Don't Feed Cheese to Lactose Intolerant Volcano Gods

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ABSTRACT

This paper looks at the many times we've been told "that won't work because we've always done it this way" in education. Which we ignored, largely because we weren't the ones that tried and, more importantly, because sometimes it's just about feeding cheese to lactose intolerant volcano gods and waiting to see what happens. From monster trucks to escape rooms, dinosaurs to scavenger hunts, and X-Men to Lego, we take a journey through some of the weird and wonderful ways that we've tried to make surveying and engineering education not just more authentic, but also engaging without compromising curriculum. In some cases we've had success, and in others we've taken a few attempts to get it right. And in some cases, we've ended up needing to convince security guards at international airports that our students are honestly doing an assignment about zombies.

KEYWORDS: *Surveying education, students, pedagogy, first-year experience.*

1 INTRODUCTION

Universities spend a significant amount of time, energy and money recruiting students, and retaining them is a high priority. Across Australia, the average attrition rate for universities was 20% when measured by the Tertiary Education Quality and Standards Agency back in 2017 (TEQSA, 2017). Universities are implementing different approaches to try and lower this attrition rate, and at the University of Southern Queensland (UniSQ) one of those approaches was the First Year Experience project, as part of a larger-scale strategic academic plan. This is where the authors come into the picture, as the "First Year Experience Leads" for their respective schools, i.e. Surveying & Built Environment, and Engineering.

This paper isn't a traditional academic paper (referencing isn't our idea of a good time!), but it does seek to layout some of the weird and wonderful things we've attempted over the years in an effort to make the education of surveyors and engineers more successful, and most importantly, fun.

With that, welcome to possibly one of the strangest conference papers you are likely to read, inspired in part by the infamous drop bear paper by Janssen (2012). While we're a surveyor (Chris) and an engineer (Catherine) first, we're academics second and that means a whole other lexicon that we need to drag you into, so let's get the boring stuff over with upfront so we can get to the good stuff.

Pedagogy is defined by dictionary.com (2023) as the "method and practice of teaching, especially as an academic subject or theoretical concept", but really it boils down to all the stuff that's involved with how we teach, both in practice and in theory (because nothing every quite goes to plan!).

While there are some main classifications of pedagogy, it's kind of like a pair of jeans – everyone has their own different style and preferences as to what works for them (and their students). The key component of pedagogy is that it is constantly evolving based on experience, knowledge and skills, not unlike all those other professional skills a surveyor and engineer might need.

Educating surveyors and engineers can be a challenge at the best of times – it's a mix of trying to get some serious maths and physics onboard (not necessarily with any context), while also trying to get a vast foundation of technical concepts down, along with building all the required skills of being a student. It is not unlike being a parent and trying to get your kids to eat vegetables at times. So, the value of a pedagogy that can make that education engaging, authentic and not compromise the curriculum is worth its weight in (pirate) gold.

Any educational course has three main components: Learning Outcomes (LOs) that must be delivered, assessment to measure how much of the LOs have stuck, and Teaching and Learning (T&L) activities that are 'the lecturer and students do things' part. It can be very easy for these things to become disconnected without deliberate design. There are any number of approaches on how to stop this disconnection, but the main one that underlines all the work discussed in this paper is the one that focuses on *how* and *what* students learn. In academic speak, it's a pedagogical design approach called 'constructive alignment'. The constructive part is the *how* (students constructing their knowledge through learning activities), and the alignment part is the *what* (the assessment and T&L activities must be deliberately aligned with the learning outcomes). In this paper, it is our pirates' gold that underpins all the weird and wonderful things we are discussing.

Before we start, it is worth noting that we are lucky to have a number of amazing colleagues who are not lactose intolerant volcano gods and genuinely engaged with our ideas and helped us bring them to fruition. We are really grateful for that. The larger audience, however, was not quite as receptive to our even moderately edgy ideas…

2 MAKING IT MODERN: SLACK & PADLET

2.1 The Issue

Universities are not unlike other large organisations. There are a huge number of systems in the background that support the business needs. The key outward facing one at UniSQ is the Learning Management System (LMS) called StudyDesk, based on the open-source system Moodle. Each delivery of each course has its own StudyDesk, and this is the one-stop-shop for students for all course materials and assessment. StudyDesk also offers a couple of communication and collaboration methods, such as forums (think early 2000s message boards) and direct messaging. Neither method is particularly user friendly and, more importantly, does not provide a method of students being able to access help when they need it.

