Go big or go home!

Exploring ways to build greater interactivity and engagement within large introductory statistics and data science courses at the tertiary level

bit.ly/SEEDlings

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Project summary

We aimed to maximise the learning benefits of lectures for students in large-scale statistics and data science courses, as well as explore new strategies to improve student engagement. Building on our previous success with using large-scale interactives, we developed new lectures designed around the interactives and combined the benefits of lecture experiences, CANVAS-based and other online collaborative activities, adapting to the challenges of teaching remotely.
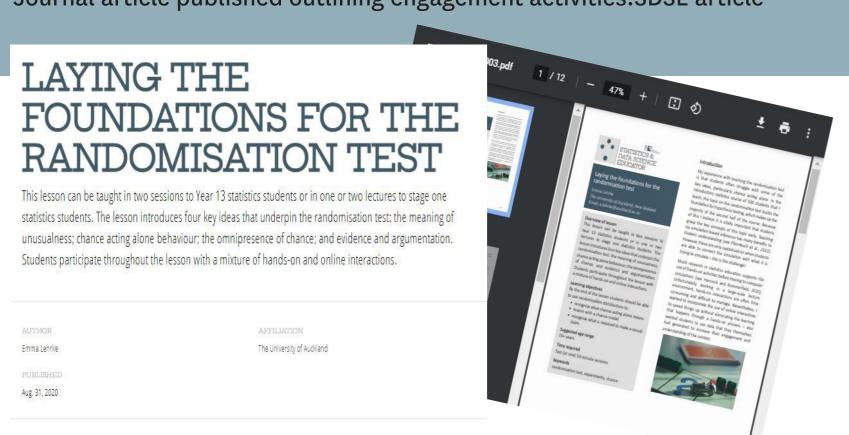
Building concepts on scale

Before lockdown, Emma was able to trial new data sets to get students to exploring data in lectures, including one based on LEGO. She also worked with Anna to develop a sequence of activities for introducing reasoning with chance and the randomisation test, which included the use of marshmallows!

After lockdown, Emma explored ways to engage students through online tutorials, receiving a Faculty Teaching and Development Grant to further develop these.

Outputs and Impacts
Journal article published outlining engagement activities: SDSE article

LAYING THE FOUNDATIONS FOR THE RANDOMISATION TEST

This lesson can be taught in two sessions to Year 13 statistics students or in one or two lectures to stage one statistics students. The lesson introduces four key ideas that underpin the randomisation test: the meaning of unusualness; chance acting alone behaviour; the omnipresence of chance; and evidence and argumentation. Students participate throughout the lesson with a mixture of hands-on and online interactions.

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Interactivity on demand

Anna explored re-designing lectures based on interactives, rather than trying to fit them into existing lectures. Over summer school (before lockdown) she trialled a series of lectures for introducing the randomisation test, which Emma then expanded and enhanced. She also developed and shared new technologies and improved existing apps to promote even more interactivity within large lectures.
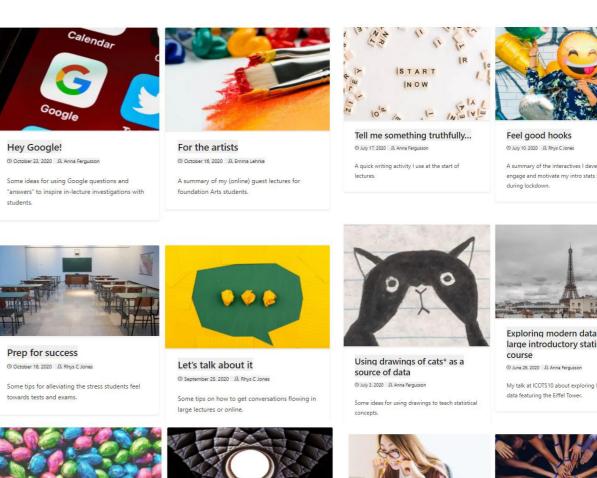
Outputs and Impacts

Hey Google! interactive-driven lecture: Go big or go home post
Teaching innovation day for Department of Statistics: Slides

1. Read article about board games and explored games on the website boardgamegeek.com Wrote a little about what they were interested in exploring

2. Learned how to create new variables for a dataframe in R Submitted code which created 2 new numeric and 2 new categorical variables

3. Explore the ori Lite Su mixed descr

DISCUSSION: How can you use interaction?

