

Synopsis

Realising that our graduates will enter Stephen Hawking's famous, "Age of Complexity"¹, Dr Simon Angus, a widely published complexity scientist and awarded educator and innovator, has over nearly a decade, kept complexity thinking front and centre of his approach to inspiring and equipping his students. Even though complex systems (dynamic, non-linear, inter-connected, and 'messy') surround us everyday in communities, firms, economies, cities, online experiences, and global networks, complexity can easily overwhelm. In response, Dr Angus seeks, on the one hand, to create deep and memorable learning experiences that will provide his students with ready-made conceptual touch-stones to navigate complexity beyond the classroom, whilst on the other, to grow in them the raw skills of broad-based critical thinking and collaboration that will enable them to be effective problem solvers and leaders in the agile, team-based enterprises, industries and professions of tomorrow.

Overview

Setting up a micro-finance bank from an orphanage in Tanzania. Part of the research team at the J-Pal Poverty Action Labs (MIT). Completing a PhD in complexity science with the Institute for New Economic Thinking, Oxford. Three stories of many, but each journey traces back to my teaching here at Monash:

*Last year in semester 1 I was one of your students in PPS [ECC2800] and absolutely loved the subject, it **really opened my eyes** to what's happening in the world and how much we can do to change it. It **inspired so much that I've ended up in an orphanage in Tanzania** called the Olive Branch for Children just outside of Mbeya. PPS was by **far the best unit I've done at university**.* – via Email, Jan 2016, from ECC2800 student, 2015.

*I know we haven't worked together in a while, but I just wanted to share the good news with you and express my gratitude because you've been such **an important part of my economics journey over the last few years**. I am pretty sure that my first exposure to the work J-PAL does was in your class. ... There's no doubt in my mind that I wouldn't have persevered as long as I have **without being inspired by you** (I tell my students that you're the **gold standard of teachers**), so thanks again.* – via email, May 2015, from past ECC2800 student / ECC2800 TA, now at the Harvard Business School / Poverty Action Labs (J-Pal, MIT)

*Just wanted to thank you for an awesome semester, ECC3860 was unreal – **the best subject I have ever done**. PPS really opened my mind, **but this subject blew it to bits – I loved it!** I was just hoping to get a few pointers from you about what I could do from here; **I love research ..** and now you've got me **hooked on programming** – via Email, received Nov 2010 from ECC2800 / ECC3860 student now studying a PhD in Complexity Science and Economic Development at Oxford University with the Institute for New Economic Thinking*

For me, *there is no better validation of my approach to teaching and learning*. As a multi-disciplinary, complexity scientist, I have somewhat of a unique insight into the ever-connected workplaces of tomorrow². Where others see complicated, random forces, without control or limit, I see *emergent, self-organised, complexity*, often characterised by *beauty and elegance*. It is this vision that I have laboured to share with my students: that they would be **'complexity natives'**, comfortable with the seeming chaos of ever-changing, amorphous, work-places and institutions through systems-thinking; and that they would enter the workplace as **inherently agile and collaborative team members and leaders**. In this statement, I express in detail my *fundamental motivations* and examples of *major educational innovations* that serve this agenda across almost **10 years** of tertiary education (2006-2016), focussing on **Monash (2008-2016)** in ECC2800/APG5229 *Prosperity, Poverty and Prosperity (PPS)* (~90-140 students), and ECC3860 *Integrated Economic Modelling (IEM)* (~ 30 students); units I built (PPS), or co-built (IEM). I also detail a *broad variety of evaluative practices* (Criteria 3). I provide a **variety of evidence of student impact** including: SETU facets; targeted survey results; student and peer feedback; cross-disciplinary listing of my units; invitations to academic seminars, journals, boards, and course-design groups; educational leadership roles; and prior recognition at the local and national level.

Criteria 1 Approaches to teaching and the support of learning that influence, motivate and inspire students to learn.

*The subject and material is **simply amazing**. Never have I been **so stimulated** for a subject. Simon is a lecturer who **clearly cares about what he's teaching** and it shows in how he does it.* – via SETU, ECC2800 student 2013

*To be completely honest, it's hard to choose because everything was very good. It's quite rare for me to say, but probably the lectures were the best parts. Simon is excellent, and **his passion** for the content **transfers through**,*

- 1 Jogalekar, A., "Stephen Hawking's advice for twenty-first century grads: Embrace Complexity", *Scientific American*, 23 April 2013, URL: <http://bit.ly/29DwHNN>, accessed 14 June 2016.
- 2 See my contribution to, "Robots taking our jobs? Yeah, but only the crap ones" – *The Age*, 2 April 2016, URL: <http://bit.ly/29RiiNF>, accessed 20 July 2016.

