

Engaging students in large groups

Ralf Becker (ralf.becker@manchester.ac.uk)

Caroline Elliott (c.elliott4@aston.ac.uk)

Guglielmo Volpe (g.volpe@qmul.ac.uk)

Session plan

- Why large group teaching
- The role of lectures in the Learning Journey
- PowerPoint Pitfalls
- Lecture Capture
- Technology and Interaction





“My students are not coming to lectures. We should not podcast lectures and lecture attendance should become compulsory.”

DISCUSS!



What do we want to achieve with a course unit?



- Facilitate student's (independent) learning
- Memorise information
- Extract principles and underlying meaning
- Integrate new with previously acquired knowledge
- Enable students to apply their knowledge in a new context

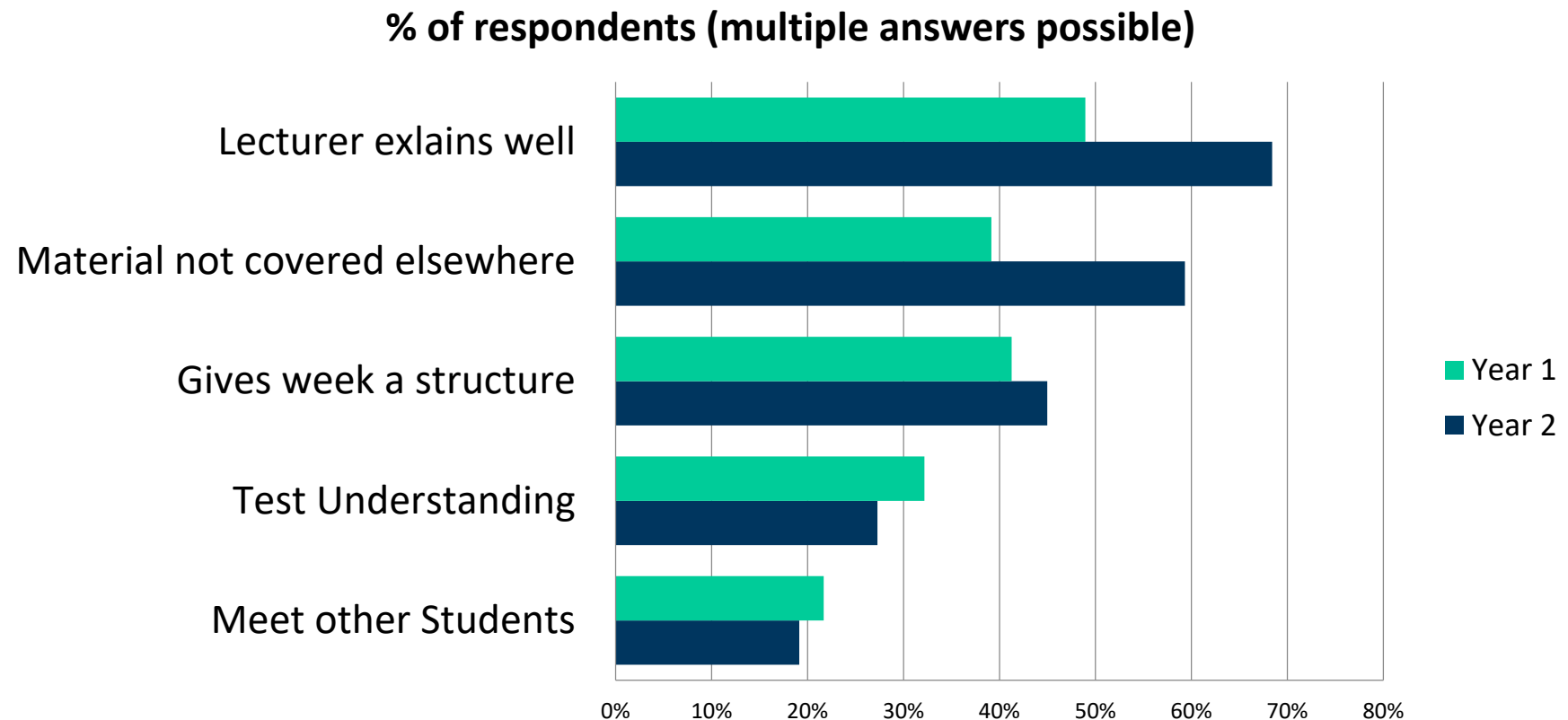
What tools do we have?

