First Year Engagement Using Clickers

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Project Overview

› Relatively small-scale "pilot project" rolling-out clickers to two schools (Maths & Life Sciences: ~500 students in total)
  – Local distribution, training & support

› Focus on "attendance monitoring" *via* clicker IDs linked to individual students as well as enhancing "active learning"

› Ethics & evaluation:
  – Students gave informed consent when they were supplied with their clicker and we'll be presenting some cohort-level data on that basis
  – All participants in focus groups and surveys gave consent for dissemination of anonymous results

Implementation

› TurningPoint software linked with PowerPoint.

› Bespoke web database created by academic staff (J D-P)

› 'Mechanics' of setting and using questions easy for staff

› Clickers makes responding easy for students

› Intention – to be utilised at in all lecture sessions

› Attendance easy for staff to view and for students to see their own individual record

Feedback from staff and students

FOCUS GROUPS AND SURVEYS

If you had a choice, what device would you use instead of a clicker?
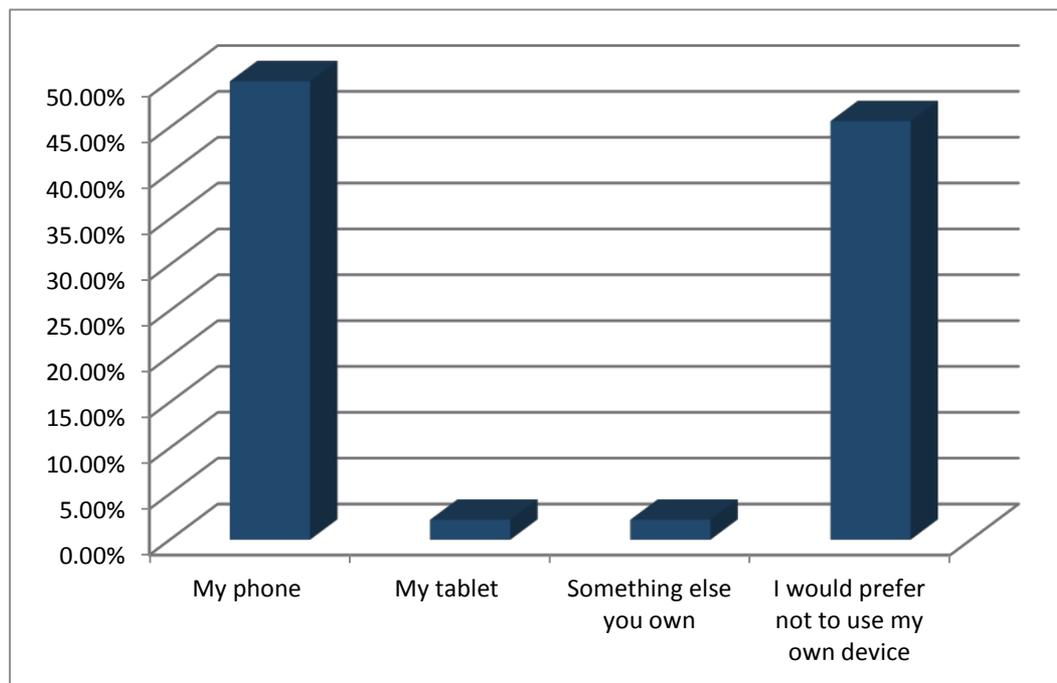
› Over 96% of responding students found the clicker easy to use with around 50% preferring to use clickers over their own devices.

› Many students prefer their standalone "clickers"
  – Anecdotally, it might be to separate "life" from "study"…

Our students' views on clickers

"I'm used to carrying my Clicker, it stays in my bag"

"A mobile phone will be too distracting, but no excuse if you forget your Clicker"

"A phone is a switch off from the lecture; you may miss too much if you use it instead of a Clicker"

Our staff views on clickers

› The staff would prefer for the students to use clickers and not their mobile phones.

– mobile phones can distract the students

– students may not have a mobile phone or may not be able to install Turning Point app on their phone and the students may not have access to Wi-Fi.

The University should provide Clickers or whatever technology they choose, the student shouldn't worry about it.'

Monitoring Attendance
Are you in today?

"I don't agree with using clickers for attendance because it's inaccurate, irrelevant and they should be focusing on enhancing our learning."

› Approximately 20% students object to being monitored or "forced" to carry their clicker

› Less than half the students feel that the clicker influences their attendance

Encouraging participation?

Active learning

› There is good evidence that, particularly in STEM, "active learning" is an effective method in teaching and learning
  – Freeman *et al* (2014) "Active learning increases student performance in science, engineering, and mathematics" *PNAS* **111** (23).