1. What is the key learning objective?
Always start with the students. What do you want them to understand by the end of the lecture? Is there a need for something more?

2. How might that learning be supported?
Is there a concept that it would help to see demonstrated? Would it help to could use data be collected? Is it something that — Do they need to write—

3. How would this fit with existing material
Can an interactive sur— that I already d— comple—

feedback from 1 – 3 to

Department of Statistics Teaching Innovation Day 2020
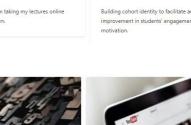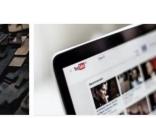– Anna Fergusson & Emma Lehrke

Sharing our ideas

We wrote regular posts on our blog to informally share and reflect on our project progress. In the future, we will also feature guest posts from other statistics educators, both within NZ and internationally.
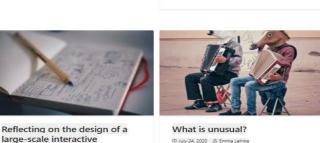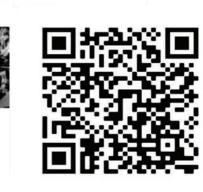
teaching.statistics-is-awesome.org/go-big-or-go-home

Hey Google!
October 23, 2020 · Anna Fergusson
Some ideas for using Google questions and "answers" to inspire in-lecture investigations with students.

For the artists
October 19, 2020 · Emma Lehrke
A summary of my (online) guest lectures for foundation Arts students.

Tell me something truthfully...
July 17, 2020 · Anna Fergusson
A quick writing activity I use at the start of lectures.

Feel good hooks
July 10, 2020 · Rhys C Jones
A summary of the interactives I developed to engage and motivate my intro stats students during lockdown.

Prep for success
October 19, 2020 · Emma Lehrke
Some tips for alleviating the stress students feel towards tests and exams.

Let's talk about it
August 27, 2020 · Rhys C Jones
Some tips on how to get conversations flowing in large lectures or online.

Using drawings of cats* as a source of data
July 15, 2020 · Anna Fergusson
Some ideas for using drawings to teach statistical concepts.

Exploring modern data in a large introductory statistic course
June 28, 2020 · Emma Lehrke
My talk at ICOTS10 about exploring Instagram data featuring the Eiffel Tower.

An argument for using chocolate in lectures
September 14, 2020 · Emma Lehrke
A short whole class activity that uses the lure of chocolate to introduce hypothesis testing.

Is context king?
August 27, 2020 · Rhys C Jones
Practical points to think about when deciding on contexts to use for teaching statistical concepts, and ideas to help you deliver an engaging and motivating data exploration you.

My journey with online teaching
June 18, 2020 · Emma Lehrke
What I learned from doing my lectures online during the lockdown.

Building identity with large student cohorts
June 15, 2020 · Rhys C Jones
Building a strong identity to facilitate an improvement in students' engagement and motivation.

LEGO explorers
August 30, 2020 · Emma Lehrke
Why I chose LEGO as the context for introducing data exploration – and how it went.

ZOOMifying a face-to-face activity
August 27, 2020 · Anna Fergusson
An example of transforming a face-to-face activity to an online synchronous activity.

A cloud of feedback
June 9, 2020 · Emma Lehrke
An approach to gathering and managing student lecture feedback.

Designing experiments en masse
May 21, 2020 · Rhys C Jones
An activity to promote in-class discussion about experiment design.