making you invest heavily. – via SETU, ECC2800 student 2015

*I just wanted to quickly say, this has been the most **inspiring** subject I've EVER taken in my learning history! It has **completely re-shaped my direction** for just simply working in a multinational and living a "comfortable life", one which the education system directs us to do ...* – via Email, May 2016, APG5229 student, 2016

Approach: Crafting *memorable, collaborative*, learning experiences

Economics has traditionally suffered from a perception of being boring and irrelevant: endless equations, diagrammatic explorations, and a persistent sense of the unreal – that economic theory handles a perfect world detached from the day-to-day. In response to this perception, I want to **surprise** students by the **beauty, power and deeply thought-provoking nature of Economic thinking**. To this end, and leveraging my somewhat uniquely eclectic formal training across the sciences, I have developed a series of in-class, hands-on pracs. My aim is to create **memorable** learning experiences – experiences which will a concept that I consider fundamental to navigating a large class of economic problems and complexity domains. *Below I provide two examples: "the technology prac", and the "specialisation prac".*

The technology prac: here, I aim to 'make the invisible, visible' – for most people 'technology' is *completely invisible*: whilst we daily engage with products of astonishing form and function, we almost never look at the designs, the methods, the ways of doing (i.e. the 'technology') that is now **embedded** in these products. Yet technological advance is a fundamental driver of economic prosperity, so *how can I make the invisible, visible?* Borrowing from engineering, I set out to modify an in-class pylon-building prac that would deliver a **life-long learning moment on the nature of technology**. *Identically* sized groups of students are given *identical* raw materials (spaghetti, rubber-bands, a tin-can), and an *identical* amount of time within which to build a pylon which elevates the tin can off the ground a given amount and then supports *American Economic Review* (AER) journals on top. A chocolate prize is given to the team whose pylon supports the most AERs. Not only does the prac bring a powerful learning moment around **collaborative work**, it never fails to show how astonishingly important **the method (i.e. the technology)** of making the pylon matters: one team's pylon doesn't stand, another's holds a single AER, yet another holds over 10. *Having fixed all other inputs, we are left to conclude that **technology** is the driving difference. My students leave the room looking at **everything anew**.*

The specialisation prac: here, when discussing models of economic prosperity, we arrive at one of the assumptions of the Solow growth model – a large, fully-specialised economy. Where most lecturers treat this as a mere detail, to do so overlooks a critical point: specialisation – the degree to which a productive process is split amongst skilled individual actors – is effectively **unavailable** to a large portion of humankind due to prohibitively high costs of exchange (i.e. transaction costs) through poor transport, communications and IT infrastructure. **Could I make the power of specialisation visceral for my students?** In the spirit of the technology prac, I designed a six-step paper-construction process that would be low-cost, simple to teach, but provide the scope needed to illuminate specialisation and the division of labour. I split students into various teams, either as a single producer (doing all steps by themselves), or as part of a three-, or six-, member team, either with, or without, intra-team costs (e.g. sitting next to each other, or walking across the lecture theatre between steps). By tracking the total number of paper products made by each individual or group at both an intermediate and final time point, I could demonstrate, live, the huge prosperity potential of specialisation and learning-by-doing: getting better through repetition.

In both of these examples, I run a '**synthesis**' session immediately afterwards, asking the question, '**So what did we learn?**' It is obvious from the spirited engagement, the excitement in the room, and the lively responses afterwards as we collate the data, that the students are in a



Figure: The Technology prac in action - students collaborate in teams to build a pylon from raw spaghetti, rubber bands and a tin can; given fixed labour and inputs, the only variable is the *technology* they employ.
—ECC2800/APG5229, 2016.

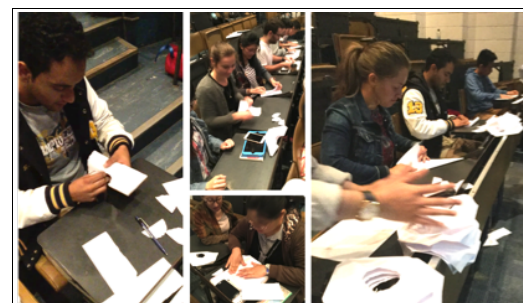


Figure: The Specialisation prac in action - students were placed either alone, or in groups of three or six, to create exactly the same output (a paper device) by following exactly the same steps. Would we observe the enormous potential of learning by doing that specialisation affords?
— ECC2800/APG5229, 2016.

hightened state of awareness. To further embed (and disseminate) the learnings from these pracs, I use iPad software, ExplainEverything to create short, review videos that I then post on Moodle (e.g. Technology: <http://bit.ly/2apfh8r>, Specialisation: <http://bit.ly/2a3YeLg>).

