy Robertson (Education, Informatics): Classroom talk
 - ▶ Prof. Bob Fisher (Informatics): The “Flipped Classroom” (also an active learning approach)
- ▶ Quectures, developed by Dr. Heather McQueen
- ▶ Peer Learning
- ▶ Discussion

“Traditional” teaching in the sciences

- ▶ Lectures, tutorials, labs
- ▶ Lectures present theory; students listen passively
- ▶ Tutorials give the opportunity to put theory in practice, exercise and collaborate with peers
- ▶ Labs involve more individual work, and are usually an opportunity to try out technology
- ▶ Tutors and lab demonstrators must step up and explain concepts which are not clear to students.

“Traditional” teaching in the sciences

- some advantages

- ▶ Traditional lectures (Bonwell (1996), Cashin (1985), Wood (1989)):
 - ▶ Can communicate the intrinsic interest in the topic, thus motivate
 - ▶ Can include research results or material not otherwise available
 - ▶ Organisation of the material can help make a point, draw conclusions
 - ▶ Can exemplify the way of working of a profession
 - ▶ Comfortable (less threatening) to students
 - ▶ Are economic: hundreds of students at once, large amounts of information
- ▶ Tutorials and labs involve active learning, and can help develop numerous skills (e.g. team work, communication, time management)
- ▶ Tutors and lab demonstrators are approachable, there to help answer questions

“Traditional” teaching in the sciences

- some disadvantages

- ▶ Evidence that traditional lectures (Bonwell (1996), Cashin (1985), Wood (1989)):
 - ▶ Are poor at stimulating thought or changing attitudes
 - ▶ Involve passive, not intellectually engaging learning, easy to forget information
 - ▶ May lead to student attention falling off after 15-25 minutes
 - ▶ Are not appropriate for higher levels of learning (e.g. analysis, synthesis) or complex material
 - ▶ Assume uniform learning pace and levels for the students
 - ▶ If using slides, irrelevant information may detract attention, watching slides may lead to neglect of interaction, speed may lose some students (Xingeng 2012).

“Traditional” teaching in the sciences

- some disadvantages

- ▶ Students may expect all answers from the central figure of the instructor, and not really understand
- ▶ Tutorials address group needs, difficult to offer equal opportunity to individuals
- ▶ Inappropriate for students with limited availability, or distance students

=> Useful to also consider and try out “new ways” of teaching

Talk by Dr. Adam Carter: “Online Learning”

The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the right side of the frame, creating a modern, layered effect. The rest of the background is plain white.

**Talk by Prof. Judy Robertson:
“Classroom Talk”**

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Talk by Prof. Bob Fisher: “The Flipped Classroom”

Time for a break!

The “Quecture” approach

- ▶ Developed by Dr. Heather McQueen from School of Biological Sciences
- ▶ Trialled 2nd year Genetics course with very positive results: more of her students preferred quectures to other approaches to teaching
- ▶ Main idea: *“Thinking is not driven by answers but by questions.”*
(<http://www.criticalthinking.org/>)
- ▶ Shares elements with the ‘flipped classroom’ approach:
 - ▶ Requires online preparation before class
 - ▶ Involves peer instruction style activities during the class (quecture)
 - ▶ (Some of) the theory is delivered online before the quecture
- ▶ However, two differences:
 - ▶ Theory is (also) delivered during the class, for more difficult notions
 - ▶ Encourages students to formulate and discuss their own questions during the quecture and online in between quectures (also see peer learning).
- ▶ Interesting or difficult questions are discussed in the following quecture

The “Quecture” approach

▶ Advantages:

- ▶ Encouraging students to develop their learning by being reflective (i.e. higher level of learning)
- ▶ Encouraging behavioural/attitudinal change in responsibility for learning (during but also in preparation for class by asking/answering questions)
- ▶ Developing communication skills
- ▶ Combining advantages of traditional and ‘flipped’ approach regarding the presentation of theory, as well as those of ‘flipped’ for peer instruction
- ▶ Feedback to teachers about questions which still need answering
- ▶ Students “feeling more part of the lecture”

▶ Disadvantages:

- ▶ Motivating students to work ahead of class
- ▶ Motivating students to ask and answer questions on online forum
- ▶ ... Can you think of others?

Peer learning

- ▶ Peer learning is centred on the **sharing of knowledge, ideas and experience between students of the same or different levels**
- ▶ Some advantages:
 - ▶ Learning a lot by explaining things to one another
 - ▶ Developing transferrable skills (communication, planning, time management, facilitation) which foster lifelong learning and contribute to their employability
 - ▶ Developing a sense of community and relieve anxiety about university life
 - ▶ The onus is more on the students who become more in charge of their learning
 - ▶ Easier to manage more students by fewer members of staff
 - ▶ Works well with online learning

Peer learning- my experience from InfPALS (Informatics Peer Assisted Learning Scheme)

- ▶ Students in higher years who “facilitate” sessions for 1st year students
- ▶ Facilitation = providing exercises, encouraging group work and coordinating student work; advising on learning strategies and university life
- ▶ Advantages for 1st year students:
 - ▶ Active learning
 - ▶ Improving understanding of course material, revision
 - ▶ Meeting and collaborating with peers, making friends
 - ▶ Adapting easier to university study and university life
 - ▶ Safe space where to ask questions
 - ▶ Being advised by older students who have passed through same experience
- ▶ Feedback (2016-17): students liked most the clarification of doubts, group work/peer learning, the friendly and helpful facilitators with experience.

Discussion

For a course that you are currently teaching, consider the following:

- ▶ **Which of the described approaches could be used in it?**
- ▶ **What would be the advantages and disadvantages (challenges)?**
- ▶ **Would the approach(es) require adaptation, or combining?
How?**

(Group work)

Resources

- ▶ Bonwell, C. C. (1996). "Enhancing the lecture: Revitalizing a traditional format" In Sutherland, T. E., and Bonwell, C. C. (Eds.), *Using active learning in college classes: A range of options for faculty, New Directions for Teaching and Learning* No. 67.
- ▶ Cashin, W. E. (1985). "Improving lectures" Idea Paper No. 14. Manhattan: Kansas State University, Center for Faculty Evaluation and Development.
- ▶ Wood, E. J. "Making lectures more exciting." *Biochemical Education* 17.1 (1989): 9-12.
- ▶ Xingeng, Ding, and Liu Jianxiang. "Advantages and disadvantages of PowerPoint in lectures to science students." *IJ Education and Management Engineering* 9 (2012): 61-65.
- ▶ On Quectures:
 - ▶ <http://www.criticalthinking.org//>
 - ▶ Teaching matters blog (2016): "Quectures: Teaching through questions"
 - ▶ Teaching matters (2016): "Experimental interactive learning "Quectures""
- ▶ On peer learning: Boud, David, Ruth Cohen, and Jane Sampson. *Peer learning in higher education: Learning from and with each other*. Routledge, 2014, pp. 3-6