

# FLIPPED TEACHING AS A METHOD FOR ENGAGING LARGE GROUPS

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ABSTRACT. In a large-scale trial at the University of Sheffield ( $n = 236$ ), we implemented a flipped approach to teaching mathematics to first-year engineers. Lectures were discontinued and replaced with an integrated format of specially filmed short videos, online quizzes and twice as much small-group learning. By comparing data on attendance, satisfaction and exam performance with students on an identical syllabus taking the same exam but taught traditionally, we found strong evidence in favour of the new approach.

## 1. BACKGROUND

The School of Mathematics and Statistics provides mathematics teaching for undergraduate students in the Faculty of Engineering. Predominantly, these modules have been taught in a traditional format of two large-group lectures (200 students or more) and one smaller-group tutorial class per week. Attendance records are kept for tutorials but not lectures. We find that attendance usually starts high, but drops off as time progresses (see figure 1).

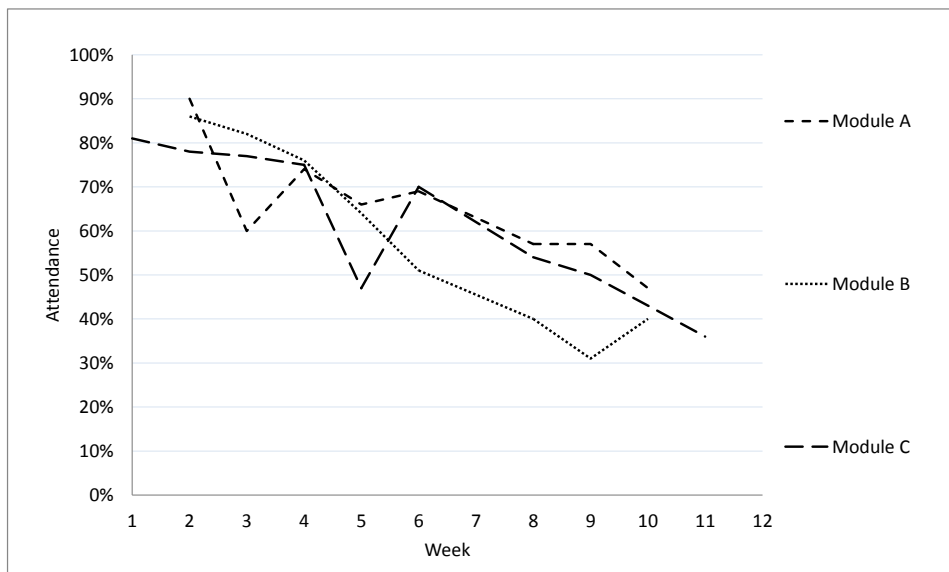


FIGURE 1. Attendance on three traditionally taught engineering mathematics modules, Semester 1 2013–14

A working group was established to look into the effectiveness of these modules, with a particular focus on whether a flipped approach, based around videos, online tests and small-group classes, could provide a more engaging course for students.

The working group established a key proposal: that large-group lectures would be discontinued, and their content split into theory (to be included in the videos) and examples (to be done in classes). This approach was to be piloted on a Level 1 module of 238 students, with two other modules with an identical syllabus but taught traditionally used as a comparison.

## 2. COURSE STRUCTURES

The new course is like this...

This compares to the old course... Each student is assigned to a tutorial group with a ratio of about 20-30 students per staff member or postgraduate assistant; on some courses, tutorials have 40 students with one staff member and one assistant, while others have 80 students with one staff member and three assistants. The tutorial classes generally consist of students working on set problems, asking for assistance as necessary but little full-class teaching.

## 3. METHODOLOGY

Here we outline the nature of the pilot and the data which would form our assessment of effectiveness.

## 4. ANALYSIS

Here we present our findings.

## 5. CONCLUSIONS

Here we sum up.

## 6. REFERENCES

### REFERENCES

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