The idea behind forums is great, but the execution is outdated in this age of instant messaging, emojis and GIFs. We have found that students don't engage particularly well with them, despite our best efforts. From our perspective, this presented a real problem. We know engagement is a key indicator in the success of a student in a course, but the communication and collaboration methods we had as a default were a barrier to that engagement.

2.2 The Cheese (aka the Solution as We Saw It)

A good proportion of our students have grown up with computers, and most have access to messaging and collaborative webservices or apps in their day-to-day lives. We set about finding some in the sea of apps that would be useful for both communication and collaboration. Our main criteria was that there would be no cost barrier for students to use them. Enter Slack and Padlet.

Slack is an instant messaging program that lets teams or communities of people come together in one place, and allows for 'channels' of communication, file sharing, emojis (including custom ones if you're so inclined) and a host of add-ins that include Google, calendars, polls, and our personal favourite, GIFs. It can be installed on phones, tablets and computers alike.

Padlet is like a virtual wall that you can cover in content-rich sticky notes, from photos to URLs and from slideshows to music – the possibilities are endless. It lets you drag and drop things around as needed to meet whatever organisational requirement you have at the time. Like Slack, it is also available across all platforms.

Both of these apps would allow us to address the concerns we had around communication and collaboration barriers, and we implemented them in our courses independently – Chris used Slack, and Catherine used Padlet.

2.3 The Lactose Intolerant Volcano God (aka the Problem with Our Solution as Told to Us by Others)

As with anything new, particularly in the world of Intellectual Property (IP) and IT departments, we were met with a wave of reasons we couldn't/shouldn't use Slack and Padlet.

"It's outside of official University systems", "ICT will never sign off on it", "You'll need to get permission and it'll take years", "The students will hate it and you'll get bad course results", and "The students will lodge official complaints" were just a few of the reasons we heard.

Thankfully, neither of us are particularly good at asking permission when we believe in something – we're much more in the ask forgiveness camp. But we are also not completely reckless, so we did a significant amount of research to ensure we would have an approach to give us the best chance of success, and also so we had safeguards in place to keep us and the students safe. For example, the two key safeguards in Slack were always ensuring another academic was present in the application, and that students could only participate or join up using their student emails.

2.4 Throwing the Cheese into the Volcano (aka the Results of Implementation)

Slack was implemented initially in a first-year course in 2019 and based solely on the volume of messages produced by students it could be considered a success. Over 3,000 messages were sent across 12 channels, compared to approximately 400 forum posts for the entire semester in

the 2018 delivery. Both years had a cohort of approximately 150 students.

The key learnings from the initial use were:

- The use of GIFs and emojis provided the opportunity for students to express context and emotion, which can often be a challenge in a text-based application.
- 12 channels were too many, students were often confused about what to post where.
- Students with higher levels of messaging tended to do better in their final grade, confirming the previous understanding of engagement being a key success factor.

Since that first implementation, Slack has been used in 20 different deliveries of different courses, across all year levels. It has not always been smooth sailing though, and the presence of a couple of strong personalities can take things sideways if not carefully handled (although this is also the case in the traditional forums). There has only been one instance of a Slack needing to be discontinued during the semester due to communication issues, when we went back to forums.

Padlet has also been a success across a variety of courses, allowing students to collaborate and organise their ideas and learning in real-time, and also engage asynchronously when the time is right for them. We have also used it successfully for staff training sessions and workshops (Which minifig are you?) and orientation (scavenger clues and photos). It recently released its slideshow mode, which we think makes it a serious contender with PowerPoint, but with some added advantages, such as accessible from anywhere, interactive and the ability to embed documents.

3 MAKING IT FUN: ZOMBIES, SCAVENGER HUNTS & ESCAPE ROOMS

3.1 The issue

Unfortunately, it is easy for things to be boring, and this is never truer then when it comes to technical materials, content and assessment. Let's be honest for a second and acknowledge that there are parts of our jobs that are mundane – surveyors will peg out endless numbers of engineering works and engineers will forever get sick of surveyors telling them their designs don't fit! There is a lifetime of a career in front of students to experience that, but there is zero reason why their learning needs to be boring.

