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Camp, G. (2015). Teaching theory into practice: A model from opera. In C. Gunn, & L. Ramsay (Eds.), *Insights into practice: Teaching cases for student engagement and achievement He kēhi whakaako, kia eke ai te ākonga: A collection of teaching cases from the 2015 CLeaR Fellows* (pp. 1-2). Auckland, New Zealand: Centre for Learning and Research in Higher Education (CLeaR), The University of Auckland. Retrieved from https://www.clear.auckland.ac.nz/en.html

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Insights into practice:

Teaching cases for student engagement and achievement

He kēhi whakaako, kia eke ai te ākonga

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

Insights into practice:

Teaching cases for student engagement and achievement
He kēhi whakaako, kia eke ai te ākonga

A collection of teaching cases from the 2015 CLeaR Fellows

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ISBN: 978-0-473-35190-8

Published 2015 by the Centre for Learning and Research in Higher Education (CLeaR), the University of Auckland

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Graphic design: Tony Chung

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2015 Teaching Cases Introduction

In 2015, the second year of the CLeaR Fellowship Programme brought together nine staff members recognised by their departments for exemplary achievements in teaching and learning. The group met regularly to share ideas and experiences of teaching, and to report and receive feedback on the progress of individual teaching development initiatives.

These initiatives focused on 'Student engagement and achievement', a broad theme, which relates to all disciplines, class sizes and course configurations. The teaching cases presented in this collection are based on individual experience, but reveal common themes and challenges that many readers will find familiar.

Creative ways to engage students from diverse backgrounds and to support their achievement in large classes feature in the cases from Education, Science, Business and Economics, and Medical and Health Sciences. Blending the affordances of technology into learning tasks and activities is another common approach, with both disciplinary knowledge acquisition and metacognitive skill development as aims for students in Engineering, Business and Economics and Education. A third theme is the use of real world scenarios in Law and Political Studies to enrich the learning experience and prepare students for professional practice after graduation. The application of theory to practice in Music, and a Libraries and Learning Services hub for staff to share their experience of using common elearning tools to support different pedagogical strategies completes the collection.

The 2014 and 2015 Fellows — a total of 17 people over the two years — all placed high value on the opportunity to connect with colleagues from across the disciplines to explore and discuss teaching experiences. Strategies discussed at meetings were often adopted for trial in different contexts, and this led to unexpected synergies. Collaborative ventures between Fellows were founded, and enduring professional relationships forged. While some of the benefits of being part of the community of professional practice created around the Fellowship Programme cannot be shared beyond the group, the stories about teaching most definitely can. This short and easy to read publication offers one opportunity for staff to engage with the work undertaken by the 2015 Fellows. Other opportunities during the year included a mid-year event in July, presentations at CLeaR's annual Learning and Teaching Symposium in November, and at various Faculty-hosted events throughout the year. One of the Fellows presented a paper on his work at an international higher education teaching conference. If any of the cases in this collection pique your interest, you are welcome to contact the Fellows directly for further information, to explore possibilities to collaborate or to run trials with your own students.

Another group of Fellows has been appointed for 2016 to work on the theme 'Engaging with eLearning'. The CLeaR website has details of their projects at https://www.clear.auckland.ac.nz/en/clear-fellowship-programme.html and CleaR's email Alerts service can provide details of initiatives and events featuring their topical initiatives.

Working with an exceptionally talented group of teachers within the CLeaR Fellowship Programme is itself an engaging and enlightening experience. My hope is that the vibrant community of practice formed to support these creative individuals and to promote the scholarship in teaching and learning across the university continues to grow in future years.

Associate Professor Cathy Gunn

Deputy Director of CLeaR

Teaching theory into practice: A model from opera

Gregory Camp (School of Music, National Institute of Creative Arts and Industries)

Overture

For most students of singing, opera represents the highest goal: top opera singers lead difficult but fulfilling lives and make enviable salaries, travelling around the world to share their art. But the road to doing opera as a full-time career is not easy, and requires intensive training not only in the mechanics of singing, but also in acting, languages, and career management. The University of Auckland has an excellent voice department that covers much of this material with excellence, but upon meeting the singers and planning to work with them on a large-scale opera performance project I was struck by the lack of theoretical knowledge that grounds their practice. This is certainly not unique to singers, but is a general problem among all musical performance students (as well as with students in other disciplines). In their haste to arrive at the practical aspects of their chosen career, students rush through the theory without really understanding how it can continue to apply to what they do in 'real life'. Knowing music theory makes the process of learning new music go considerably faster. Familiarity with the physical mechanics of the body in performance allows musicians to understand their bodies and retain their health in this demanding profession. Knowledge of music history makes performers think critically about what they are doing and how it fits into the wider history and culture of their art form, in turn helping them create a performance with deeper meaning. My particular concentration throughout this CLeaR fellowship was on languages: I hoped to demonstrate with my singers that knowing some of the theoretical linguistic concepts behind the words they sing leads to richer, more meaningful performances. The test ground for this was a major production of scenes from a variety of operas, presented to the public in two sold-out performances in September 2015. In the first semester of 2015 I coordinated a performance skills module on linguistics for singers in which I taught them the theories and skills needed to fully understand what they are singing, and during rehearsals in second semester we sought to apply these skills to their work in the scenes. The result was a successful performance, but as our opera programme develops I hope to incorporate this theoretical training even more effectively.

Act One

Classical singers need to be able to sing well in at least four languages: English, Italian, German, and French. Unlike spoken drama, opera and art song are most frequently performed in their original languages; this is very important because the sound of the words is paramount in singing, and good librettists and composers set specific words in specific ways to convey their meaning through music. At worst, translating these texts into other languages betrays their carefully-wrought meanings, as the words no longer interact effectively with the music. Sensitive translations and judicious recomposition can mitigate this effect to some degree, but most opera houses today, especially in the English-speaking world, perform the majority of their repertoire in the original language. Thanks to the rise of surtitles (translations projected above the stage), audiences can understand the words that are being sung. In addition, singers who hope to have an international career might be singing German to native German-speakers, French to native French-speakers, etc., so they need to have a convincing command of the languages. In previous decades poor diction and understanding were somewhat more permissible, but as opera singers are increasingly required to act as well as sing beautifully, and as audiences become more familiar with the words of operas because of surtitles, language work has become more important. Many singers are happy to learn the sounds of the languages and leave it at that, but the most successful practitioners on the international stage today have a much more solid command of their languages: what words mean and how the meaning is conveyed by the music. It is unrealistic to expect university-age singers to be fluent in four languages, but I hoped to show during this fellowship that some theoretical grounding in linguistics can help them deal with the languages logically and systematically. This was my goal in teaching the 'linguistics for singers' module. This consisted of six two-hour lectures presented to our cohort of twenty singers, who ranged from the second through the fourth year of their undergraduate programme. (The other six weeks of the semester featured modules on the craft of the actor, which also played an important role in the subsequent preparation of the opera scenes, and in which I took part as a participant-observer.)