- Lectures
 - Tutorials/Seminars
 - Reading
 - Coursework/Groupwork
 - Online quizzes
 - Podcasts
 - Online Clips
 - Peer Assisted Study Schemes
- } Tech enabled

**BUT, all rely on
students engaging
with these!**

Why do students come to lectures?

- Responses from 143 Year 1 and 209 Year 2 Students of Statistics and Econometrics, The University of Manchester



What does typically happen in a lecture?

- Main vehicle to convey material
- Mostly done by the lecturer presenting
- Extra reading and tutorials to supplement that material
- Coursework to deepen knowledge (often on a particular aspect of the material)

Understanding of learning

- (Deep) knowledge is constructed not passed on
- Students aim to integrate new material with existing knowledge and real life experiences
- May have to overcome existing mental models which is likely to require:
 - some element of active learning
 - student's motivation to learn
- Our aim:
Engage more students into this type of learning

Lit: good summary by [Steve Draper](#) (Glasgow)

Active Learning

- Students actively engage with material / challenge their preconceived understanding
- Motivated students will typically do this by fully engaging with extra reading/tutorial questions/coursework and reading beyond the expected
- Can happen in different settings (but typically doesn't happen in a traditional lecture)
- Why not?

Aim: By moving elements of active learning into the classroom we can perhaps engage more students into activities that facilitate deep learning