Adding to the comments at the top of this section, I believe that my students understand my desire for 'depth' in their learning. A good example from a student sent (unprompted) to the Business School follows,

*I have had Simon in several classes over the past few years and he was by far the best teacher I have had. He **always got the class thinking, encouraged deeper thought and really got you thinking about the issue at hand!*** – via Email to Business School general enquiries, May 2011 (ECC2800 & ECC3860 student)

Where the Faculty average is 4.0, since 2009 my units have received over **4.7** for the 'Intellectually stimulating' facet of SETU; in four of these years, the score was **over 4.8**.

Taken together, the pracs deliver that enchanted, mercurial learning moment where all else seems to fade away and the class is reflecting – as one – on the profound findings of an otherwise mundane task.

Criteria 2 Development of curricula, resources and services that reflect a command of the field.

Over nearly a decade of teaching at Monash, I have been heavily involved in the **innovative design** of many educational elements which enhance the educational experience and leverage my command of complexity science. In this section I will focus on my **continuous innovation approach to two-sided critical analysis** in the **research essay** task in my second year ECC2800/APG5229 unit.

Context – Why persist with the 'Academic Essay'?

My time in the tertiary sector (2006-2016) has coincided with one of the most **dynamic periods in personal technology development in human history** – the rapid diffusion of the internet through hand-held devices, the dramatic lowering of the cost of very fast computational platforms, the profusion of 'app' based service-sector intermediation – to name a few examples. This period has enormous promise and is one of the key drivers of the *complexity of the modern workplace*. Unfortunately, the hightened ubiquity and accessibility of the internet has seen research essays suffer: many academics are unwilling to set assessments for which internet-harvested text is now a real prospect. Moreover, assessing essays and providing helpful feedback is seen as **inherently time-intensive** – time which is ever vanishing in modern academic life.

Yet, I am of the firm belief that the academic essay has **enormous value** for the worker of the *complexity age*:

- **Critical logic skills:** First, long-form writing of an academic nature requires the student to develop critical logic skills – the formation of a thesis, the development of a logical sequence of ideas, the identification of counter-arguments and rebuttal. As mathematical formalism is to physical sciences, the academic essay is to the social scientist, developing the critical, logical, and structured approach to analytical thought.
- **Drinking from the fire-hydrant:** Second, the academic essay provides a perfect platform to train students in how to 'drink' effectively from the 'fire-hydrant' of information now at their fingertips. The 'art' of the internet is not *what* to look at, but *why a resource is worthwhile to look at*. The distinction is subtle, but enormously important for complexity natives. The research essay cultivates this skill-set.
- **Human's unique domain – synthesis:** Third, we know from countless studies of employers that the ability to write clear, succinct, prose is a skill in high demand. As work is increasingly machine-augmented, the final act of synthesis, interpretation and communication will be the **unique domain of human agents**.

*But how do we deliver these critical learning outcomes **efficiently to large classes**?*

Approach: A Personalised Essay Feedback Engine

Since the inception of ECC2800/APG5229 in 2009, I implemented a 35% research essay as the main in-semester task. From the outset I developed a standardised, online, marking rubric, implemented in a Google Form, which was used to mark all the essays. Of note, **I pre-wrote a large number of feedback comments** (both positive and constructive) which aligned with the check-boxes of the marking rubric online. By using my computational skills, I was able to **automatically link** a student's online assessment form to the comments, and so, craft a paragraph of **specific** feedback on a student's essay writing. In addition, the marking form gathered a further general comment on the essay. I was then able to use mail-merge software to bring together all assessment and feedback elements into a **personalised feedback email** which included the student's overall mark and grade, their bespoke (automated) paragraph of feedback on various aspects of essay writing, a hand-written general comment on their work, and general feedback across the entire cohort.

This approach was received with a mixture of thankfulness and amazement – many students **had never**

received such personalised feedback on their essays before. From our side, the system was marvellous to use since data entry on any given essay could be done at any web-browser, triggered long-form written feedback, provided excellent summary statistics on common mistakes across the cohort (which I could use for generalised feedback), and encouraged us, as markers, to focus our attention on the particular aspects of a student's work not covered by the more common aspects which were handled by the pre-written comment system.