We began the module with work on translation. What different types of translation are there? What makes a good translation? How can you tell a good translation from a bad one? When the singer does not speak the language of the text, translations take on great importance. An inaccurate translation can lead to a performance that misunderstands the words and, by extension, the music. Therefore, students need to be taught what to look for in a translation. Ironically, the more literary and stylish a translation is, the less accurate it is likely to be. While the audience might value a translation that translates the style as well as the sense of the poetry, such a translation might lead a singer in spurious directions. What is needed is a more literal translation that concentrates on the meaning of the words rather than their style. We also explored the question of whether 100% accurate translation is really possible and came to the conclusion that all translation is a compromise, but there are different sorts of compromises that the singers now know how to read critically. After our study of translations, we discussed each part of speech in turn (nouns, verbs, etc.) and compared how each language (including English) deals with them. In each case I began the lesson by explaining the function of the part of speech in English; even though it was the first language of most of the students only a few had prior knowledge of grammar terms. By having them analyse their own language first, the students got used to this kind of analysis on more familiar territory before they learned how to recognise the parts of speech in texts in the various foreign languages. This is especially important for a few reasons: usually nouns and verbs are the most important words in a sentence and so require the

musical emphasis; singers need to know the important words in order to emphasise the right notes when they sing. Recognising parts of speech is also important if a word-for-word translation is not available and a dictionary needs to be used. Knowing how the languages are structured, and being able to recognise simple function words, will help them know how to use a dictionary effectively. Finally, we began to place the theoretical framework of words into sentences, and explored together how composers have set sentences to music. Using sentence diagrams we analysed linguistic structure, and I hope next year to develop a way to map musical analysis onto these syntactical models so the links between words and music become even more apparent.

Act Two

In the second part of the linguistics module we began to look at incorporating the knowledge of languages into performance practice. Unfortunately time was running very short, as more time was needed to reinforce the basics of language structure discussed above than I anticipated. Because most students come with no linguistic knowledge it all had to be taught from scratch, leaving little time for the more interesting examination of how this theoretical knowledge can be applied to the music they sing. We did have some time to begin looking at recitative, a style of declamatory text setting in opera usually used to carry the plot forward (i.e. not arias, duets, or other more pointedly 'musical' structures where the characters reflect upon what has happened). Recitative is among the most difficult styles of music to sing in a foreign language, as it is here that the meaning of the text must come through most clearly in the singing; musically recitative is very simple (and in the operas of Mozart or Rossini is accompanied only by a keyboard instrument), so singers cannot rely upon the orchestra to help them communicate. Recitative is very close to speech, so any faults with language become obvious. I chose passages of recitative to work on from the standard operatic literature; this year the students had not yet begun learning the music they were to perform in the opera scenes, but in the future they will have their music sooner and I will be able to draw from it for this part of the teaching process. This applied part of the process was primarily student-led: I wanted them to work on interpretation of the recitative on their own, using the tools provided to them in the first part of the class. Unfortunately the students were shyer than I expected about taking ownership of their music. This is a general feature of our performance students, who are brought up to wait for the teacher to tell them how to sing or play their music, or to follow the notation religiously. Opera requires interpretation to be effective, as does any other music, but because it has a text the lack of interpretation is more apparent in opera. Our system of musical notation is not accurate enough to show *everything*, even though this is what students seem to expect. In future iterations of the class, I will need to spend more time empowering the students to interpret their music on their own.

Act Three

Primed by the linguistics and acting modules, we were ready to start rehearsals for the opera scenes as soon as the students returned from the inter-semester break. There was a great deal to think about in very little time (and the students did not look at the music over the break to nearly the extent they should have!): only two months until the performances in mid September. I had not directed opera on such a large scale before, so I was learning as much throughout the process as the students. We became a community of learners rather than a top-down teacher-as-dictator group. As I develop my skills as a director I will need to focus on retaining this community ethos, which resulted in a much more interactive and involving process for the singers. It was also more difficult for them, however, as my approach to directing did not involve telling them exactly what to do. Instead, as with the interpretation of the texts that we discussed earlier, the singers and I devised the staging of the scenes and the character motivations in the rehearsal room itself. I provided the frame (in this case I set each scene in as if it were from a 1940s Hollywood movie), and guided the students to fill it in themselves. Because our scenes were in French and Italian as well as in English, the language work that had been done previously was quite helpful. The singers and I now shared a linguistic vocabulary that helped us discuss the issues at hand precisely and concisely. Had the rehearsal period been longer or more intensive, we could have explored even more of the applications of the language module to the specific opera scenes, but the first priority needed to be learning the music. My colleagues and I plan to build more time into the students' schedules for next year's project and to provide them with a clearer timeline. Unfortunately rehearsal time is always at a premium because most students hold part-time jobs in addition to studying. They need to know as far in advance as possible what is required of them so that they can plan accordingly.

Finale

The experience of preparing the opera scenes production and the linguistics for singers module that led up to it was of great value to me as a teacher and, I hope, to the students as well. They have gained a set of tools that will help them as they continue their careers after they leave university, and they now have some valuable stage experience to draw from. Most of the students were surprised at how much work was involved to take an opera from notes on a page to a performance that an audience will enjoy, but the enthusiastic response gave us all the confidence that our hard work was worth it.

Applied academic teaching and learning: How and why you should introduce real world teaching

Alison Cleland (Law) and Jennifer Lees-Marshment (Politics and International Relations)

Introduction

A degree by itself is not enough to get a student a job, and it certainly isn't enough to ensure they get the best job that enables them to practise what they have learnt at university both effectively and ethically. If we want our students to contribute to the world, we must prepare them for the realities of working in that world. This paper discusses: pedagogical and employability benefits of applied teaching; our applied learning methodologies; and how colleagues might use these in their teaching.

Why we should engage in applied academic teaching and learning: pedagogical, external and individual perspectives

The 'holy grail' of tertiary education might be said to be deep learning. We want our students to construct meaning and to carry that understanding with them into their futures. Teaching in the context of the real world requires students to experience and apply real-world solutions to real world problems. That applied learning is likely to engage students deeply with the subject matter: "by creating opportunities for learners…in the context of real world challenges, knowledge is acquired and learning is transferred from the classroom to the realm of practice." (Stein, 1998).

There is a growing demand for applied politics teaching from government, employers, students and the media in order to promote graduate employability. Lightfoot (2015) notes that The European Higher Education Area has long identified employability as a priority and surveys of employers from Europe and the US note they look for competences rather than knowledge. In the US, a recent poll of the public suggested the value of a degree is declining: "instead, understanding computer technology, working well with different types of people, keeping your skills current, and having good family connections trump the importance of college." (Cook, 2015) Similarly New Zealand media noted how "employers are ignoring candidates with the best university grades in favour of those who clearly demonstrate skills." (Jones, 2013) Students come to university wanting to learn how to succeed in, contribute to, and change the world. Traditional degrees teach them what the problems in the world are, but don't show them how they can work in that world and solve those problems. They want – and *need* – preparation for their future job.

The conventional view of politics and law students is they will become politicians and lawyers. But "the most frustrating question a student in the UK can be asked when they tell people they are studying political science at any level of study is 'what are you going to do with that degree then? Become a Member of Parliament (MP)?'" (Lightfoot, 2015). We are not just educating future MPs or lawyers; there is a wide range of politically and legally related jobs out there. We owe it to our graduates – and ourselves – to educate them about what is available: see Figure 1.