Lit: Meta analysis of active learning in STEM, Freeman et al., PNAS, 2014

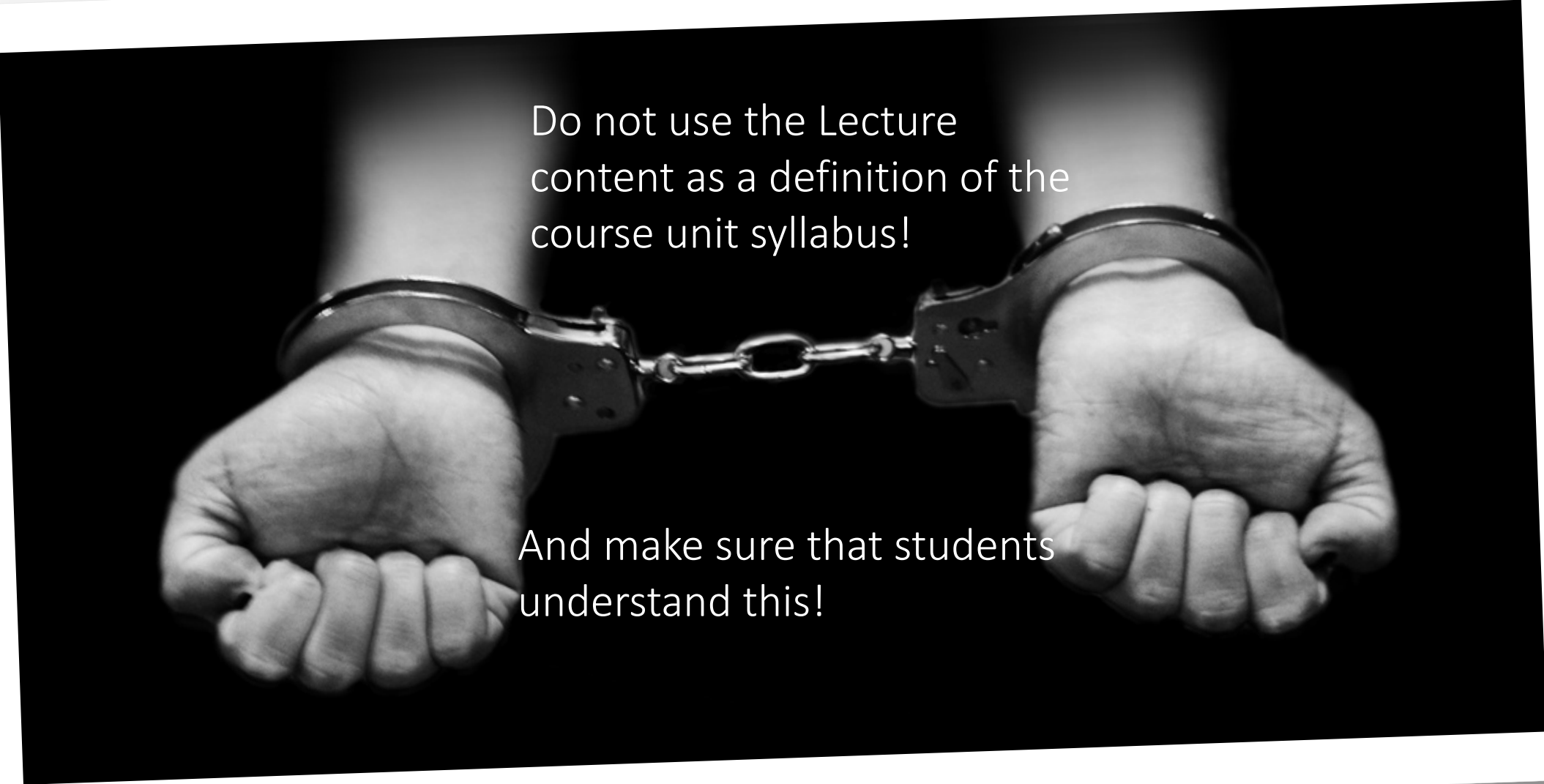
Learning process

Think about the entire learning process not only the lecture!

- What is best achieved by lectures?
- What best by other tools?

Restrictions:



- School guidelines on how many lectures and tutorials you should put up
- Convention/Student expectation and work pattern
- Your workload



Do not use the Lecture
content as a definition of the
course unit syllabus!

And make sure that students
understand this!



The learning journey – use your VLE

 **Learning Objectives** 

This week we expect you to learn:



- why we want to do multiple regression.
- the properties of OLS estimator with multiple regressors.
- the consequences of omitted variable bias.
- what multicollinearity is and why it matters.
- how to estimate a regression with multiple coefficients in RStudio and provide an economic interpretation of the results.



Reading: [Wooldridge](#) Chapter 3 and Appendix E

 **BEFORE the lecture** 

In order to prepare yourself for the lecture you should review this material BEFORE the lecture; the lecture will assume that you have done this:

- [interpretation of multiple regression coefficients \(why we want to condition on other covariates\)](#) (6.23 mins)
- [OLS estimator in summation and matrix form](#) (8.57 mins) (check the Discussion Board for some further useful links on using matrix algebra including the solution to an exam type question).

 **Lecture Notes Week 3** 

 **AFTER the lecture** 

Enabled: Adaptive Release, Statistics Tracking

You should review the following items which provide necessary detail on topics discussed in the lecture (this is essential material which WILL BE INCLUDED IN THE EXAM)

- [Proof of unbiasedness of OLS with multiple regressors](#) (7.37 mins)
- [Omitted variable bias](#) (9.59 mins)
- [Multicollinearity](#) (5.23 mins)
- An outline of the proof is given [here](#). Details are provided here (courtesy of Ben Lambert): [part 1 clip](#) (4.43 mins), [part 2 clip](#) (5.59), [part 3 clip](#) (4.52 mins). A slightly different version is given in Wooldridge's Appendix E.3.

