

Flipping: Getting the most out of the Flipped Classroom

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1. Challenges of teaching First Year Mathematics/Statistics

- Service unit—so usually not considered relevant or important by students.
- Compulsory unit—so added resistance, unwilling students.
- Poor mathematics background—usually the lowest for a large proportion of the class. Partly the institution is to blame for continually lowering entry requirements.
- Variable background—both mathematics and majors. So difficult to find right level: too high for many to understand, and too low for the rest to be engaging.
- Large units, 500 – –700 students per semester, 1100 per year.

2. Importance of attendance

Attendance is key to performance

1. Nyamapfene: attendance is “the key determinant for academic performance”, in a study for courses with online lecture notes.
2. Purcell: 10% increase in lecture attendance resulted in 3% increase in examination performance for civil engineering students.
3. Rico: less well attended classes had higher failure rates.

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- Low student attendance—typically 30%, can range from 7% to 70% for larger first year classes.
- Several reasons for missing classes—bad lecturers, bad lectures, work, laziness, lack of engagement,...

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- Fulfill our teaching duties so we can get back to research
- Impart a body on coherent information
- Teach them all we can!

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To get students to think!

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- Much like watching a movie. BUT if you are watching a Hercule Poirot murder mystery you may want to review some of the evidence!
- Socrates and his disciple Plato taught by questioning and dialogue. This has not been possible in university setting due to large class sizes—practised in tutorials.

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- Students cannot read and understand mathematics, especially at first year.
- Will we have time to cover the syllabus in flipped mode?
- Will it work?
- It will take too much time to prepare!

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- So deliver content using technology, THEN use face-to-face contact to explode the learning experience!
- If what we are doing in the learning experience can be done without the technology, then the technology is wasted.

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- Pre-recorded lectures to complement the lecture notes are essential. (At the moment I have a partial flip. Full flip planned for next semester.)
- Reduce material to be covered in lectures. Aim for depth, not breadth. “Less is more” (Cousin 2006). This requires careful thinking about and organising materials.

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- Each session needs to be well planned.

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- The same format and atmosphere needs to be established for tutorial and other classes for a consistent delivery. Tutor training.
- Don't be tempted to fall back into "lecturing"!

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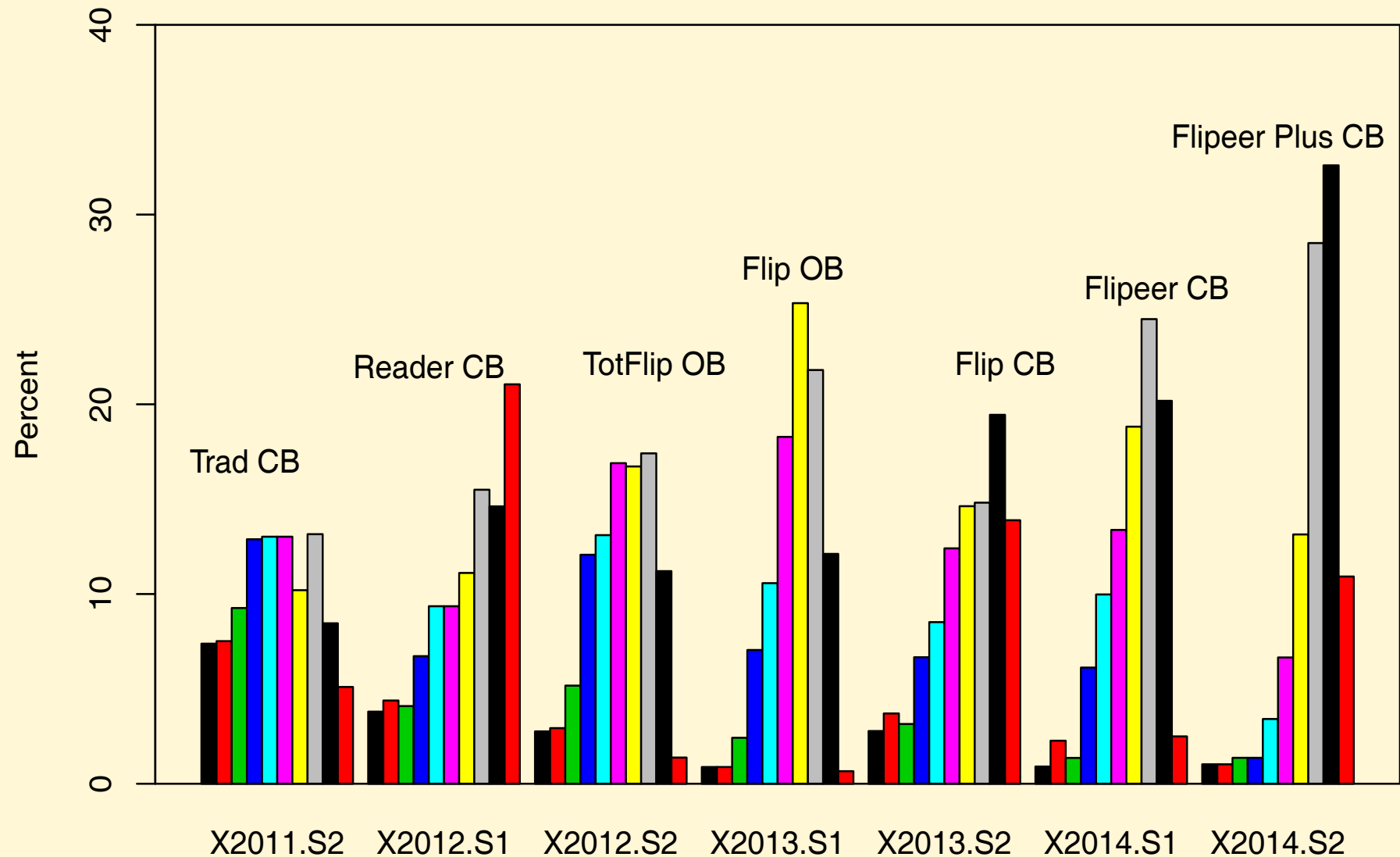
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- So increase the number of experts!
- Involve tutors in the lecture!

- I like the interactiveness of the lectures and allowing students to get to know each other while doing stats.
- He walks around the lecture theatre and helps with questions that I don't understand and he gets everyone involved in the lectures.
- I work better being able to work with others and to be able to confirm the processes of which I get my answers from with my peers so being able to work in groups has been really helpful in consolidating what I've learnt.
- Being able to work in groups when solving questions for some new concepts learnt.
- For a hard subject he makes it very enjoyable — sometimes I got to uni looking forward to his lectures.

Short video of a typical session.

	2013 S1	2013 S2	2014 S1	2014 S2
Mean Exam mark (%)	61.0	64.4	64.5	68.7
Mean Overall mark (%)	62.2	66.5	67.9	72.1
Pass rate (%)	81.1	83.4	90.4	93.6

Deciles by Semester



In an essay first published in 1929, A.N.Whitehead wrote

The university imparts information, but it imparts it imaginatively... This atmosphere of excitement, arising from imaginative consideration, transforms knowledge. A fact is no longer a bare fact: it is invested with all its possibilities. It is no longer a burden on the memory: it is energising as the poet of our dreams, and as the architect of our purposes.

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- The world is an ever-changing place. We must change with it.
- Technology presents **BIG** challenges, but also **HUGE** opportunities.

1. R.N. Khan, Teaching first-year business statistics three ways. Lighthouse Delta 2013: The 9th Delta Conference on teaching and learning of undergraduate mathematics and statistics, 24-29 November 2013, Kiama, Australia
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