

# Flipping the classroom for 550 students

*It's no mean feat but it might just be worth it...*

**Charlotte Price**  
Principal Teaching Fellow  
Statistician, WBS

**Maria Walker**  
Assistant Publishing Manager  
WBS eLearning

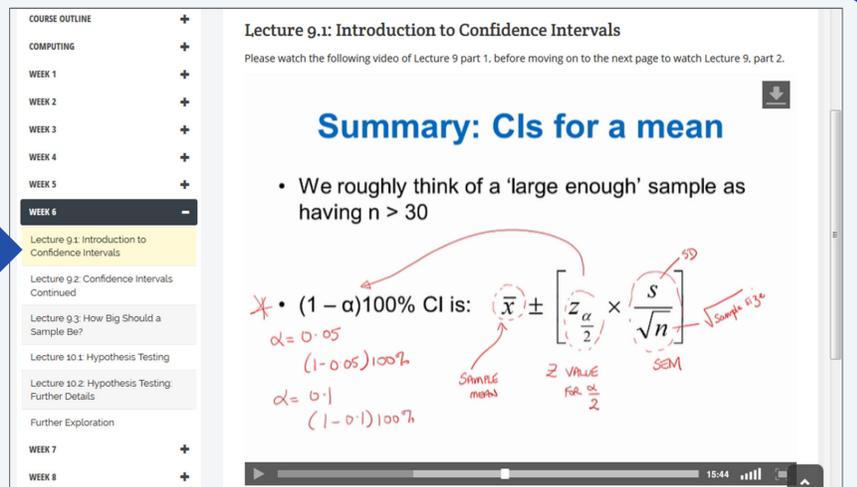
## Introduction

At WBS, first year students take the core module Quantitative Analysis for Management 1 (QAM1), a foundation course in statistics. Some students have studied no maths since GCSE level while others have taken a range of quantitative A Levels (or equivalent), which makes this a challenging module to teach. A major re-write of the module materials in 2013, followed by a move to include a mid-term online assessment in 2014, has resulted in consistent positive student feedback. However, the announcement of a large increase in student numbers in 2015 prompted the most radical change to QAM1 yet, teaching using a flipped classroom. A flipped classroom “uses technology to move lectures outside the classroom and uses learning activities to move practice with concepts inside the classroom” (Strayer, 2012).

## The process of flipping the QAM1 classroom...

### Step 1: record the lectures

- Recorded using TechSmith Camtasia 8
- Lectures broken into parts with an average length of 25 minutes
- Videos edited to ensure smooth, professional delivery
- A mix of talking to camera, PowerPoint presentation, and hand-drawn annotations and explanatory workings using a graphics tablet

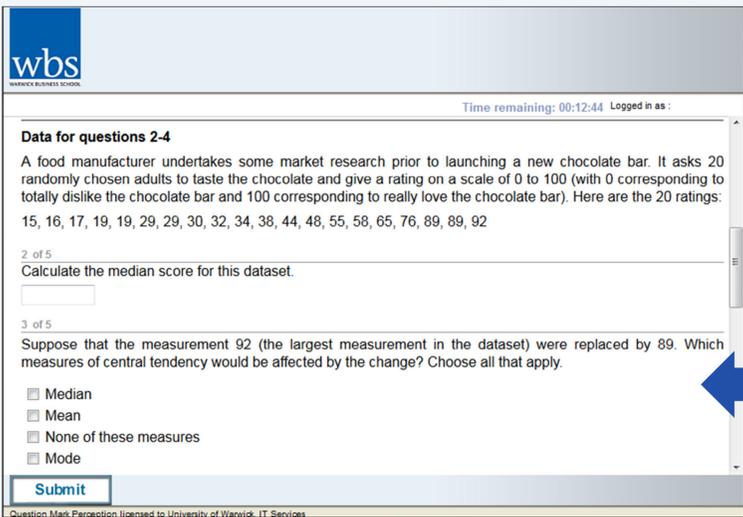


### Step 2: prepare interactive classroom sessions

- Weekly tutorials re-written to focus on group-work exercises
- The lecturer moved from teaching large lectures to smaller group teaching

### Step 3: prepare online class tests

- Students tested in week 7 and week 10 of the term
- Questionmark Perception used (<http://warwick.ac.uk/perception/>)
- 10 questions, 45 minutes, multiple versions of each question
- Excel system used to create up to 99 variants of some numerical questions
- Randomisation of questions presented to minimise potential for collusion



## Benefits

### To students

- Can watch lectures in own time at own speed, multiple times
- More detail in videos than is possible in traditional lecture slot
- Higher value face-to-face time with module leader
- Can sit tests anywhere on campus with good internet connection

### To faculty

- Avoids need for lecture space and test facilities for 550 students
- Can monitor student progress and engagement during the module
- More time available to support under-performing students
- Test results available immediately after the test is finished

## Did students enjoy QAM1 in 2015-16?

A quasi-experimental study was used to compare end of module feedback from QAM1 students in the 2013-14 cohort (control group) with those in the 2015-16 cohort (treatment group). The response rates were 75% (327/438) and 82% (455/558) respectively. Here are some headlines:

	2013-14	2015-16
I found QAM1 interesting	66%	85%
The lecture slides were very good or excellent	65%	86%
I found QAM1 difficult or very difficult	63%	31%

## ... and did they like the flipped classroom?

Of the 455 students who completed end of module feedback in 2015, 80% said they liked the flipped classroom approach and 93% rated Charlotte's teaching as very good or excellent.

*"I am a great fan of the method used for teaching QAM. Online lectures meant that I could go at my own pace, go back on things I didn't understand, and do it whenever I wanted to. The tutorials were great for practice. On the whole, I really enjoyed learning in QAM I; this system should be used for more modules."*

*"Great module, with clear explanation of everything. Especially great idea to teach by online lectures"*

*"I cannot state this enough, I appreciate the dedication you put into this. Regardless of the grade I will get, I strongly believe that this is what quality teaching looks like"*