Outsourcing

“**Outsource**” part of the (**examinable!!!!**) material away from lectures (either before or after)

- personally often to online clips, but could be reading or podcasts or other delivery means as well
- Very introductory exposition
- Long and tedious (but important) arguments
- Proofs

This gives **more time in lectures for:**

- More complex/subtle material
- Extended Examples
- Discussion / Dialog (easier when using Webinars?!)
- Staff/Student and Student/Student interaction (e.g. quizzes, small practice questions)

Death by PowerPoint



Research question 1

- Random effects (GLS) regression with bootstrapped SEs to identify determinants of school efficiency score
- $\theta_{jt} = \beta C'_{jt} + \delta A'_{jt} + \gamma R'_{jt} + \rho E'_{jt} + \varphi M'_{jt} + \omega L'_{jt} + \tau T'_{jt} + (\alpha_0 + u_j) + \varepsilon_{jt}$
- C'_{jt} = vector of competition variables
- A'_{jt} = set of dummies indicating the school's affiliation to a coalition
- R'_{jt} = vector of reputation variables
- E'_{jt} = vector of school characteristics
- M'_{jt} = vector of variables about the county in which the school is located
- L'_{jt} = set of location dummies
- T'_{jt} = set of time dummies

Research question 2

- How to produce a blockbuster



PowerPoint Hints

- Avoid too much text
 - Definitions; Equations; Diagrams; Short Lists
- Avoid having too many slides
- Do not recite
- Avoid multiple types of animations
- Opportunities for pictures and hyperlinks

Why not go a little basic?



Lecture capture vs. Screencasting

- Screencasting: recordings of presentations or computer screen content with audio
- Lecture Capture: recordings of computer screen content, audio and the presenter
- Lecture capture systems include Panopto; Echo360; eStream

Lecture capture advantages

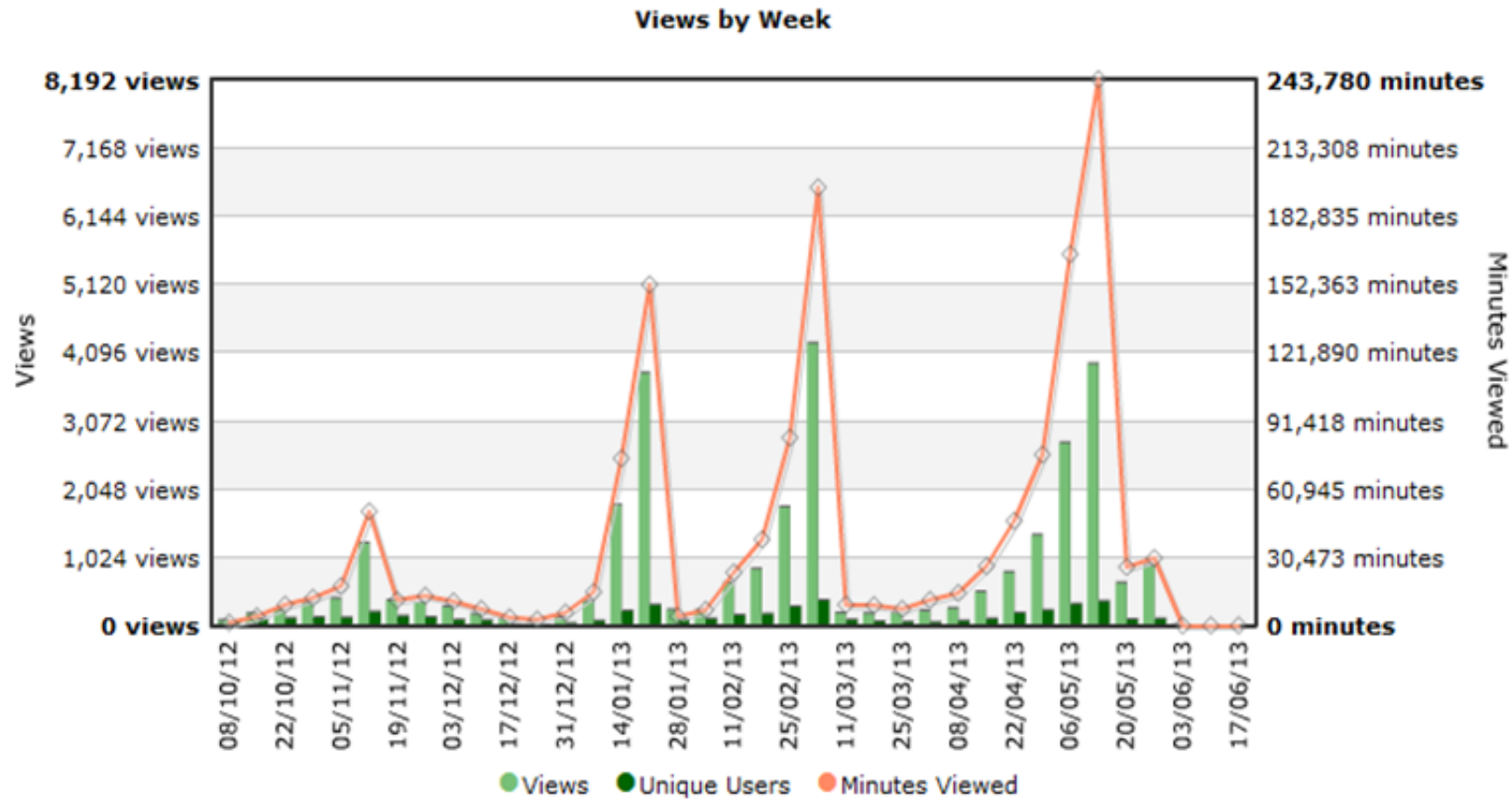
- Great for revision (pause and repeat)
- Additional support for students with additional needs
- For international students
- If distracted in class
- Lecturer can speed up
- You do not have to watch yourself
- You can watch yourself