Over the next two years I made refinements to the method including, including the student's own marked-up essays in the feedback email, and, in response to a suggestion from a student, breaking the assessment into a 10%, 1 page, 'Argument (Outline) task', submitted three weeks prior to the full, 2,000 word, 25%, Research Essay; thus providing a key, early feedback point as students crafted their arguments. By 2013, **the student response was phenomenal** with many students explicitly mentioning the **depth of feedback** in their written comments (*"Feedback for the essay argument was very fast and helpful", "I love the feedback Simon gave on both assignment tasks", "Thank you for the feedback re my essay. ... The feedback was also fair, constructive and valuable."*). Quantitatively, whereas the Useful Feedback SETU facet is typically the lowest scoring response across the university (mean 3.90), I had brought this aspect up from 4.25 (ECC2800) in 2011, to 4.58 (2012), and an all-time best, **4.76** in 2013 (seeing an 'Overall' SETU score hit **4.83**). *By the end of S1 2013, however, I reflected on the system and wondered if I could do more for the educational benefit of the essay for students.*

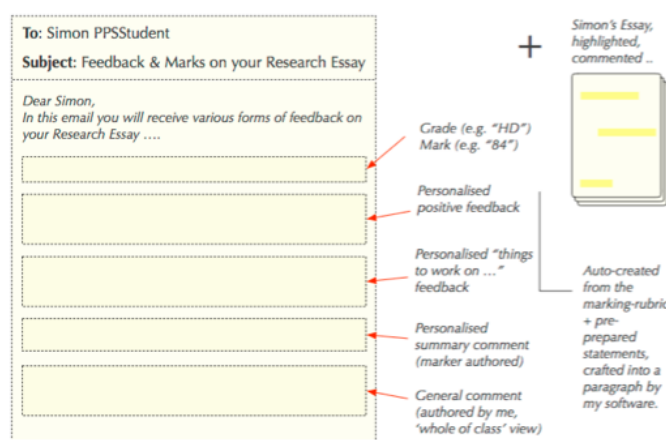


Figure: Outline of the personalised feedback system email to students.

Approach: Summative Peer Review (SPR) ~ towards *two sided* critical thinking.

During 2013, for my research, I was spending more time thinking about machine-learning recommender engines used by major websites. Around this time I was also experimenting with online discussion log marking techniques including the use of other student's posting responses to reveal the quality of a peer's leading post. The key insight here is that **there is powerful latent information held in multi-user environments**. This led to something of a 'penny-drop' moment, where I realised that as good as it was, the personalised essay feedback engine was funnelling *all* of the critical reading and reviewing tasks through the teaching staff: **the students were not being trained in the other side of critical thought – critical review**. In a word, we have been developing **one-sided** critical thinking, not **two-sided**. I then embarked on a further major innovation cycle to introduce and embed **Summative Peer Review (SPR)** into my unit (see Criteria 3 for evaluation approaches to the SPR). By 'flipping' assessment, I saw enormous potential educational benefits including:

- **Development of critical review skills:** agile teams constantly require members to critically review each other's work, sometimes even formally checking it, but always with an aim of providing insightful feedback which would improve the work. By getting students to train in critical review, and then 'sit on the other side', and formally review each other's work, they would be learning exactly this critical review skill.
- **Better scope and depth of feedback:** by utilising the multi-learner environment of large-scale teaching, each student would receive not just a single perspective on their work from a faculty member, but multiple perspectives, increasing the depth and breadth and overall quality of the review cycle.
- **Scalability:** finally, if possible, summative peer review, using the latest online learning environments could potentially deliver these benefits with the same or lower administrative overheads.

Over the Summer of 2013/14 I worked hard to develop the first iteration of the SPR system. After reviewing the literature and consulting others who had experimented with summative peer review, I set upon several design-features including:

- **A binary rubric:** to reduce subjectivity, the literature suggested using 'Agree' / 'Disagree' responses to a series of assertions regarding the quality of the assignment, coupled with a 'Comment' section for reasoning.
- **Training:** the literature emphasised the importance of exposing students to the exact same assessment rubric that would be used during the assessment phase by having them assess multiple pre-assessed (by faculty) assignments of a similar nature to build experience and calibrate their assessment level.
- **Double-blind review:** again, to support objectivity, I wanted students to assess (and be assessed) without any social network overlay, and so experience industry-standard, 'double-blind' methods.

- **Moderation:** critically, students would need to feel supported that any apparent 'mistakes' by peer reviewers could be reviewed and corrected by faculty.

With the aid of online tutorials, I was able to implement all of these features into two Moodle Workshop modules, one each for the (1-page) 'Outline (Argument) task' and the full Essay task. However, the standard Moodle module does **not provide essential oversight and audit facilities**. To bridge this gap, I again leveraged my computational skills to **design and write software** that would: a) Provide lists of students to follow up who had not completed their training-, or peer-, assessments; and b) Identify students who had disagreed often with the faculty-marked training assessments to encourage them to complete more training prior to peer-assessing. As discussed in Criteria 3, the first iteration of the SPR in 2014 saw a qualified success of the system, with obvious areas for improvement. Overall, I was extremely pleased with the **maturity** and **diligence** of the students in carrying out their assessments, indicating to me that students – with training and support – were indeed **capable critical reviewers** and fundamentally could be **trusted** to discharge their reviewing tasks with due seriousness. Whilst my prior research on peer review had found a similar result, *to see it in action across a class of around 100, 19-20 year-old students, was inspiring*. For the second iteration in 2015 I introduced several new features to the system (see Figure). I also created an explanatory video for the entire system (see, <http://bit.ly/29RiiNF>). As documented below, by just the second iteration of this major innovation, student feedback was extremely positive.