Figure 1: The wide range of politics jobs available

- Jobs include analyst (e.g. policy, local board, research or intelligence analyst), advisor, coordinator, administrator, officer, facilitator, organiser, campaigner, manager, researcher, team leader, director, strategist, assistant and head of brand.
- Job adverts talk of advocacy, communication, community relations and outreach, marketing, media, government relations, public affairs, support, events management, planning, development, management and engagement.
- Jobs are in organisations including government ministries, parliaments, state and provincial government, local councils, charities, NGOs, political parties and MPs offices.

However, students won't know this unless we tell them. We need to make them aware of the possibilities and help them get those jobs so that our students go and run government instead of corporations. This will increase the chance that they take the knowledge and understanding we traditionally teach them into political and legal practice. In law, legal jobs require a range of capabilities including people skills and appreciation of clients' interests; we need to help students understand that law is a powerful tool for fairness and equality – not just for making money – so they use their skills in community law centres, with NGOs and in policy work, not just in corporate law.

What we are doing about it: examples of applied academic teaching in law and politics

Alison Cleland introduced role play and reflection into an undergraduate Family Law course, producing a DVD containing three mock client interviews. The clients presented as traumatised, angry and confused. Students were asked to critique the interview techniques observed. Students then discussed approaches to interviewing with experienced family law practitioners. The assessment required students to roleplay a family law client interview, then to write a reflection on the experience. Students identified skills required that would benefit clients and identify solutions for them.

Jennifer Lees-Marshment created an undergraduate course The Practice of Politics and created a website for prospective teachers. The

Auckland UG course aims to develop the skills and knowledge needed for students to practice politics effectively; considering the range of jobs available in politics and government, the highs and lows of working in politics, the path to obtaining a position in politics and government and the skills to practice politics both effectively and ethically. It covers:

- *Working in politics:* goals and motivations; political jobs and practitioners; and challenges and benefits of working in politics.
- *Careers in politics:* personal brand and capabilities development plan; applying for jobs in politics; interviewing for jobs in politics.
- *Effective political practice:* practical skill training such as workplace writing and media skills.
- *Ethical political practice:* ethical awareness, supporting diversity, and the art of the possible/achieving change.

Teaching The Practice of Politics website is for academics wanting to teach this course: see Figure 2.

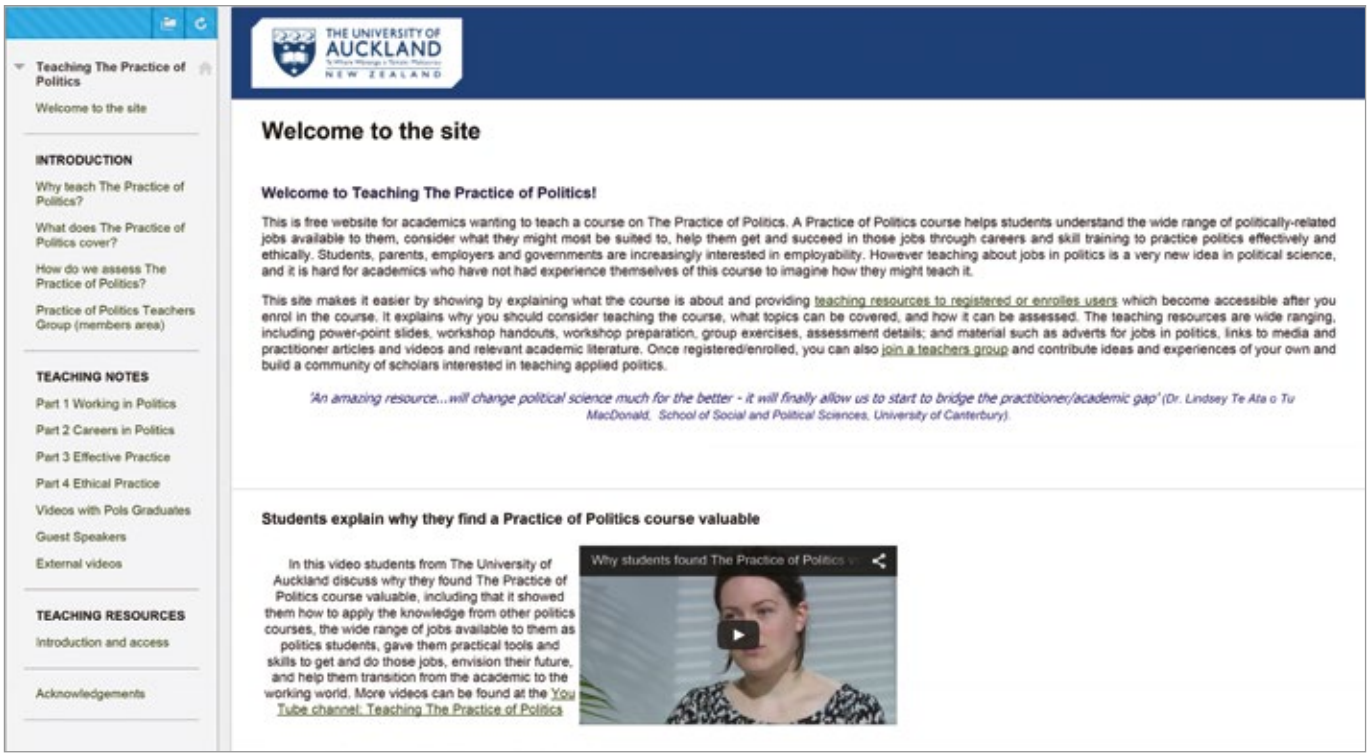

Figure 2: Screen shot of Teaching The Practice of Politics website.

The website explains why you should consider teaching the course, what topics can be covered, and how it can be assessed. It also offers a wide range of teaching resources, power-point slides, workshop handouts, workshop preparation, group exercises, assessment details; and material such as adverts for jobs in politics, links to media and practitioner articles and videos and relevant academic literature.

Why it works: the value that comes from applied academic teaching

There are obvious practical benefits from this kind of teaching: it makes students aware of the options for jobs in their subjects and shows them what working in these areas is like. But there are also academic benefits: real world teaching helps students see the value of their traditional law/political science degree and how to practice law and politics more effectively. Student feedback and reflection in Family Law clearly demonstrate this:

- "I feel that the process of building rapport with a client raises a difficult issue because the lawyer is almost always dealing with an emotional subject matter and client."
- "It must feel like walking at egg shells at times, providing a sense of hope but ensuring they don't get too hung up on far-fetched, unrealistic positive outcomes."
- "[family lawyers] must remember that every client is a unique person that will have different stories and perspectives. Therefore the lawyer's approach needs to be flexible."

Similar comments have come from students who have done the Practice of Politics course:

- "Should be a core paper for ALL politics majors."
- "Opened my eyes to the variety of different jobs available in politics."
- "Videos of ex-students talking about their jobs were inspiring."
- "Valuable to my understanding of how my education would be useful in the workforce."