› Clickers can be used to facilitate this in-class, in both traditional classrooms and bespoke learning environments

› To examine students' perceptions of this (and the clickers project as a whole) we gathered student opinion using the clickers half way through the year

Is the primary purpose of the School using the clickers clear to you?
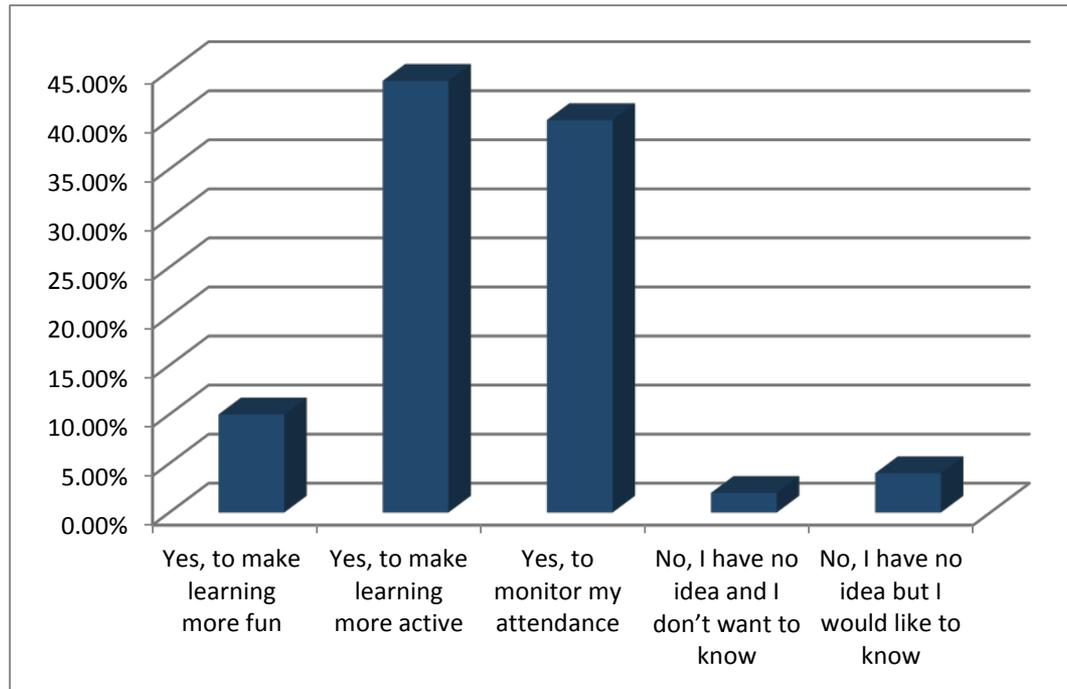
› One module had been using a "peer instruction" methodology which students appear to have interpreted as "active learning" without prompting ☺

I enjoy answering the questions using my clicker.
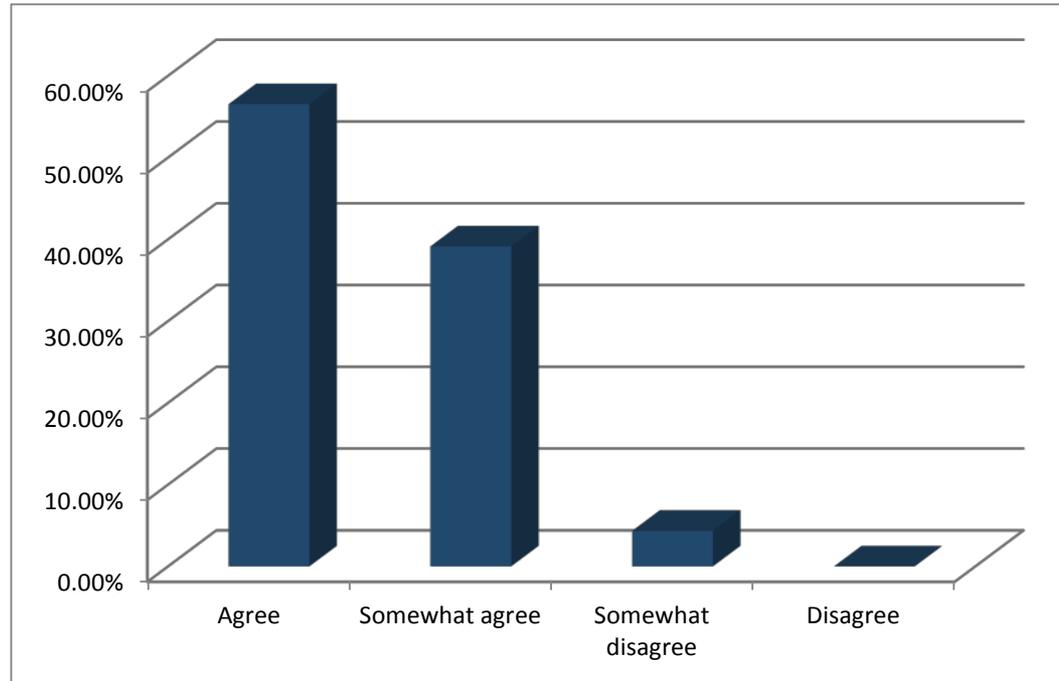
› Students seem to appreciate the opportunity to 'test' themselves – with the safety net of in-class anonymity amongst their peers (should things go wrong) even if their results can be seen by staff.