We had to address this issue in two key areas, i.e. orientation (because who really wants to hear a bunch of professors with long titles talking *at* you) and assessments (because measuring the three corners of a triangle five times in a row is boring to do, boring to write about, and boring to mark). Neither were engaging, let alone fun, and neither were achieving their key deliverables.

3.2 The Cheese

The main opportunity of this particular piece of metaphorically stretched cheese is that we could make stuff fun and engaging, while also achieving the key outcomes. For orientation, it meant moving away from the parade of professors to a meaningful engagement with staff and students, along with some defined Key Performance Indicators (KPIs). Students needed to know some key people and key locations on campus and online, and they needed to know how to survive their first few weeks. Ideally, they'd have met at least one person they'd see in class.

Initially the idea of an escape room was thrown around, but the logistics of delivering it in a short time frame meant we shelved it (for now). The next idea was the one that stuck – we needed a hybrid version of a scavenger hunt that took students to meet key people, see key locations and learn the handful of things that they needed to have a successful first week.

For assessment, it meant making sure we were balancing the required LOs, reducing the opportunity for Academic Integrity (AI) issues (cheating) and making it interesting. The course in question was 'Introduction to GPS', where students are learning about the basics of Global Navigation Satellite Systems (GNSS), so we also needed to reduce technological barriers (access to GNSS units) and ensure students could participate wherever they might be on the planet (one student was deployed in the Navy).

In the wee hours of the morning (probably after too much marking, an episode of The Walking Dead, an abundance of caffeine and not enough sleep), the idea to present students with a zombie survival scenario was hatched. Students would be able to use an app on their phone no matter where they were, they would need to visit five locations that met their survival needs, and they would need to make a 'Survival Manual' explaining how GPS worked to a layperson, to be used in the event the student got turned into a zombie.

3.3 The Lactose Intolerant Volcano God

The volcano gods were most displeased with us over these two pieces of cheese. Suggestions about the childish nature abounded when we suggested that orientation should be fun and engaging, and not involve three hours being talked at in a lecture theatre. The most common question was how we would make sure students knew all the minutiae that was in the information dump that orientation was, which in reality was probably all but forgotten as the students exited said lecture theatre.

"Zombies are completely unprofessional and childish. How will the students see that as relating to GPS?!" said another when reviewing the first zombie assignment. One even told us it couldn't be educational if it was fun. Largely the feedback on both ideas was of the same theme – it was breaking out of the "we've always done it this way" comfort zone. At this point, please refer back to our earlier statement about permission and forgiveness. At least orientation had the backing of our Heads of School, so we had our chance to show the doubters it could work.

The other concerns around orientation that were raised were legitimate: How much would orientation cost to do this way? Do we have the skills to organise an event like this? Do we have the people to pull this off? What would the students think? We weren't sure of the answers, but as women in Science, Technology, Engineering and Maths (STEM), we're not strangers to a challenge (we will even admit to seeking them out), and we had a goal and a deadline, so began the hard work.

3.4 Throwing the Cheese into the Volcano

Let's start with the zombie assignment. It was a hit on all fronts – largely due to the options we gave students around their submissions. Reports, videos, presentations and other forms of submission would all be accepted, the only restriction was that interpretive dance was only acceptable with a supplied interpreter to explain it to us. Not only did the students get into it with Snapchat filters, makeup and costumes, but they also wrote short stories, an act of a play, did David Attenborough style YouTube videos and made amazingly awesome and clever GNSS

memes. They went above and beyond the scope of the assignment, and many even pondered the longevity of GNSS in a zombie apocalypse world. Most importantly though, their marks (and eventual grades) indicated a level of learning that broke the bell curve, in the good way.

We have continued to run the zombie theme in this course for 5 years now, and it has begun to develop an infamy that might be hard to get away from – we have overheard first year students asking each other if they'd done "the zombie subject yet". Maybe pirates might need to make an appearance in the future…

Orientation has been very much a case of having a goal and a deadline and not sleeping very much. It has been an iterative process – the first delivery was too intricate and relied on very specific timing, which of course was out the window in the first 30 minutes. Other versions have seen diabolical weather slow down our timelines, meaning lunch was cold, key staff being out sick, as well as all the other challenging things that happen in any event. Despite all these glitches, overall, it has been a real and significant success, to the point that it is now being rolled out as a university-wide model for orientation.