	Beginning of course (%)	End of course (%)
I have an understanding of how my politics degree could be used when working in politics	2015 – 27 2014 - 20	2015 – 96 2014 - 90
I have a strong awareness of the range of jobs in politics	2015 – 33 2014 – 10	2015 – 89 2014 – 90

Figure 3 shows the results of a survey asking students to self-report skills at the beginning and end of The Practice of Politics course. It shows that students' knowledge of how their degree is valuable to their employment increases from low before taking the course, and jumps to high by the end of the course.

Furthermore, in interviews for the teachers' website, students talked about how the courses showed them the value of their politics degree. They noted how a lot of politics students want to help people and make a difference in the world and what this course does is shows them how to do it; it shows them how to use everything they've learnt in other courses and makes their whole degree more real (Lees-Marshment, 2015).

Applied teaching is not a threat to traditional teaching: it supports it. It shows students why their other courses are valuable and creates a bridge between traditional teaching and their future practice.

How you can do it: the range of ways to integrate applied teaching in your courses

There is a range of ways colleagues can introduce applied academic teaching into courses to promote applied learning. Teaching methodologies could include case studies, simulations, role play and shadowing/observation of practice. Applied assessment instruments might require a policy brief, recommendation to minister, report, memorandum for judge or written advice to a client. Class content could include a session on skills training such as media training, workplace writing, oral and written communication skills, interviewing, negotiation, leadership and team work. Remember, you can start small: it can just be one aspect of your course. And you can also pursue more extensive multi-disciplinary versions of what we are doing. You can support/lead development of client based courses in social work, teaching, medicine, and discipline or faculty practice courses e.g. The Practice of Sociology, The Practice of Management, The Practice of Law or The Practice of Arts.

Conclusion

If you are wondering whether you should get involved in applied academic teaching, ask yourself this: what skills do your students need in the workforce? And then ask yourself: how much do you do at the moment to ensure they have these skills when they graduate?

If the answer is not much, you are not alone! We are not normally expected, encouraged, trained, or rewarded for thinking about this. When university education was limited to a small elite, and society was more uniform, a degree itself was enough to mark students out as possessing superior knowledge. But we now teach a much larger number of students, and given the world itself is increasingly complex and diverse, employers naturally are looking for more than just the transfer of knowledge.

If you're still not convinced, think about why you are an academic. Think about the values, ideas and ethics involved in what you do. Real world teaching is all about taking the research you do, and applying it; passing it on to students in a way that they can take it to the real world and practice what you preach. This is about preparing students to get a job, but also do a *good job*. As a pedagogical bonus, engaging your students in applied learning will encourage deep and life-long learning that will make them valuable and adaptable employees.

For politics students, making sure they can work effectively in government can help our democracy work more successfully. And for law students, making sure they can put their legal skills to use for the benefit of broader community, not limited to a corporate client base, is crucial for social justice. So for your students, think about what kind of practitioner you would like them to be, and what you'd like them to change in that world outside the ivory tower and start engaging in applied academic teaching!

And if you need any help or advice, please don't hesitate to get in touch (see Figure 4)

Figure 4 Contacts for further information or advice on applied academic teaching

- Jennifer Lees-Marshment, Associate Professor in Politics, j.lees-marshment@auckland.ac.nz, www.lees-marshment.org
- The Practice of Politics https://www.coursebuilder.cad.auckland.ac.nz/flexiblelearning/practice-of-politics/
- Teaching The Practice of Politics YouTube channel https://www.youtube.com/channel/UCVBW-CJywWf-zbJDI8R2pfw
- Teaching The Practice of Politics web-site https://www.coursesites.com/s/_TeachingPracticeofPolitics
- Alison Cleland, Senior Lecturer in Law, alison.cleland@auckland.ac.nz, https://unidirectory.auckland.ac.nz/profile/alison-cleland
- Family Law http://www.law.auckland.ac.nz/en/for/current-students/current-undergraduate-students/cs-course-planning/cs-course-descriptions/elective/LAWGENRL433.html

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Mission Possible: Engaging students in large classes

Bodo Lang (Marketing, Business School)

What is this teaching case about?

Engagement is one of those words that has risen to the top of the priority list nearly everywhere. Employers talk about employee engagement, marketers talk about customer engagement, and educators, not surprisingly, talk about student engagement. So in this teaching case I will talk about some of my experiences with student engagement. In particular, this case is about structural changes in a course and what their impact was on student engagement. And how playing ball can help.

What is student engagement?

Much has been written about student engagement. As a result there are different schools of thought and competing definitions of student engagement. Most commonly, definitions include references to educationally effective activities which lead to a variety of measurable outcomes.

Why is student engagement important?

Student engagement has become a hot topic for a variety of reasons. The first and perhaps most important reason is that one of its key outcomes can be high quality learning by students. Typically this manifests itself in higher student achievement. Furthermore, classes in which students are highly engaged can be more enjoyable for both the students and their teachers. A third benefit of high student engagement is that it strengthens the ties amongst students and the ties between students and the teaching team. Lastly, when teachers start to think about student engagement, their teaching tends to benefit from being centred around the most important component of the learning process: the student.

The course and the students

I teach an elective year three paper that is part of the Bachelor of Commerce at the University of Auckland. The paper is called 'Advertising and Promotion' and is mainly taken by students who major in marketing. The paper is offered in both semesters and is one of the larger stage three courses in the marketing major with around 200 students being enrolled each semester. The course is taken by a diverse mix of students consisting of international students who are likely to speak English as a second language and domestic students who are fluent in English and familiar with New Zealand advertising and marketing activity. Students also vary markedly in terms of their communication skills.

Five years ago, the teaching team adopted a 'flipped classroom' model. In this model, students are regularly assessed, typically on a weekly basis, to allow them to familiarise themselves with the learning resources on a continuous basis. All tests together are worth around 30% of the final mark for the course. The weekly assessments also give students the opportunity to re-engage with parts of the learning material that they have not mastered. Two days after each weekly test students participate in a highly interactive two-hour class. This class consists of some content discussions, case studies, examples of advertising activity, guest speakers and individual and group exercises.

So what's the problem?

After some trial and error in the early days of us adopting the flipped model, student attendance and student engagement in this course had been high. Similarly, student achievement and student satisfaction as measured by course evaluations and lecturer evaluations had also been high for a number of years.

However, when talking to students on a one-to-one basis they would often express their dislike for the weekly tests being *before* the interactive two-hour class. It was a learning model that many weren't yet familiar with. Furthermore, I had also been wondering what would happen to student engagement if the timing of the weekly tests was moved so that they would take place *after* the two-hour classes, thus matching students more traditional expectations of test timing. So in many ways, there was no 'problem' in the course. Instead, there was an opportunity to explore how test timing may impact on student engagement.

What changes did you make?

To explore these issues I varied the timing of the weekly tests so that half of the weekly tests were *before* the two-hour class (i.e. our normal 'flipped' test practice) and the other half of the tests were *after* the two-hour weekly classes. I measured students' engagement levels with an established scale. I also observed how attendance rates and participation levels would very between the two test conditions (test *before* class versus test *after* class).

What happened?