I try my best to answer the questions.
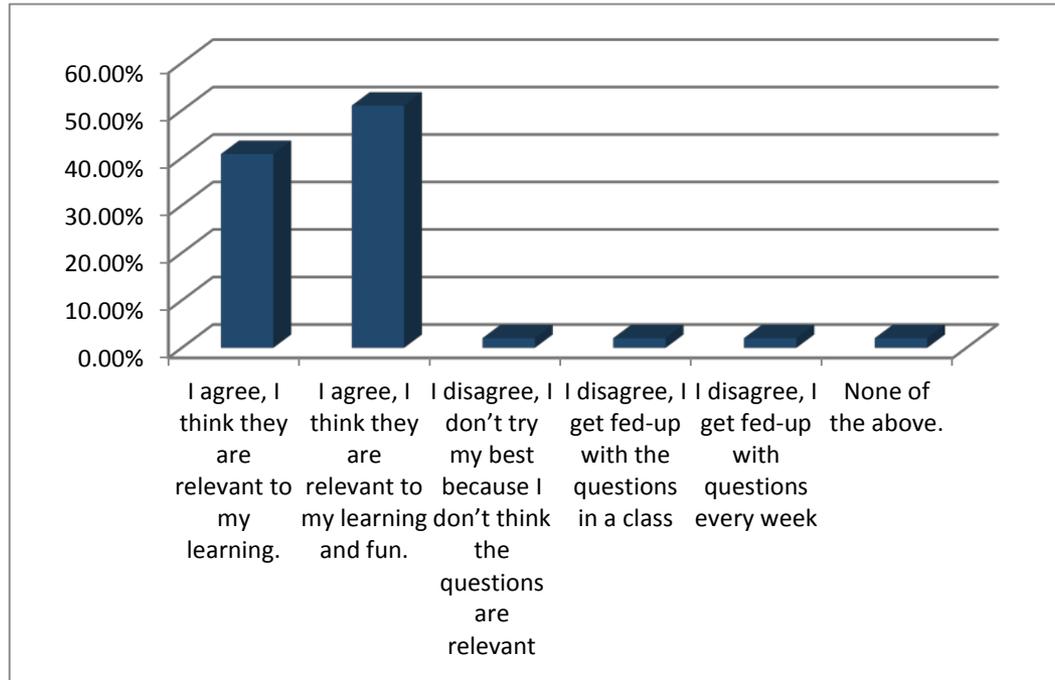
> Some staff reported that a higher proportion of students make a serious attempt to solve example questions when these are posed with the clickers than without – virtually all students present have a go (only a small number seem to guess).

I feel that the quizzes have been beneficial to my learning.
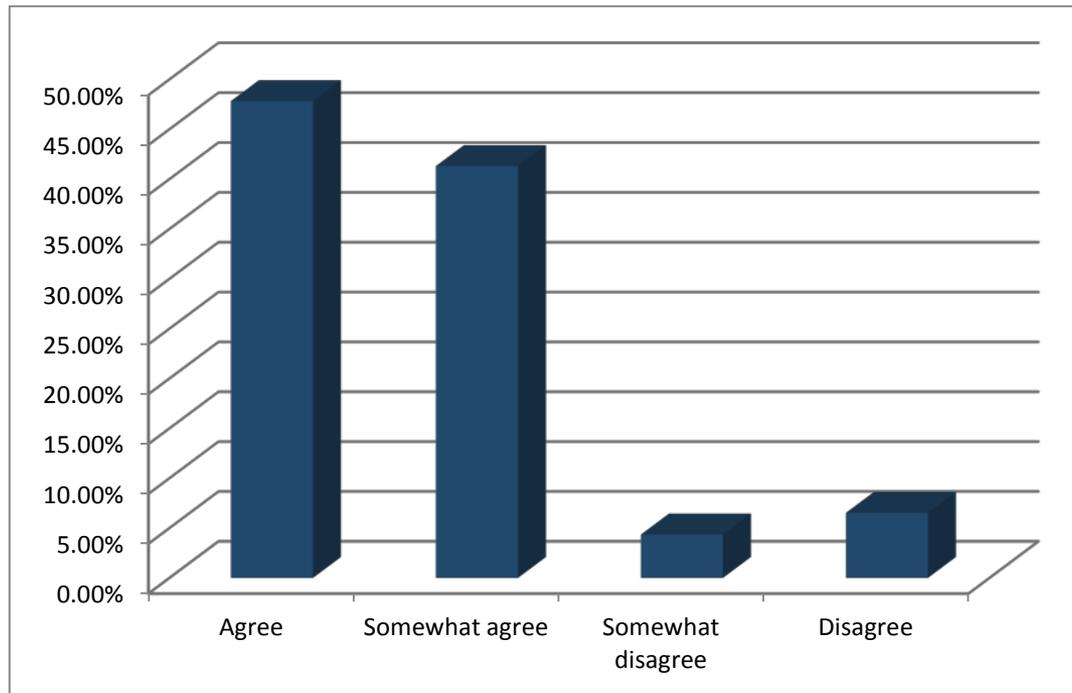
› Only 7% out of the students responding somewhat/ disagree

Intervention – Referral for Poor Attendance

› Students with poor attendance were identified and referred to a workshop supported by senior staff to point out the error of their ways.

› Unfortunately owing to data loss early on the referral was early in the second semester – possibly too late for significant effect.

› Also follow-up to the referral was not co-ordinated and so for most students this was a one-off event

› There is some evidence that the intervention may have had some effect. Taken across the year the rate of decline in attendance was less for the group of students who were referred than for those who were not.