The key learnings we have taken from it so far are:

- Knowing what the key outcomes are up front is critical – and not being afraid to question if the key outcomes you are working towards are the ones you *should* be working towards.
- Having backup resources and staffing is key to it running smoothly.
- Letting others help is important, but the underlying philosophy must be non-negotiable.
- You can do a lot with almost no budget if you are creative – cute plastic dinosaurs can be used as an icebreaker, a prop for scavenger hunt photos, and as Chris discovered at a residential school, a great quality control tool for knowing which group set up which GNSS unit based on the type and colour of dinosaur in their photos.

4 MAKING IT REAL: EXAMS SUCK, WE'D RATHER BE DOING STUFF

4.1 The issue

Well before the COVID-19 pandemic threw the proverbial spanner in the works, we were already on the road to phasing out exams in certain courses. Invigilated exams are excellent for academics in terms of marking time being minimal as you do not need to provide feedback, and they make it very hard to cheat. However, they are generally not a useful technique for students to understand where the deficiencies in their knowledge are, and they can disadvantage neurodivergent students, such as those with Attention Deficit Hyperactivity Disorder (ADHD), anxiety, Autism Spectrum Disorder (ASD) and Specified Learning Disorders (SLDs) such as dyslexia. Surveying and engineering students are generally hands-on people, so this also presented the opportunity to get them doing stuff instead of just writing about doing stuff.

4.2 The Cheese

As with the zombie assignment discussed in the previous section, the main opportunities in replacing invigilated exams with assignments was to make them relevant to a student's location and life experiences, make them personalised to minimise academic integrity issues, make them hands-on and practical where possible, and, of course, to make them fun.

The type of 'cheese' in this situation varied depending on the course it was a part of, but the common theme was that they all followed the 'constructive alignment' approach. We wanted students to take the knowledge and skills learned through a course and use them in their assessment, making sure that assessment was open ended and personalised where possible. As an example, students were regularly given options in the way they wanted to present the required information – recordings, interviews, models, designs, reports and presentations were common methods. To ensure we did not completely blow the marking timelines out of the water, we put some general guidelines in place, including word counts, interview lengths, number of slides and length of recording.

4.3 The Lactose Intolerant Volcano God

Increasing the marking load of an academic (volcano god) is a guaranteed way to get at least some fiery bursts of lava. The most common concern lay around having to mark personalised assignments, particularly where there are calculations or computations involved. Providing feedback is very time consuming in these cases, and consistency of marking can be difficult without an appropriate rubric, which takes skill and time to develop. Thankfully, COVID-19 broke the stranglehold on this one, helped along by some specific direction from the higher levels of the university.

4.4 Throwing the Cheese into the Volcano

There were the predictable teething issues with moving away from the habit of invigilated exams: the limitations of software to do what we needed efficiently for marking and grading, academic integrity cases for new assessment that hadn't had the years of refining that exams had, submission glitches and just the basics of having everything set up correctly considering all the moving parts.

The biggest benefit in redesigning our assessment has come from the engagement with various parts of our respective professions. It tuned out one of the simplest ways to identify the knowledge deficits was to speak to the people who were dealing with the issues that were resulting, i.e. our colleagues in government and private industry. Within the scope of specific courses, we managed to quickly identify the areas that were being missed in the design of course activity and assessment, and we were then able to design targeted, authentic, real-world focused assessment to address them.

In time, we have been able to refine these styles of assessment, while also getting more creative with them – some courses have implemented a 'choose your own adventure' style assignment to allow students to personalise their work. This in turn has minimised the academic integrity issues.

The other benefit of these style of assessments has been the implementation of more consistent assessment instructions and materials. Assignment briefing documents are more detailed in the first year, giving quite explicit instructions about what is expected in terms of reporting and response, while later years much of the non-technical instructions are removed as students have more experience in what is expected of them (in academic language we call this scaffolding). The marking rubrics that provide students with information on what is a high-level response through to a poor response are also more consistently implemented across courses and assessment items. These rubrics allow students to know when they are 'done' answering an assessment piece, and the expectations around achieving different levels of marks.

The benefit of this has been evident in several key first-year courses. The progression rates of two key surveying courses, SVY1110 Introduction to GPS and SVY1104 Computations A, are shown in Figure 1, where a significant increase in progression after assessment redesign is evident.