Clearly, there is a greater incentive for students to read the learning material when the test is before class because this gives them the only opportunity to familiarise themselves with the material. Therefore, I was quite certain that students would be more inclined to read the material in the 'before test' condition compared to the 'after test' condition. However, this is not what happened. Instead, students were just as likely to read the material in the 'before test' condition as they were to read it in the 'after test' condition. This came as a bit of a shock to me as I had applied the time honoured adage that 'incentives shape behaviour' from economics. I enjoyed this falsification as my rational beliefs had been challenged.

However, students' attendance rates and their in-class participation were more in line with my expectations. Attendance was high in the 'before test' condition, probably around 70 to 80%, yet it was slightly higher in the 'after test' condition. This made sense because attending class in the 'after test' condition is likely to increase students' test performance. Conversely, attending class in the 'before test' condition is inconsequential to students' performance in the weekly tests because the class takes place after each test.

More surprises were in store for me, however. Students' participation in class differed between the 'before test and 'after test' conditions. To my dismay, students appeared *less* likely to respond to questions and to participate in class discussions in the 'after test' condition. This undoubtedly made these classes more cumbersome for me – and possibly for my students as well – because it put more pressure on me as 'the fountain of knowledge' and reduced student engagement.

So why did this happen? There are a number of potential reasons for this behaviour. Firstly, strategically-minded students may be less willing to engage and share their insights with other students because this would lift other students' performance in the weekly test, but not their own. In contrast, such students would not have had such considerations in the 'before test' condition because their engagement in class has no impact if the test is before class. So a classic rational argument again. Another, perhaps more empathetic reason may be that students were less engaged in the 'after test' condition because they were simply more anxious about the test that was going to take place after class. In other words, they were more concerned about the upcoming test, rather than having a highly engaging class. Whatever the reason, I had to do something about the lower-than-expected engagement in these classes.

Stuff this. Let's play ball!

Thus, one of the unintended consequences of my study was that I had to work even harder to generate classroom interactivity. As a result, I tried a new method, new to me anyway, of selecting students to answer a spontaneous question in a large class. The technique is very easy to implement, requires little precious in-class time, is fun to do for both teachers and students, it has a game character and, most importantly, it is effective. Anyone can use this simple technique. You don't have to be using a 'flipped model', team-based learning, or anything else. The technique simply helps you to instil a bit of fun into your classes and get some interactivity going, without being too draconian about it.

Imagine this: you are in the middle of your class. You have a great question prepared that you think many of your students should be able to answer. You ask your question. You blink your eyes. You repeat the question. You encourage your students with smiles. You encourage them with compliments about their cleverness, their looks, their brilliant engagement in previous classes. Nothing happens. Time drags on. Nobody says a word – apart from you because you are desperate to 'fill the gap' left by the lack of response. So you have somehow created the total opposite of student engagement. We've all been there.

Here is one solution that has worked well for me with my students: rather than selecting a student ("You there! In the last row. With the ring through your nose. You! Yes, you!"), which may be construed to be picking on students, you can simply use a 'third party' method of selecting students to answer a question. That means neither you, nor another student selects someone to answer a question but a 'third party' does. All you need is a large, soft ball. All you do is, tell your students that whoever is touched by the ball has to answer the next question. Then you ask your students a question and throw the ball into the masses. By doing this, you are making the selection of students fairly random and you manifest this sense in the ball ('the third person'). Another advantage of this method is that it becomes very obvious who is to answer the next question. You may call this technique the "Death Star", the "Ball of Doom", or "Dodgeball". Whatever you do, make it fun and your students will respond favourably and engage with you. Once you have warmed them up with this technique, they are more ready to participate in other individual and group exercises.

There are a few ways in which you can vary this technique. You can turn your back to the students when you throw the ball so that students truly get a sense of randomness. You can also ask students to catch the ball and the first person to not properly catch it, has to answer the next question. Relenting control is a scary thing but it can work wonders. In other words, why not let students throw the ball too?

I have found that this technique worked very well with my students. I am a big believer in 'enjoyment arousal' and the educational literature backs me up on this. If students enjoy what they are doing, they are more open to learning. So next time you are finding yourself in a timeless void left by one of your questions. Consider playing ball with your students. Great things may happen.

Tahi: Encouraging expertise in the way students engage with learning

Keri Moyle (Engineering Science, Faculty of Engineering)

What's the problem?

Education in a course-based system inherently requires students to learn material in a defined, linear, sequence of discrete parts which frequently do not refer to one another; it is unsurprising that the structure of student knowledge becomes similarly discretised and linear (Hay et al, 2015). So while students know *what* we've taught, they also know *how* we've taught it. If we teach in modules, they will know in modules, if we teach in courses they will know in courses, if we examine frequently they will study (and forget) frequently. There are justifiable reasons for course-based teaching and assessment, and I am not challenging them here, rather proposing that if the *how* of our teaching strategies and delivery so affects student knowledge, then perhaps we must seek a way to change our *how* such that it leads to more beneficial traits and learning behaviours.

Tahi is a software program designed so that the way in which digital content is accessed by students promotes expertise, as defined below.

Expert vs novice: what's the difference?

There have been many terms in educational literature used to distinguish the what of knowledge from the *how* of knowledge: Ausubel's (and later Novak's) meaningful or rote learning (Ausubel, 2000; Novak 2010), Marton and Säljö's deep or surface learning (1976), Jacobson's clockwork or complex systems mental models (2001), the well-thumbed Biggs and Collis' (1982) and Bloom's (Anderson et al., 2001) taxonomies of learning outcomes, as well as the idea of the differences between novice and expert cognitive structures (Hay et al., 2007, 2008, 2015).

In this discussion I use the terms 'expert' and 'novice' to refer to the ends of a spectrum of cognitive structure (thought patterns) rather than experience or time in a field. Here, a novice is a person who – irrespective of their education or experience – has novice-like thought patterns, and likewise an expert has expert-like patterns, to be explained in a moment. Ericsson (2006) tells us that "continued improvements (changes) in achievement are not automatic consequences of more experience", thus it is entirely possible to be a highly educated novice just as it is possible to be a beginner expert; it is ironic that while education desires the latter it usually results in the former.

The schematic in Figure 1 (a) illustrates the two continua of cognitive structure and learning exposure or experience, and shows the familiar student pathway (lower arrow) toward the practised novice and the desired student pathway (upper arrow) towards expertise of any level.

The novice tends to have a linear (or sometimes disconnected) structure of knowledge: for example, knowing how to go from idea A to B to C to D, rather than A straight to D, or any others in any other order. It is a directional, linear structure as shown in Figure 1 (b). In contrast, the expert tends to have more complicated relationships between ideas and is able, for example, to go from B to D via A or even via F, as shown in Figure 1 (c). Note that the expert does not necessarily have a greater *number* of ideas than the novice (that is, she does not necessarily *know more*), but the *structure* of what she does know is very much more complex and inter-related than that of the novice (Hay, 2007).