Attendance statistics

Referral - Intervention for Poor Attendance

y = -0.0188x + 0.8222
R² = 0.68289

y = -0.0091x + 0.3003
R² = 0.48509

Referred
Not referred

Attendance

Teaching Week Number
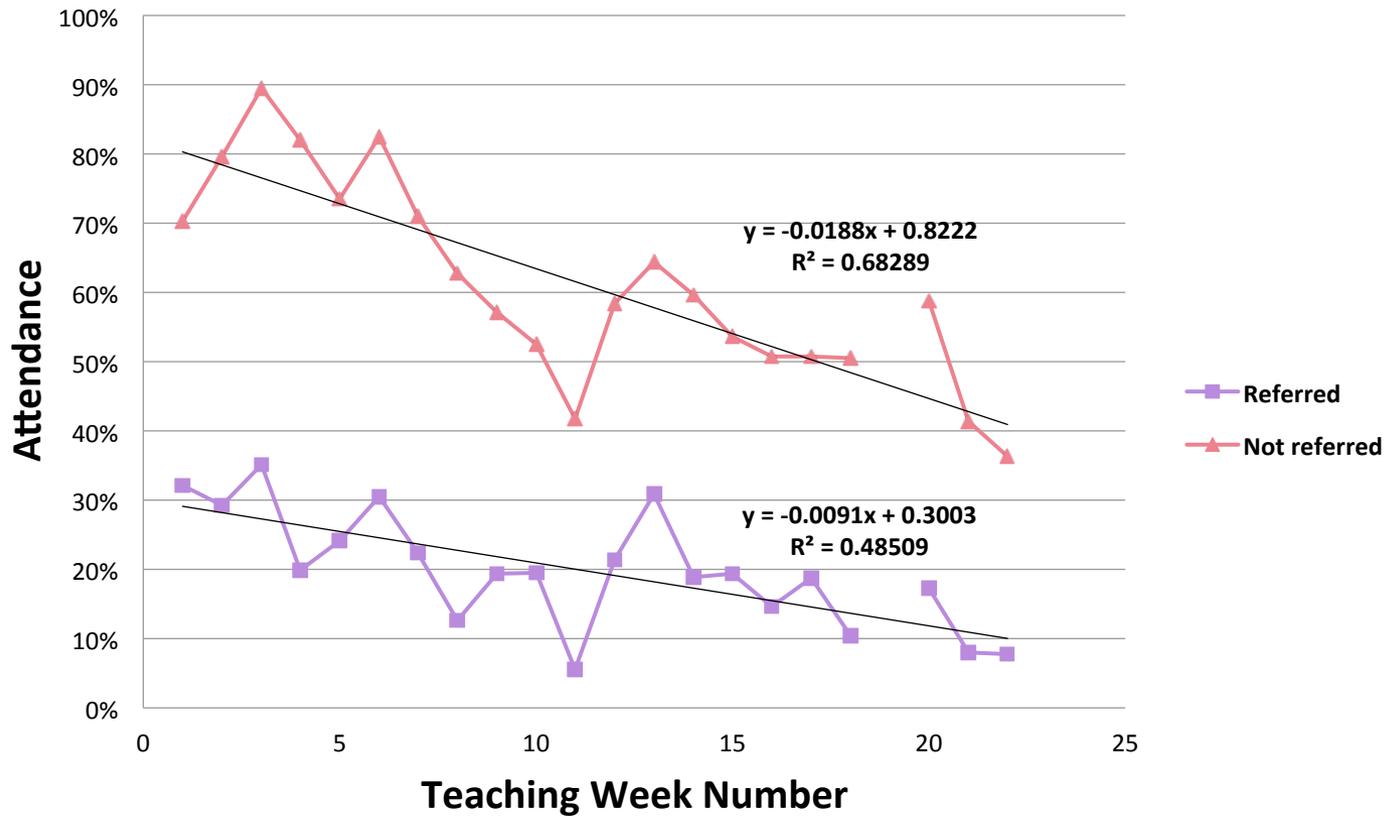
› Decline for referred students may be less