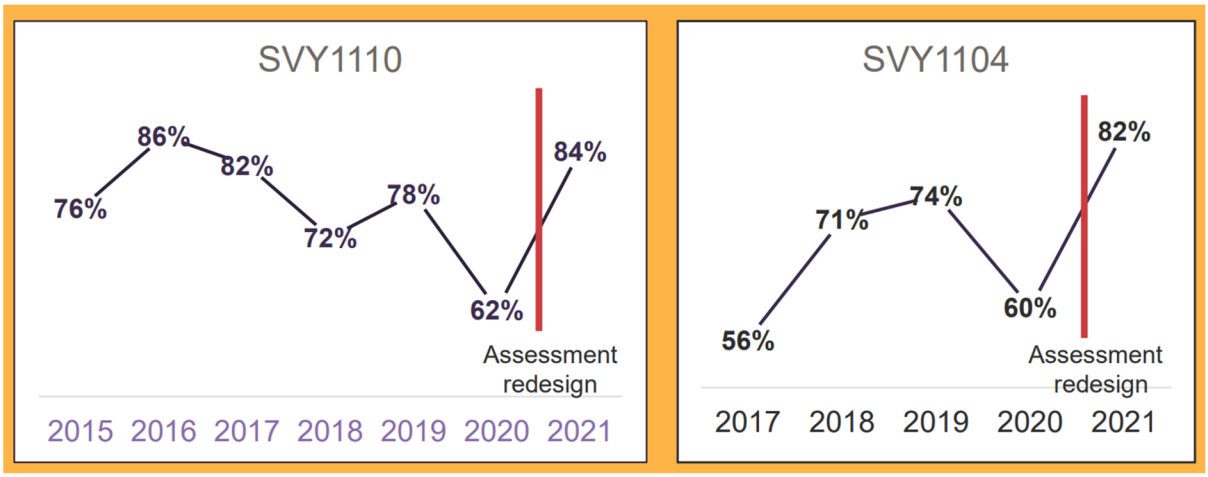

Figure 1: Results from two key surveying courses, indicating progress rates before and after assessment redesign.

5 MAKING IT PERSONAL: PROFESSIONALS CAN WEAR DINOSAUR T-SHIRTS

5.1 The issue

We all have our own perception of academics, and that will usually involve some combination of the following adjectives: remote, aloof, genius, picky, judgmental, scary, standoffish, cranky, boring, tweed coat-wearing and superior. While the reality is obviously more complex, these perceptions of academics often mean that students feel they are unable to approach a lecturer for help or clarification. That is a significant problem in terms of teaching and learning activities being successful.

5.2 The Cheese

In our first few years as academics, we heard a lot of conversations around how to get students to be authentic, and how to get them to engage with lecturers. The part of the conversation that was missing was what motivation students had to be authentic with us – it was akin to asking them to trust us with no evidence of why they should.

This led us to the somewhat obvious conclusion that if we weren't authentic with them, we couldn't expect them to be authentic with us. What authentic looked like in terms of an academic was a harder proposition, and the literature was relatively quiet on the attributes of a 'good' lecturer, let alone an authentic one. In the absence of study-based evidence, we set about talking to our colleagues and students to get some anecdotal evidence on what authentic looked like.

The responses were varied, but we identified that along with knowledge of and confidence in the course content, staff (particularly in first year) should consistently demonstrate the following attributes when dealing with colleagues and students:

- Friendly
- Approachable
- Empathetic
- Supportive
- Organised
- Flexible and responsive to student needs
- Excited about the course
- Demonstrating best practice teaching & learning
- Open to constructive feedback and prepared to innovate
- Team player

Further to this, we then proposed a suite of training for staff who teach into the first year, in particular courses with head start (high school) students enrolled. Ideally, the training courses should include:

- Supporting students in distress
- Supporting students' mental health
- Blue card (working with children check)
- Core inclusion training course
- Disability inclusion
- Indigenous inclusion
- LGBTIQ inclusion
- Teaching & Learning (T&L) induction
- Assessment essentials
- MATE – bystander program
- Neurodiversity awareness training
- Empathy training
- Emotional intelligence development
- Basic developmental psychology

We realised that upskilling staff to this level would take some time, so we proposed that initially all teaching teams should include at least one person who has completed each course or has prior experience in a course area. Not all of these courses exist yet either, so we are doing our best to keep these on the radar!