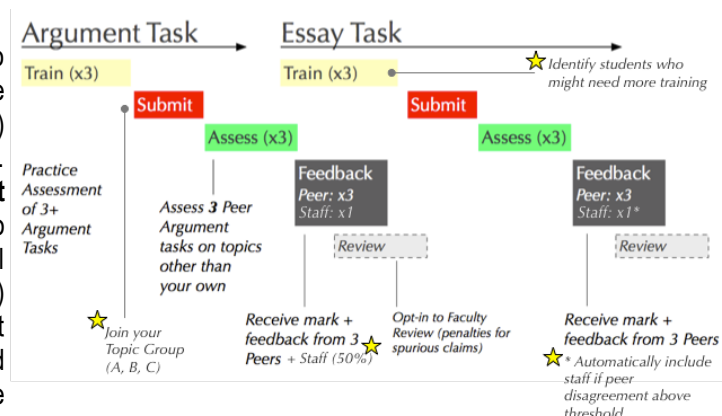


Figure: Outline of the Summative Peer Review (SPR) system. New features indicated by ★.

*I thought the peer review process was a **superb concept**, and **very well implemented**. The fact that we each had to practise a few sample reviews before actually reviewing each other's essays helped to **build up confidence** that we would assess each other's work competently. Personally, it **greatly assisted in my essay writing skills** - since I myself would be an assessor of another person's work, I felt like I knew what the assessor of my work would be looking for, and thus how to write my essay better in the first place. . And afterwards, the actual feedback received was **more detailed and helpful** than what one might traditionally receive from a lecturer or a tutor who is pressed for time. I used to avoid essays but now I feel I have the courage to jump into essay writing.*

– ECC2800 student, via SETU, S1 2015.

Quantitatively, after receiving a significant drop across all facets of the (ECC2800) SETU, the 2015 instance returned strongly across the board, with 'Useful feedback' hitting 4.73 and my 'Overall' score returning to 4.75. (for SETU summary, see Fig.)

In addition to educational design focussed on the academic essay, over the last 8 years at Monash I have: designed two new units (ECC2800 Prosperity, Poverty & Sustainability; ECC3860 Integrated Economic Modelling (with B. Parris)), one of which (ECC2800) is now listed in 5 streams, majors or courses across three faculties; been a member of a novel Sustainability course design team (B.Sus-Dev, 2014-2015); co-authored a tutorial chapter on NetLogo – the software used in ECC3860 (Berryman & Angus, 2010); founded *EconomicsNow!* (<http://www.econnow.com/>); and been invited to give many educational lectures on complexity science as they apply to sustainability (Monash Studio Series, May 2016), futures (Monash Future Thinkers, May 2016), and global studies (guest lecture, ATS1326 Contemporary Worlds, 2014 –).

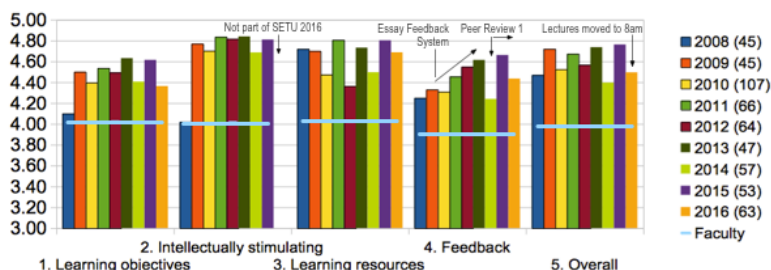


Figure: Summary of SETU outcomes, 2008-2016, weighted (by response rate) median per year. Predominantly reflecting ECC2800/APG5229 (2009-16), and ECC3860 (2010-12).

Criteria 3 Evaluation practices that bring about improvements in teaching and learning.