Attendance statistics - Gender
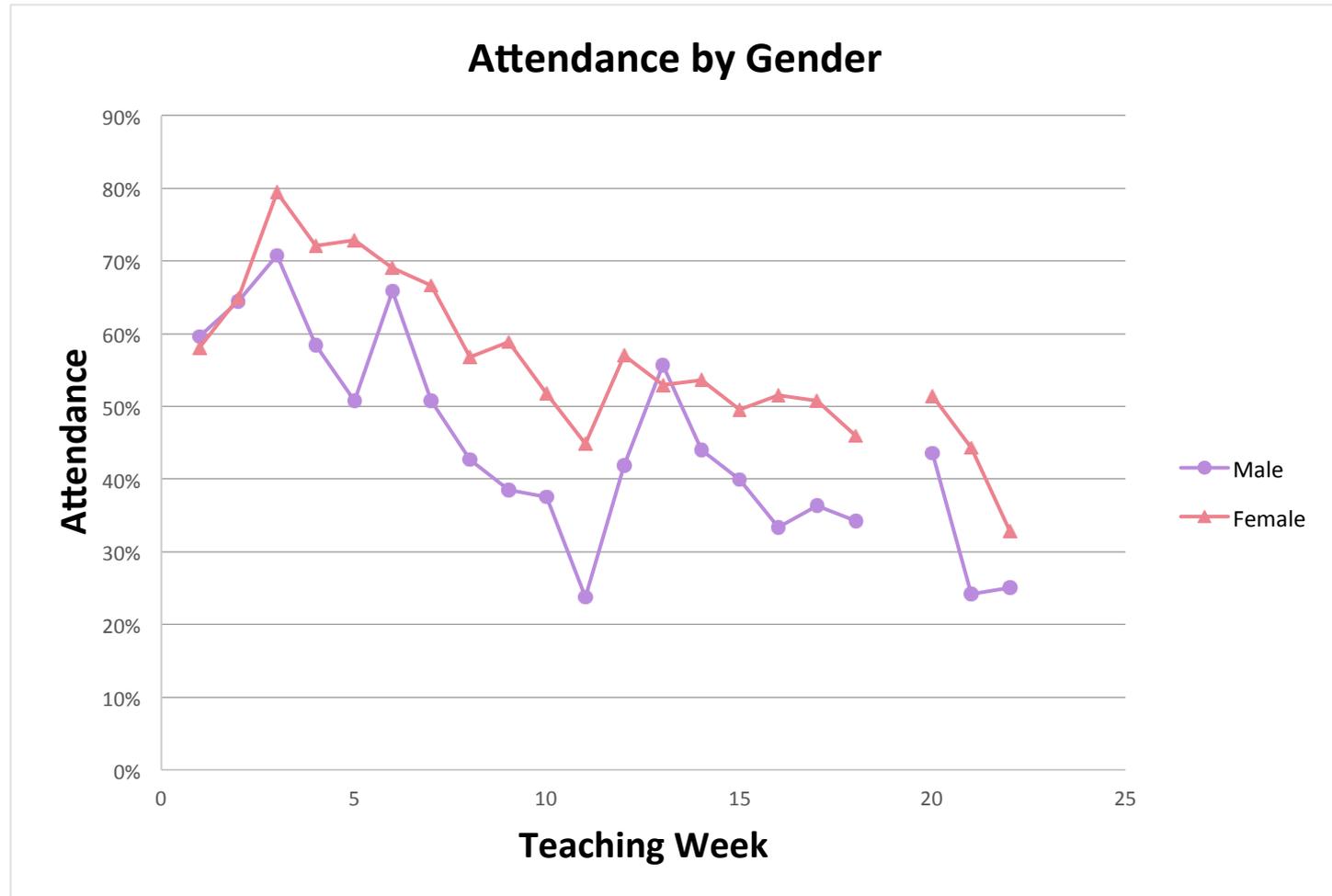
› Slight evidence that attendance by female students is better

Attendance statistics - Ethnicity

Attendance by Ethnic Background
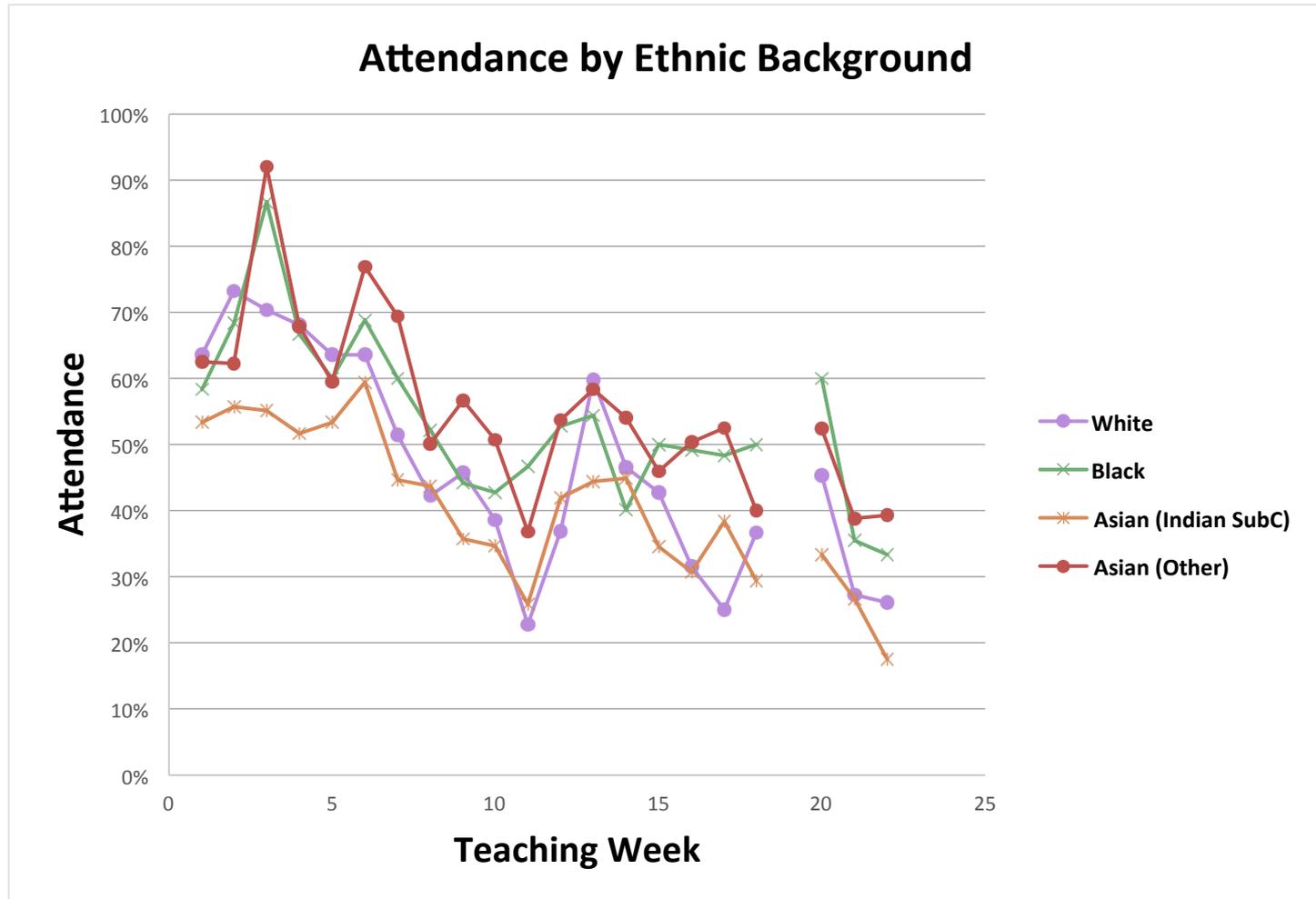
› Asian students with family background from the Indian Subcontinent appear to have the lowest attendance – 'Other Asian' students have the highest attendance