Lecture capture tips

- Familiarise yourself with the technology in advance
 - Get used to using the pause button and the microphone in advance
- Repeat student questions and comments
- Don't point at the whiteboard, you may not be seen
- Use the visualiser
- Don't stray too far from the microphone - unless you have a lapel mic
- Use your hands to convey a message – do not jingle keys and loose change
- Give students reasons to come to lectures



Possible usage patterns



Lecture capture research

- Students do watch lecture recordings
 - but only view parts of lectures
 - Usage increases around successive tests
- No negative impact on lecture attendance or participation
 - Reduced demand for office hours
- Recordings supplemented rather than replaced lectures
 - Recordings encouraged independent learning
- If the lecture is delivered more than once, record the 2nd session
- Lecture Capture time saving compared to screencasting

Value added

- Students have access to substantial learning support: lecture slides, notes, videos, etc.
- Why should a student come to the lecture?
- Can the lecture be designed to provide a ‘Value Added’ that other resources cannot?
- Learning as a social construct: students active (and interactive) engagement
 - Audience Response System
 - Games/Experiments
 - Extended worked examples
 - Discussion of grey areas / policy implications



Audience response system (1)

- Challenge, engage, address
- Interplay between direct teaching and continuous feedback from and to students
- Social Learning – Peer Instruction ([Mazur, 2001](#)) / Team-based learning ([Aricò and Lancaster, 2018](#))
 - Students listen whilst the teacher asks a question
 - Students think independently on their response
 - Students submit their answer on their clicker/response device
 - The teacher can see the results
 - Students then pair up with someone who's answer is different to theirs
 - They discuss why they choose their answer
 - Post-discussion, students answer the same question again on their clicker/response device
 - The teacher sees and shares the results: discussion, elaboration of results and fixing of key ideas and concepts

Audience response system (2)

- Consider questions that have 'surprising' (for the students) results and use them for discussion...
- Use ARS to run competitions between students (left hand side of room vs right hand side etc.!)
- For each lecture consider using:
 - Set of slides available on VLE for all students
 - Set of slides with ARS questions but not publicly available (further incentive to come to lecture?)
- Walk around room during ARS questions
 - Engage with students
 - How do they approach the questions?



Games/experiments

- Games
 - Use interactive games to introduce students to topic/theory/concept
 - Ask students to identify key features/issues
 - Formalise theory taking insights from game
 - The CLT experiment in statistics...
 - Attend 'Games & Media' workshop later on today!



A photograph of a white card with the word 'enjoy!' written in black cursive. A red line is drawn underneath the word, curving slightly upwards at the ends.