5.3 The Lactose Intolerant Volcano God

This approach was a fairly significant change in approach for some academics. Some argued that they needed to maintain authority as the lecturer and being distant and aloof was part of that persona. This goes hand in hand with the "I am the lecturer, I know everything and must always be right" philosophy that we personally find even the thought of exhausting. We argue that by showing students how you authentically work through a problem, and perhaps make mistakes, is a much more useful learning tool than reusing the same pre-prepared exercise you have run through the same way every year for the last decade. Remember that students are learning the process, and the outcome for them is not just the result but the incidental learning that happens when we approach problems authentically. In the same theme, it was also floated that being authentic was not professional – one must have different personas for your professional and personal lives. Thankfully, many academics embraced the idea of being authentic, giving them a framework to continue and extend what they were already doing in their courses anyway.

Perhaps the best argument for authenticity in educational settings is that it helps to make it fun. It is a way to introduce a relevant bad joke, share an industry experience that demonstrates why this concept is really important, empathise with students because you may have also found this or that concept difficult, and share strategies. While the argument can be made that being an academic does not excuse one from the requirements of professional development, it can be a fine line to walk when an academic is balancing the needs of two professional identities – the surveying and engineering professional development requirements must be balanced with those of the professional academic.

5.4 Throwing the Cheese into the Volcano

While we are yet to collect evidence from our colleagues on how their own authentic journeys are progressing, we can provide a non-exhaustive list of the authentic actions we have taken in our own journeys:

- We use things that we like to make classes interesting, including Lego, dinosaurs, games, superheroes and zombies. Turns out you can teach logic gates with dominoes, volumes with Lego and database design with a bag of mixed lollies.
- We have used Lego and dinosaurs to add a touch of fun to events, most recently orientation where two large inflatable dinosaurs welcomed students to the session.
- We gave a university-wide presentation on re-thinking orientation while wearing matching Lego pyjamas.
- We now have a whole library of themed shirts to choose from – no more pyjamas! People have begun to ask what shirts we will have for different events so they can participate. Is this what it is to be an influencer?!
- We do not blur our office backgrounds when doing recordings or holding online classes. The students can see our collections of dinosaurs, Pop Vinyls, Lego and minifigs and other trinkets we have collected in our professional lives. As well as the piles of mess! They make for good talking points when a new class starts. (In the event we do put on a background, there is a good chance that Lego is featuring…)
- Our technical lab spaces also have a variety of 'decoration' – the Survey Store at Springfield campus has a display of Lego minifigs that first year classes contribute to by making a minifig to represent themselves.

While we are by no means done on this journey, some of the key learnings for us as professionals, academics and individuals have been:

- You can be a friendly authority figure.
- Being a professional is best demonstrated by technical knowledge, collaboration and respect, not by wearing a shiny suit and a tie.
- Acknowledging mistakes and taking action to correct them is not only authentic but is modelling good professional behaviour for students.
- Supporting colleagues to be authentic can be a challenging journey, and some will take longer to figure out what their 'professional' authentic self looks like than others.

6 CONCLUDING REMARKS

In this paper, we have presented some of the weird and wonderful ways we tried to make surveying and engineering education not just more authentic, but also engaging without compromising curriculum. While the majority of the discussion has referred to anecdotal

observations, it has hopefully provided a unique insight into some of the work and philosophy that goes into educating surveying and engineering students at UniSQ.

We urge anyone involved in the education of surveyors and engineers to reflect on their contribution to the learning journey. Do you have a clear understanding of what is trying to be achieved, and how it is to be achieved? Are these the things that you should be aiming for, or are they the things that you have always just done? Are the activities that students are being asked to undertake really a reflection of the learning outcomes, or have they been done out of habit and ease of process?

And most importantly, never be afraid to ask the hardest question there is in education: But why? Preferably while wearing a dinosaur T-shirt…

ACKNOWLEDGEMENTS

As mentioned earlier, it is worth noting that we are lucky to have a number of amazing colleagues who are not lactose intolerant volcano gods and genuinely engaged with our ideas and helped us bring them to fruition – you know who you are! We are really grateful to have you on this journey with us. We would also like to thank our families for putting up with the weekend and overnight absences while we worked crazy hours – Darren, P, Fletch, Tony, Hannah and Callum, you're all rockstars.

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