Attendance statistics – Parent HE
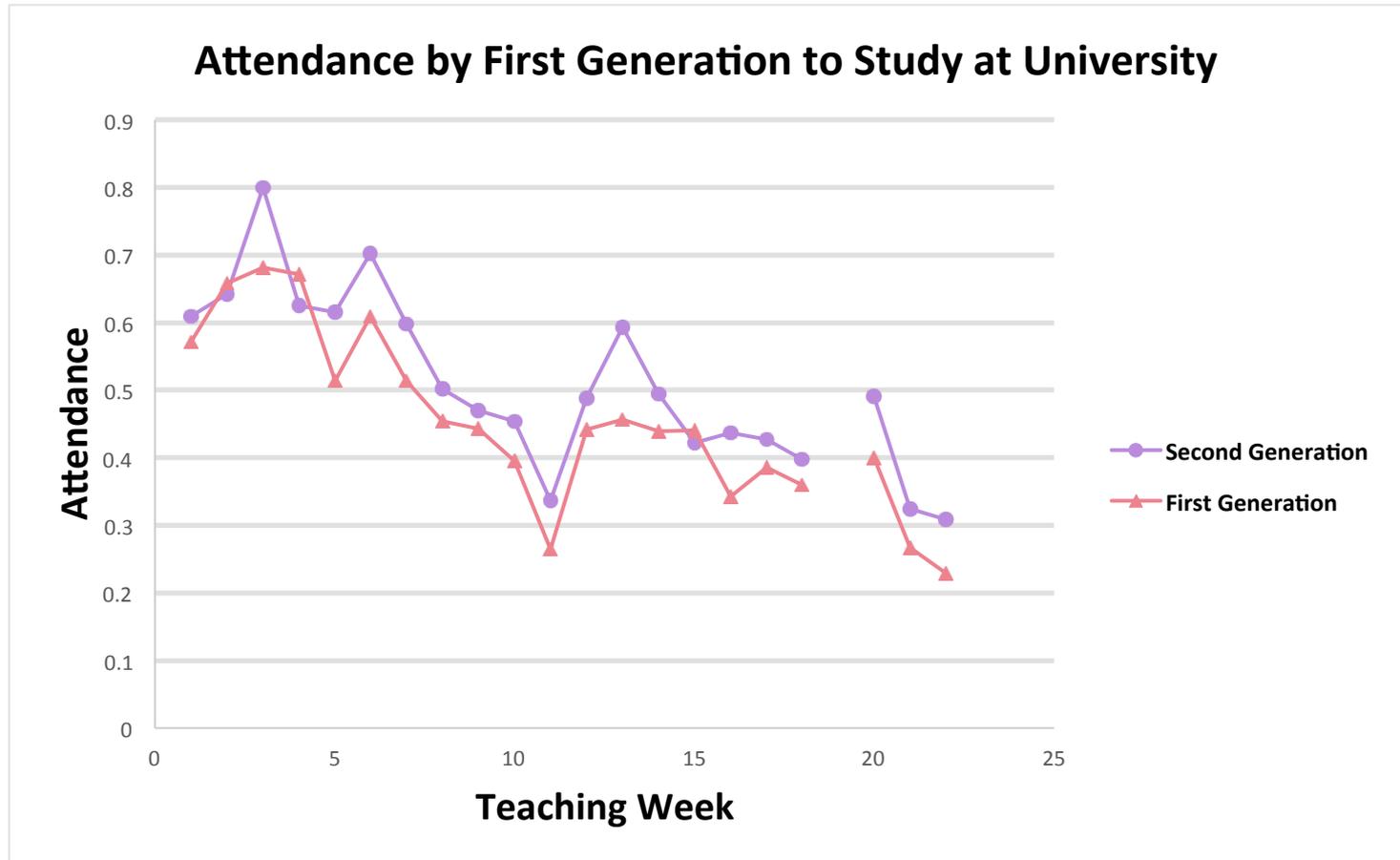
› Students who are the first in their family to study at university have slightly lower attendance