As I have expressed elsewhere³, educational innovation is **academic risk-taking of a special kind**: consequences (the good and bad) are experienced by *real* students in *real* time; the timescale of development is

3 **Angus, S.D.**, "The Highs and Lows of the Educational Innovator: of cobbles, haircuts, and flipped assessment (Pt. Two)", *The Educationist* (Open Learning Australia), 8 April 2015, URL: <http://bit.ly/29wFbGx>, accessed 13 July 2016.

slow – we typically receive one set of field-feedback on our innovations per year; and for standard economic reasons, the *risk-amplification* of educational innovation means that it is likely to be under-provided by the faculty – we'd prefer to keep the *status quo* than step out into the ring ourselves. However, as this statement contends, educational innovation, is not optional – our graduates' work-places are rapidly evolving: in complexity and agility. For these reasons, because I am strongly committed to educational innovation, I am **necessarily strongly committed to the evaluation and self-reflection cycle** of educational innovation. My improvement cycle in teaching and learning involves four key steps which I will *exemplify through my introduction of Summative Peer Review (SPR) to ECC2800/APG5229* (as described in Criteria 2).

Step 1. Ground-work – learning from others' experience in design.

An obvious way to enrich the educational innovation cycle from the outset is to leverage the experience of others. For me this takes various forms: reading relevant educational literature and attending talks on educational innovation; absorbing online materials, how-tos, and blog-experiences; and finally, direct conversations with those who have already been down the same path. Prior to starting the SPR trial I did all of the above: a) I surveyed (and obtained logins where necessary) four different platforms for peer review (e.g. PRAZE, TeamMates, Moodle-Assignments, Moodle-Workshops) speaking in two instances with the designers of the systems to better understand their strengths and weaknesses; b) I read online and academic literature on peer review, most usefully the excellent summary and references therein from Teaching@UNSW⁴ and their Moodle-Workshop guide⁵; and c) I contacted Monash's own 'Promoting Excellence' team (now part of the OVP-LT) to gain contact details for anyone at Monash who had implemented a similar system. This led to two fruitful conversations with Monash academics who had some experience with SPR.

Step 2. Analysis – Longitudinal data-gathering and analysis.

As a complexity scientist who has worked with data and analysis all my academic life, I place a very high value on **quantitative, targeted, and longitudinal tracking** of my educational innovations. To this end, I again designed a targeted, anonymous, and longitudinal survey platform to yield systematic feedback on the SPR and the outcome of further refinements. The **Figure** (right) gives summary results: the overall student satisfaction with the system; and student perceptions of how the system has improved students' critical writing skills. After the first iteration (2014) it was clear that a significant portion (around a third of students) were dissatisfied with the system (left-hand panel). The survey allowed me to drill down on the reasoning, as I had students rank the most significant

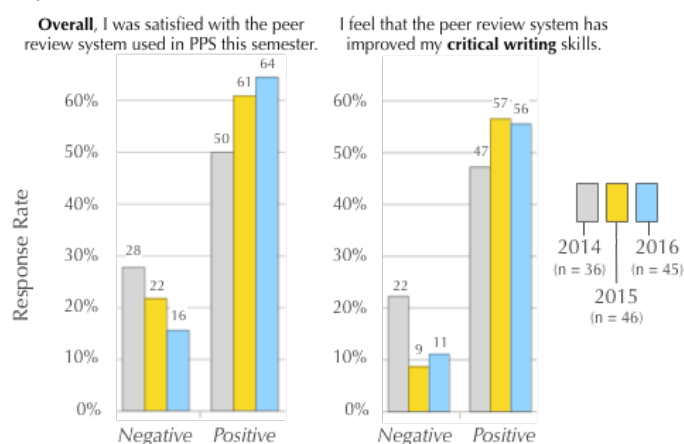


Figure: Anonymous, targeted, longitudinal, online student survey results of the Summative Peer Review system over the three year innovation cycle to date ('Negative' is the summation of 'Strongly Disagree' and 'Disagree'; 'Positive' is the summation of 'Strongly Agree' and 'Agree').

positive and negative attribute of the SPR from a list, or provide additional reasons. These data led directly to the formation of the '4 Issues' to address for the subsequent innovation cycle (detailed in Criteria 2). After making significant refinements in 2015, the survey instrument gave directly comparable changes in student perceptions showing a significant drop in negative views on 'improving critical writing' (22% down to 9%) and an increase in positive 'overall' satisfaction (50% up to 61%). Pleasingly, the third iteration (2016) has consolidated and extended these gains.

Step 3. Student Engagement – Involving my students in the educational innovation cycle.