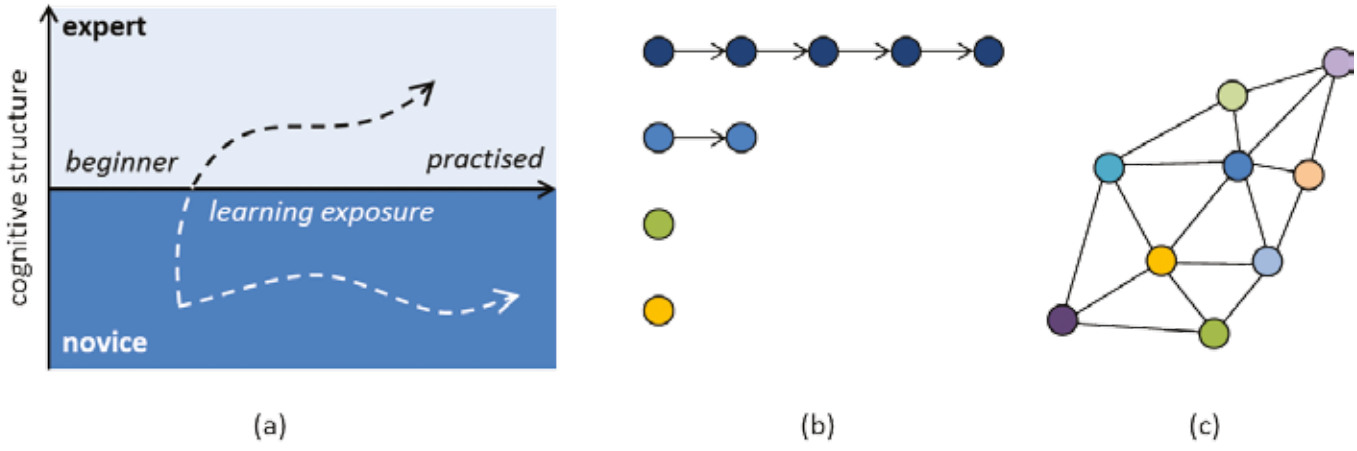

Figure 1: (a) Schematic showing two continua of cognitive structure (from novice to expert) and learning exposure (from beginning to practised), where the upper arrow represents a desirable student learning trajectory and the lower represents the customary student pathway, (b) a representation of a novice knowledge structure where ideas are connected in a linear, sequential manner, and often disconnected from other ideas, (c) a representation of an expert knowledge structure where ideas have many complicated connections and do not rely on a directed sequence.

These differences in knowledge structure create behavioural differences, with novices tending to use mechanistic approaches to problems rather than the adaptable or flexible approaches of the expert. Novices tend to fixate on the superficial rather than the abstract or structural

aspects of problems, and experts vice versa (Novick, 1982). It is easy to see how education in a course-based system reinforces the linear and disconnected nature of novice knowledge structures, and it is this situation which Tahi aims to address.

What is Tahi?

Tahi is an online program to assist student learning by encouraging and practising characteristics of expertise simultaneous with the delivery of existing course material. Taken from Māori and meaning (amongst other things), "together, simultaneously, as one, in unison" as well as "first", the name "Tahi" is intended to convey the idea that both the learning *matter* (that is, the substance of subject material and disciplinary knowledge) and the learning *manner* (that is, the connections and organisation of the learned matter) must be addressed together from the beginning if expertise is to be fostered.

Constructivism suggests that the actions of the student are more influential than those of the teacher on the final structure of student learning (the how of learning), an idea echoed by the work of Hay, mentioned earlier (2015). Thus, the question, "What do I want student to *have*?" is better framed as "What do I want students to *do*?", though both questions have been used to give the rationale of the program's operational design.

What do we want students to have?

Novak (2009, p23) provides a good starting place from which to answer this question, defining the requirements for meaningful learning as:

1. Relevant prior knowledge: that is, the learner must know some information that relates to the new information to be learned in some non-trivial way.
2. Meaningful material: that is, the knowledge to be learned must be relevant to other knowledge and must contain significant concepts and propositions.
3. The learner must choose to learn meaningfully: that is, the learner must consciously and deliberately choose to relate new knowledge to relevant knowledge the learner already knows in some non-trivial way.

Addressing point 2 first, we can be confident in stating that common to every educational situation is the existence of a disciplinary domain in which it sits. Engineers have ideas about engineering, chemists have ideas about chemistry, and painters have ideas about painting. Two aspects of expert performance are the ability to transfer knowledge from one situation to another and to relate ideas to one another; in order to do either of these some (albeit small) amount of knowledge is required in the beginning. It is entirely fitting that one of the answers to "what do I want students to have" is meaningful or domain-based knowledge, but the course structure in which that knowledge is delivered often implies the scope of that domain as "this course" rather than "this profession". It is important that students recognise the domain in which to situate their knowledge, and it is just as important that that domain is a meaningful rather than an arbitrary one. As anyone who's ever had to re-enter a room to recall why they left it in the first place will know, "walking through doorways causes forgetting" (Radvansky, 2011), so we as teachers need to be sure – where we must impose walls and doorways on our students' learning processes – that these are in sensible places.

What do we want students to *do*?

The expert behaviour referred to in point 2 above is the practice of *abstraction*; that is, the student must first *recognise* that the material to be learned is indeed relevant and of significance, and to understand what that significance is. As a simple example, consider the following question:

In her apple orchard, Jenny has five rows of four trees, each with eighty apples. If she picks one hundred apples every day, how long will it be before she is halfway through picking?

When asked what this question is *about*, the novice might answer "apples" or maybe "apple picking" and look for their own prior knowledge resources and work out solutions accordingly; they have identified the *superficial* rather than the *structural* aspect of the question. In contrast the expert is not distracted by the setting, and would look for solutions related to multiplication (Novick, 1982). A critical part of expertise is the *recognition* of the structural and transferrable aspects of the problem, the identification of the 'real' question; in short, *abstraction*.

A second characteristic of expert behaviour is the practice of accessing and using prior knowledge, as mentioned in point 1 above. In our maths example, as soon as the expert has identified that it's about multiplication, he can then use *any* previous experience of multiplication from *any* previous setting to solve the problem. This expert behaviour relies on the domain of knowledge: if, as previously discussed, the domain boundaries are recognised by the student as being "this course" rather than "mathematics", then both the quantity and quality of the prior knowledge they are able to access is greatly limited. Hay et al. (2008) found "that students' prior knowledge is a key determinant of meaningful learning", so fostering both the recognition of prior knowledge in the true domain (as opposed to the arbitrary course-based domain) as well as their ability to access that knowledge is crucial.

Finally, and related to point 3, is the idea that the experts recognise the value of *current* learning to *future* situations, and address it accordingly. This is, in essence, a reversal of the second point: if a student is convinced that the *prior* learning above is both accessible and useful in the *current* situation, then it becomes much more likely that he will be able to see his *current* learning as of importance to *future* situations as well.

How can Tahi help?