Attendance statistics – Social Class

Attendance by Socio-Econonmic Class (Family)
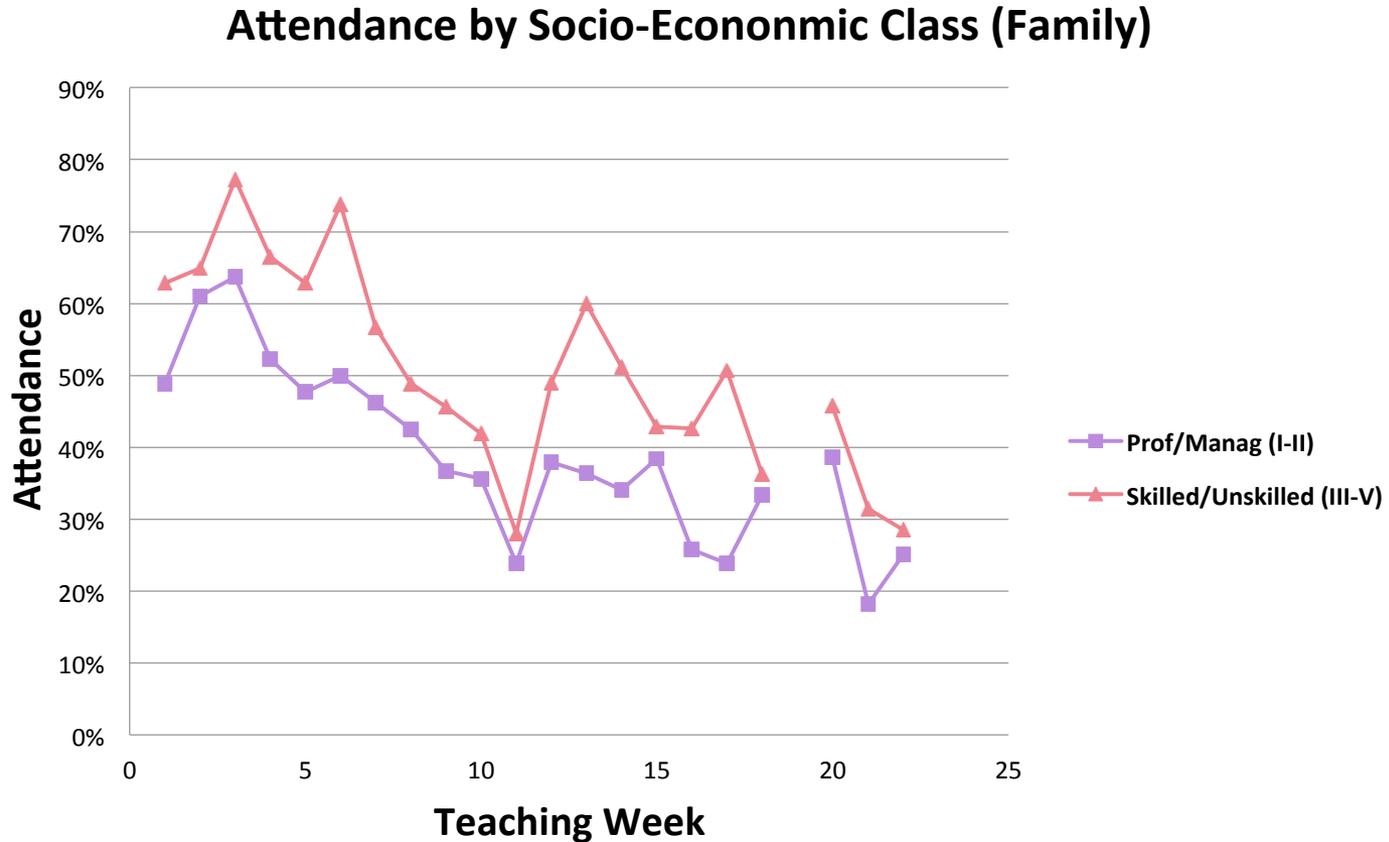
› Students from 'higher' social class backgrounds have slightly lower attendance

Attendance statistics

› Using the clickers to provide electronic attendance data has enabled some quick and coarse analysis.

› The overall conclusion from the negative gradients is clearly, unfortunately, that we are boring lecturers.

› However, with a better structured approach to intervention some overall improvement in attendance might well be possible.

› Would this be worthwhile?