Given the highly motivated and talented pool of students we engage with at Monash University, I am no longer surprised by the mature and astute way that they perceive my educational efforts. For this reason, I seek to engage the students themselves as **quasi-collaborators in my educational innovation**: I want to **involve the students in the risk-taking moment**. This approach serves many aims: announcing to the students that I am an innovator and that they are part of an innovation cycle (so be ready/prepared); encouraging them, from the earliest point, to be *critically reviewing* what I am doing and sharing their experiences with me; and above all, valuing and empowering them as **co-creators of educational experiences in my classroom** – I lead them, but

4 Teaching @ UNSW, "Assessment Toolkit / Student Peer Assessment", URL: <http://bit.ly/29CWyKs>, accessed 13 July 2016.

5 Teaching @ UNSW, "How to use the Moodle Workshop tool for peer review and self assessment", URL: <https://teaching.unsw.edu.au/node/1320>, accessed 13 July 2016.

they are part of 'the team' when it comes to our learning. For the SPR I implemented this principle as follows:

- **A dedicated FAQ area on Moodle:** prior to the unit starting, I set up a dedicated SPR FAQ forum with a series of pre-filled Q & A ('Is the feedback I get from Peer Reviewing the same as lecturer marking?', 'How long will peer reviewing take?', 'What if reviewers disagree?', and so on).
- **Targeted emails to early-adopters:** in the early weeks I identified 'early-adopters' – students who had got into the SPR first and started reviewing the first examples.
- **Written feedback, early and often:** An open encouragement to send me early feedback on experiences with the SPR saw many students over each semester taking advantage, as exemplified by the initiative taken by one group of my students in 2014 who hosted their own online discussion on the unit's qualities.
- **Updating each cohort on issues and changes made:** after the first semester's experience with the SPR I gathered all feedback received through various channels (qualitative and quantitative) and distilled four key weaknesses. I started the next semester (iteration 2) with a similar FAQ Forum on Moodle, but this time, I lead with the question, "What were the refinements to the system you made between 2014 and 2015?". In answer, I wrote a short summary of each 'issue' and provided a 'response' to indicate what I'd changed this time around (see Criteria 2). An example of the Issue/Response to 'issue 2' is given in the Figure (right).

Issue 2

We received a small number of comments in 2014 from students who were concerned that their great ideas for their essay would be stolen during the peer assessment of the Argument task, by assessing students who are doing the same topic.

Response: It turns out that in the new Moodle there is a simple way to deal with this. In 2015, we'll be asking students to 'sign up' to their Topic, prior to BOTH their Argument and Essay submissions, and, we'll use the back-end of Moodle to ensure that assessors of your work will be chosen only from students who are doing a different topic to your own.

Figure: Example snapshot of Moodle post to ECC2800/APG5229 students prior to S1, 2015 explaining one of the key refinements to improve the Summative Peer Review system based on their peers' feedback in 2014.

Step 4. Reflection – Self-reflection and analysis through synthesis.

Finally, I take time to take stock, gather all the evidence together and undertake a synthesis of what I've learned. I use two principle methods to drive synthesis:

- **Reflective note-taking in Evernote:** I prepare summary notes on the semester, focussing in particular on recent educational innovations from a high- (e.g. SETU) and granular- (e.g. qualitative feedback, targeted surveys), level. These notes always conclude with a list of 'to-dos' for the next iteration.
- **Synthesis through knowledge transfer:** I use invitations and opportunities to contribute to educational transfer forums as **key drivers of synthesis and reflection**. I find the practice of writing a series of Blog pieces, or developing and giving a talk to other educators drives reflection and change. For example, I was invited by the educational blog, 'The Educationist' (Open Learning), to share my experiences of introducing the SPR system⁶. Furthermore, I gave a talk in the Department of Economics Skills Transfer workshop on the first two iterations of the SPR (Angus, 2015), and was invited in 2016 to the inaugural Monash Education Academy (MEA) Learning & Teaching Conference 2016 as one of only four, 1h, workshop speakers to present on all three iterations of the SPR (Angus, 2016). One attendee, Dr Kim Anh Dang, of the Office of the Vice-Provost (L&T) noted in particular my 'effective reflective' practices: "Thank you very much for sharing the slides - your reflections on your innovation. If you don't mind, I will also refer to you in this case as an **example of an effective reflective educator, learning and building on your work**. I think this again would be very meaningful for other academics." (June, 2016)

The simple four-step evaluation process detailed and exemplified with the SPR system above has been my evaluative method **over nearly a decade of tertiary teaching**. During this time I have conducted many iterations of this approach, resulting in the production of numerous self-reflection notes and summaries, the authoring of two academic papers, the running of multiple targeted surveys on around 17 key innovations, and have generated and delivered multiple educational talks at seminars, workshops and conferences both local and national (see listing in CV).

Criteria 4 Innovation, leadership or scholarship that has influenced and enhanced learning and teaching and/or the student experience.

*Just a quick message to let you know that I just won an **OLT citation award** with the application that you helped me with when it was still at the Faculty stage! I also won the Monash VC Teaching Excellence award this year and I just wanted to thank you again for **all your help and your comments that I kept in my applications all the way**,*

6 All pieces are linked from the last part: Angus, S.D., "The Highs and Lows of the Educational Innovator: of cobbles, haircuts, and flipped assessment Part Three", *The Educationist* (Open Learning Australia), 15 April 2015, URL: <http://bit.ly/29Bv6XL>, accessed 13 July 2016.

and your ideas that have been instrumental in the success of my applications.