The student experience with Tahi has been designed such that the three key expert behaviours (abstraction, accessing of prior knowledge, and learning for the future) are implicitly encouraged and rehearsed during the interaction with course material and assessments, both existing and new. The student's capability in each is reinforced using a cyclical structure as shown in Figure 2.

add | Course material (both assessments and resources) are added to the system, either through manual upload or through automatic links to an online content management system (the latter is still in development).

tag | Students are alerted to upcoming assessments and taken through the process of identifying the underlying concepts in their questions. In a process known as 'tagging', the student drags a box around an area of the page representing the question they are addressing and selects the most relevant concepts from a controlled list. Currently this controlled list covers material in all undergraduate courses in the Faculty of Engineering and the Faculty of Science, and its concepts number approximately 5000. This step encourages the process of *abstraction* – the first characteristic of expert behaviour – requiring the identification of what the question is *really* asking about before proceeding. The tagging interface page is shown in Figure 3.

find | Resources are supplied based on the student's *own* identification of concepts within the question. This step draws information from any and all previous courses – inherently extending the domain boundaries beyond the walls of "this course" towards a wider and truer representation of the discipline or programme – and includes both course resources supplied by the teacher as well as the student's own notes and previous assessment submissions, all of these in any course. This is shown in the right hand side of the screenshot in Figure 4. The tags in the previous step may be amended if/when the student realises that the resources returned are not appropriate or helpful, allowing instant and relevant feedback on the abstraction and identification in the previous step. This step extends the availability of prior knowledge into all previous courses, encouraging a greater richness and broader domain of relevance for the ideas learned.

use | We make no alteration to the way in which students complete their assessments; they will be finished and submitted for grading in the usual way.

save | The third key item answering the question "what do I want students to do?" is to learn deliberately in such a way that their current situation can inform their future ones. Submitted assessments are automatically saved against the concepts identified in them (indicated by the dashed arrow in Figure 2), allowing them to be discovered as a resource in the 'find' step above. In studying knowledge transfer, Novick (1982) found that people were more likely to retrieve information from a *previously solved problem* rather than from *previously learned information*, highlighting two things: firstly, the importance of some kind of application during the learning of abstract concepts, and secondly the need to encourage students to 'know what they know' by reminding them of previous learning activities. The previous submissions are shown in the upper right hand side of the 'find' page in Figure 4, where students can see both the questions and their own graded answers for each submission.

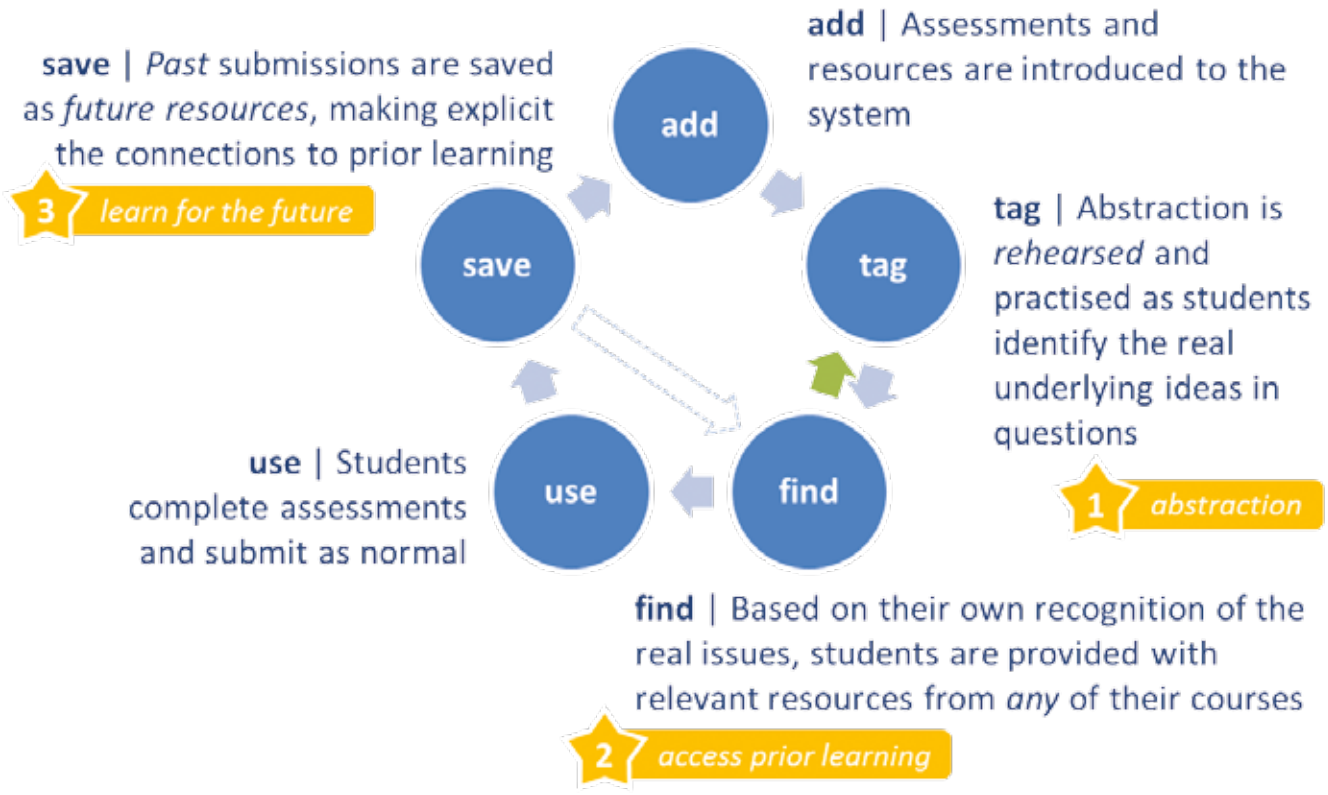

Figure 2: Schematic showing the cyclical stages of Tahi and the students' interaction with it, with the three key aspects of expert learning highlighted where they occur.

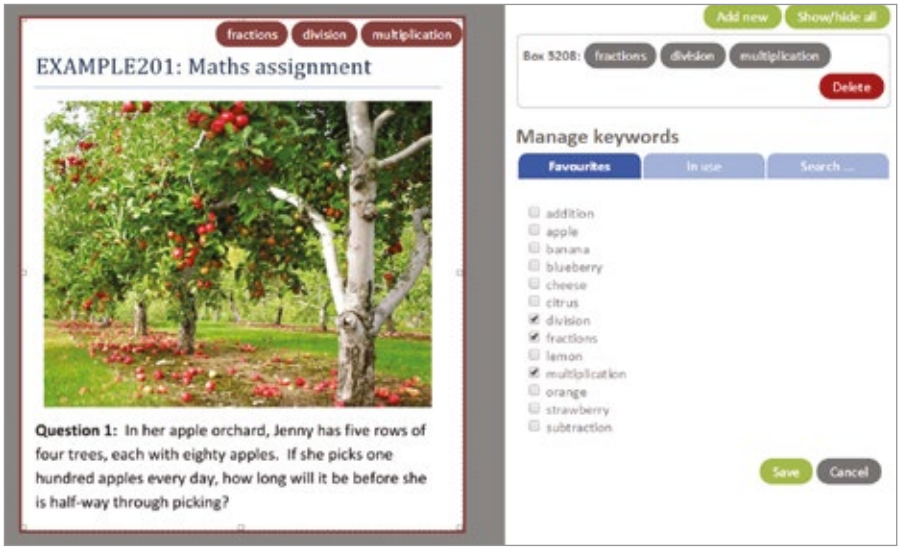

Figure 3: Screenshot of the 'tag' page in Tahi. The student has selected 'fractions', 'division' and 'multiplication' as being the *what* that the question is really about.