Results v Attendance

Student Marks v Attendance

$y = 63.204x + 22.933$
$R^2 = 0.48614$

Module Mark
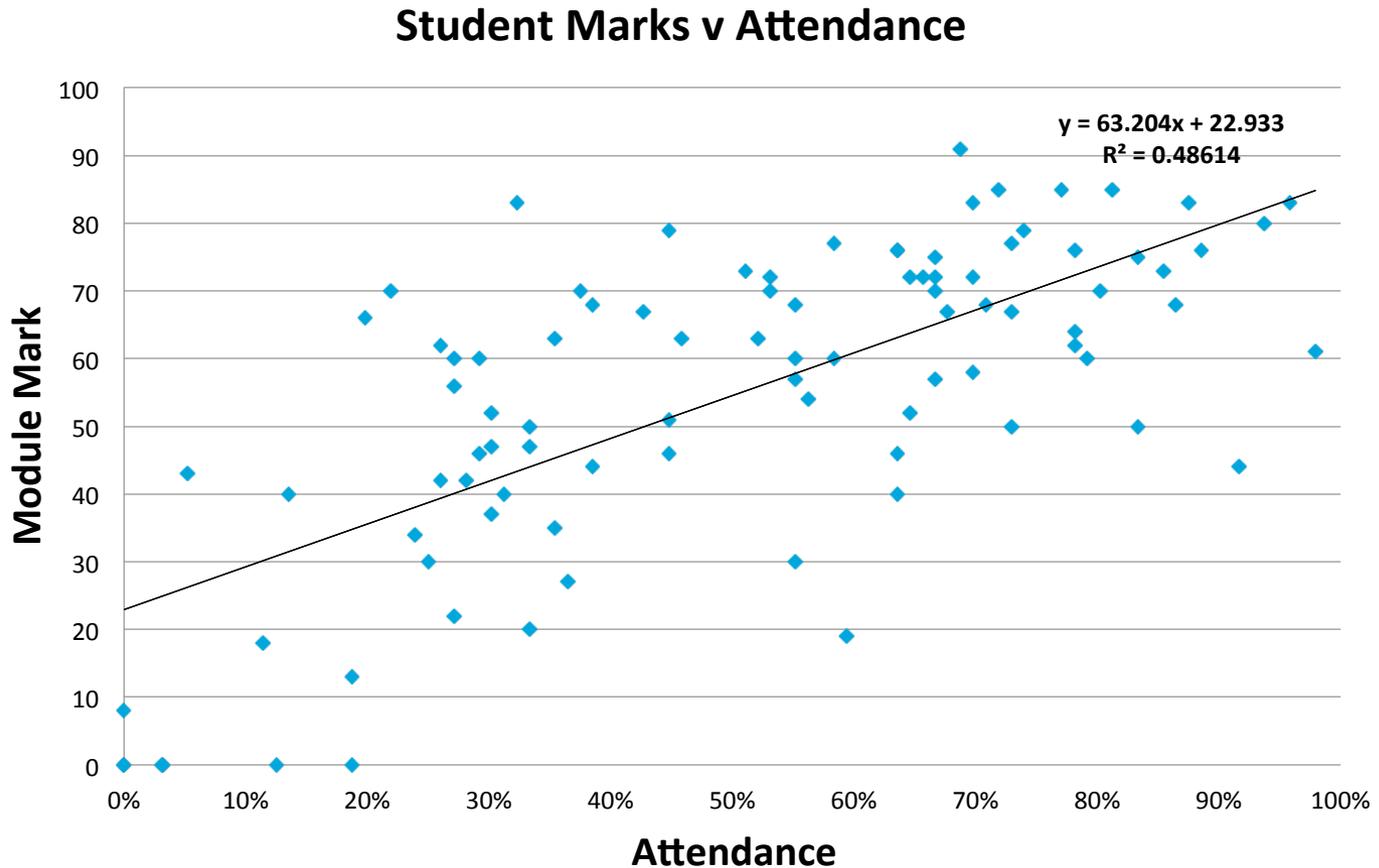
Attendance

› Correlation Coefficient is 0.697

Engagement statistics

› For a first year core mathematics module the correlation between the final results and the attendance record is, thankfully, fairly high.

› The mean mark for those with less than 50% attendance is 40.5 (47.25 if zero marks are excluded) and the mean mark for those with more than 50% attendance is 66.73. (There is a statistically significant difference between the groups whatever test you perform.)

› We are not entirely wasting our time.

Lessons learnt

› Data from a significant number of sessions in the first 5 weeks was lost owing to software problems – meaning that "chasing" poor attenders was delayed

› Relying on academic staff to create the database software "in the margins" is slower than paying a developer

› A 'one-off' intervention to address attendance issues is fairly close to useless

› Staff need more training in asking questions which promote engagement

What we did not achieve

› Increased attendance
  – Although data was incomplete across the last 2 years as far as we can tell attendance was very similar (the employment of clickers had no effect)

› Increased average marks
  – In the core mathematics modules average marks were effectively identical across the last 2 years

What we did achieve

› Increased engagement from students
  – Feedback from students is broadly positive
  – Feedback from staff reports increased student engagement
  – In the core mathematics modules the proportion of A & B grades has risen significantly this year so perhaps the students who have attended have benefitted more from the sessions than last year

› Increased engagement from staff
  – Feedback from staff : 'It makes us think about how we run our sessions.'

› Monitoring attendance should permit identification of students having problems with the transition to HE

Further ahead?

› The feedback has been sufficiently good for the project to be extended for first year students across the university

› Next year the 'current' 1st year mathematics students will be in their 2nd year *with their own clicker* so we are extending his project to the next level

Thank you!

Any questions?