Near, far, wherever you are, data exploration will go ON!!!
August 14, 2020 · Rhys C Jones
Teaching remotely – take two!

Successfully launching tutorials into cyberspace
August 14, 2020 · Emma Lehrke
We created some awesome online teaching resources during lockdown. How can we use what we learned from that experience to enhance our campus teaching?

Bootstrapping with Lego
May 16, 2020 · Emma Lehrke
A lecture to introduce bootstrapping that uses both demonstration and online interactivity.

Large-scale interactives for large-enrolment courses
May 4, 2020 · Rhys C Jones
My talk at ICOTS about using large-scale interactives in intro stats courses.

Reflecting on the design of a large-scale interactive
July 10, 2020 · Anna Fergusson
Revisiting one of my old interactives and reflecting on its design.

What is unusual?
July 10, 2020 · Emma Lehrke
A summary of an activity I use to teach distributional reasoning.

Towards greater interactivity in large lectures
May 1, 2020 · Anna Fergusson
Some foundational ideas for the 'Go big or go home' project.

Feel good hooks - engaging and motivating students

Rhys used a variety of platforms to engage and motivate students to supplement lectures: Google Sheets, Google Hangouts and Canvas Quizzes. Engagement activities were embedded in lecture recordings, which included: Name that tune (tunes were played on a keyboard for them to guess), guess who the famous person is (impersonations of celebrities for students to guess) and the use of teddy bears (Frederick and Jessabella) who presented students with riddles and quizzes.
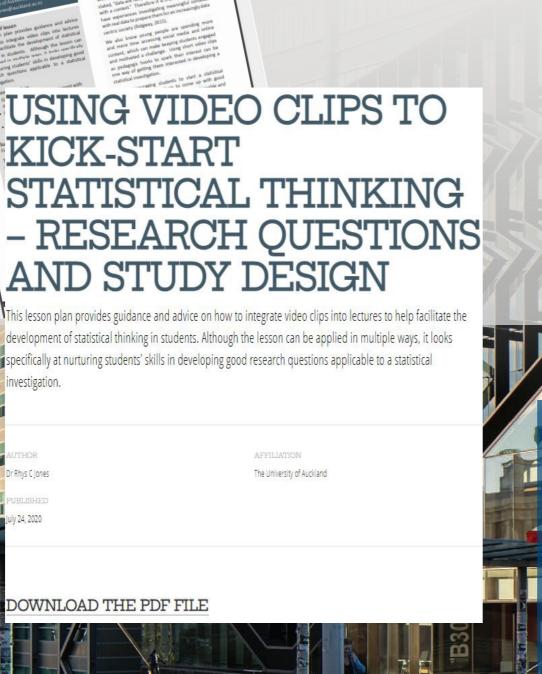
Students were encouraged to provide their answers via Google Sheets. Some of these activities were suggested by students, showing we value their ideas. Students could also upload pictures of their whanau (including pets) to share with the class, via Google Sheets.

Students also stated key concepts and ideas they didn't understand, whereby a recording was made and shared on Canvas to answer them. Student generated data (i.e. where students were studying in the world) were also used to supplement course content delivery, using visualisation software like iNZight and iNZight VIT to display their data.

Outputs and Impacts
A student created a video montage of some of the engagement activities: TikTok video
Invited to share elements of this project at: FoS celebration of teaching event 2020, FoS Pandemic Pedagogy and Education zoom event 2020 and also an event run by Sage - Supercharge your online quantitative teaching (UK and USA): YouTube Video & Sage online webpage for the event
Journal article published outlining engagement activities: SDSE article

USING VIDEO CLIPS TO KICK-START STATISTICAL THINKING – RESEARCH QUESTIONS AND STUDY DESIGN

This lesson plan provides guidance and advice on how to integrate video clips into lectures to help facilitate the development of statistical thinking in students. Although the lesson can be applied in multiple ways, it looks specifically at nurturing students' skills in developing good research questions applicable to a statistical investigation.

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