– via Email, Sep 2015, from successful Faculty, Vice-Chancellor's and OLT Citation Award winner, L Orlando

*A personal thank-you to each of you who gave up part of, or in some cases all of, your Sunday to represent the Department of Economics at Viewpoint today. ... The highlight, I thought, was **Simon's economic workshop**. It was **wonderful! You are a natural Simon**.*

– via Email, March 2013 from Head of Department regarding the Viewpoint high-schools Economics experience day.

As with my approach to evaluative teaching practices (Criteria 3), and collaboration amongst my students (Criteria 1 & 2), **collaboration** is a major theme of my educational journey. I have benefited greatly from colleagues' teaching and learning approaches and have sought, where possible, to share my ideas, skills and approaches with others to the benefit of students. I detail here a series of roles and contributions that have benefited the student experience beyond my own teaching:

Dept. of Economics Tablet PC program: in late 2008 I attended an e-Learning seminar at Monash and saw what was possible with a Tablet-PC. I saw this as an obvious 'middle-ground' enhancement over the rigid 'PowerPoint' style slide-shows that were becoming all too prominent, or the overly-dynamic 'chalk-and-talk' of the teaching of yesteryear. Soon after, with backing from my Head of Department (HoD), I trialled a Tablet PC in my own teaching, and then lead the establishment of the Economics Tablet PC program – providing a bank of Tablet PC's to my colleagues to teach with. The program continues to this day, now with a bank of MS Surface Pros.

The Innovation & Quality in Education Group (IQEG): After serving for two years on the Department's Education Committee (EC) I identified that whilst the EC was capable of handling programming issues in the educational portfolio, there was almost no time devoted to the *quality or innovation* of the educational experience within our programs. Again, with backing from the HoD we established a dedicated group to measure, support and enhance the quality of our offerings. By Sep 2010 I chaired the first meeting of the IQEG. I continue in this role to the present, with the IQEG now initiating and administering an innovations grant program (worth \$30k p.a.), the Department's excellence in teaching award, numerous 'transfer' seminars and workshops, and various other initiatives that seek to enhance our offerings and up-skill our members.

The B.Sus-Dev: In late 2014 I was approached by the VC's office, under the Monash-Warwick partnership to join a small team who would build an innovative sustainability course, jointly offered between Monash and Warwick university. My involvement with sustainability teaching and complexity were identified as important points of contributions to the work of the group. Unfortunately, the course has not materialised, but two years of work saw the development of a truly innovative, parallel-stream, course offering in sustainability that is finding applications in other ways through the university.

Scholarship & Dissemination: since my first years practising tertiary education I have sought to be engaged academically with the educational literature. Since this time, I have authored or given 15 papers or talks on my innovations (see CV), with one of my co-authored papers (Angus & Watson, 2009) being highly cited and blogged about. During this time I was invited to join the *British Journal of Educational Technology* (BJET) Editorial panel, and have subsequently reviewed 11 manuscripts for BJET, and others for *Computers and Education*. A sample of educational talks given across complexity and economics outreach, and innovation is here: <http://bit.ly/2ag9unF>.

Schools/student outreach: for the last few years I have been the Department's nominated speaker for schools outreach activities (e.g. Melbourne High 'experience day'). I have also been a regular contributor to Monash open days as the Clayton campus Economics speaker, and have spoken at a range of Economics Students Society of Australia events to encourage, inspire and entertain the next crop of Economists. I was also invited in 2014 to provide lectures to the ATS1326 Contemporary Worlds cohort on the global financial system. Again, using a complexity lens my lectures are now a regular feature, receiving strong student reviews (see quote above).

Mentoring: after being recognised by a **Dean's Award for Teaching Excellence (2009)**, a **VC's Citation (2010)** and an **ALTC Citation (2011)** I was asked by the (then) Promoting Excellence team to serve as a mentor to educators across the university. Since then I have assisted four successful VC's and OLT Citation award recipients from diverse backgrounds such as theology, chemistry, mathematics and pharmacy (see quote above). I have also assisted numerous colleagues with promotion and educational award cases.

Dept. of Economics Educational Mentor: recognising my skill-set and contributions across the department, faculty and university, the new HoD has asked that I serve in a new role for the department, as the 'Department of Economics Educational Mentor' – here, I will be released from some other service duties to be on-call to mentor individual colleagues at various stages of the educational journey. This role will formalise and expand my already active mentoring role with several colleagues across the department.