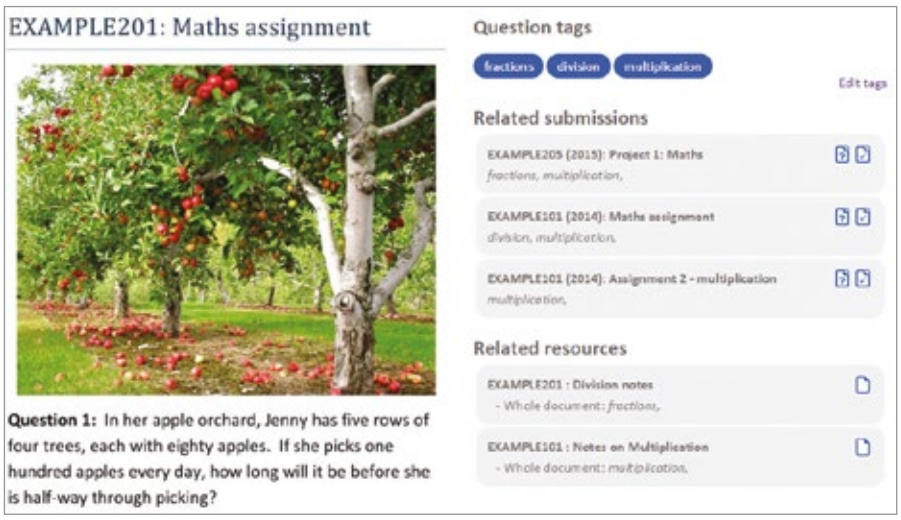

Figure 4: Screenshot of the 'find' page in Tahi. The student's abstraction in Figure 3 is carried into this pane, providing them with links to any of their own previous work which is relevant to the current question (both the question and their answers), as well as any resources supplied by the teacher or saved by the student. All information is sourced from any course which the student has taken.

Where to from here?

Tahi will be tested early in 2016 with a small focus group of students. Its cross-course nature means that it must be tested on a *single student* across *multiple courses* rather than within a *single course* across *multiple students*, making recruitment and assessment more challenging than usual. Following this testing (and any adjustments) it will be piloted in a larger cohort, with results of these investigations to be reported in the usual channels. Anyone interested in being a part of these tests or discussing the ideas here is more than welcome to contact me.

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The SEALLS Project: A Case of Blending in Technology to Enhance Student Engagement and Achievement in Large Lecture Settings

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The context and its challenges

Teaching hundreds of students in a large lecture setting presents some obvious challenges: capturing and holding students' attention, creating opportunities for genuine engagement and interaction with – and among – students, providing timely and effective feedback on learning, and much more. The challenges are greater still when the course has students from three campuses and requires several audio and video-feeds to tune in those students. Imagine further that this course is a compulsory one for Stage One students, most new to the University and as yet uninitiated in its ways of seeing and doing.

It is against this backdrop that I assumed the duties of director, coordinator, and primary lecturer of EDUC 119 *Development, Learning and Teaching* in 2012. At that time, the course had a history of approximately 15% of its roughly 400 students not completing or failing it. Such a rate might not seem alarmingly high, particularly in some disciplines, but for a mandatory foundations course in education – in which one only needs to earn a 50% to pass – it is somewhat disconcerting. The concern heightens when one considers that an additional 30% of students barely passed the course (earning only C's), and that these students are preparing to be teachers.

The goal and the means to achieve it

With this context and its challenges in mind, I set out to make changes to EDUC 119. The overarching goal of the changes was fairly clear: to increase student achievement. More precisely, I wanted to increase student learning and to see this reflected in a shift in the distribution of grades with fewer students failing or 'underachieving' (the C's) and more students earning A's and B's. The means of achieving this goal were less certain or definitive. From an educational psychological perspective, one of the obvious ways to increase learning and achievement is to engage them in their learning.

Conceptually, student engagement has been defined in three distinct ways:

- Behavioural (e.g., attending – or failing to attend – lectures and tutorials; participating in all course-related activities; taking notes and asking questions; studying and completing all assignments on time).
- Cognitive (e.g., psychologically investing in one's learning; being strategic and reflecting on one's learning processes; going beyond the required and seeking to master the content or skills to be learned.
- Emotional (e.g., being interested in learning and seeing it as valuable; feeling joy and/or excitement about what one is learning).

So my goal was to make changes that would increase achievement by increasing learning through greater engagement.

Two things became immediately evident. First, digital technologies offered answers to a wide range of the *how-to* questions inherent in the challenges presented in this context. EDUC 119 needed to be redesigned from a traditional large lecture structure to a 'blended learning' approach. To increase students' behavioural, cognitive, and emotional engagement with the course — its concepts and theories, requirements and assessments, lecturers and tutors, and other students — we needed to adopt and integrate digital technologies like robust learning management and classroom response systems.

The second immediate reality was that restructuring the course was a substantial undertaking and I couldn't achieve it quickly or alone. As fate would have it, Dr Steve Leichtweis, the Manager for the Centre for the Creative Application of Technology in Education (CreATE), reached out to me shortly after my first year of making changes to the course. Steve, along with two members of his staff, Nicoletta Rata and Damon Ellis, were eager to help me with transforming EDUC 119. Steve also asked Dr Kirsten Locke, who was coordinating EDUC 118 (the other large lecture course required of Stage One B.Ed teacher education students) to join the budding team along with Dr Catherine Rawlinson and Michael Willimott from the first year experience team. Each of these individuals has played an important role in the work of the SEALLS Project. Finally, the successes of the project would not have been possible without the excellent team of graduate teaching assistants, professional teaching fellows, and lecturers on EDUC 119. All were instrumental in both the redesign and delivery of course.

Blending in technology: The redesign of EDUC 119

As alluded to above, the redesign of EDUC 119 centred on transforming the course from a traditional large lecture course to a 'blended learning' experience. According to Garrison and Vaughan, "Blended learning is the thoughtful fusion of face-to-face and online learning experiences…[that] represents a restructuring of class contact hours with the goal to enhance engagement and to extend access to Internet-based learning opportunities" (p. 5). Specifically, in our redesign we fused the existing four hours of face-to-face learning experiences per week (two hours in a large lecture setting and two in small tutorial groups with 30 or fewer students per week) with a series of on-going online learning experiences throughout the semester. These experiences included participation in:

- Five short (approx. 15 minutes each) online activities related to the theories and research being discussed in the course readings or lectures.
- PeerWise, a web-based program that allows students to create questions and explain their answers as well as answer other students questions and rate them.
- Two online quizzes (20 items each with a mix of true-false, multiple choice and fill-in-the-blank questions).
- One essay assignment with peer review (note: tutors and students were encouraged to use Turnitin's PeerMark, Originality Report and GradeMark to facilitate review and marking process; they were not required to do so, and very few did so).

In addition to these required (graded) activities, students could engage in a number of other (optional but strongly encouraged) online activities. These options included downloading course resources (e.g., the course booklet, assignment guides, and lecture notes) and posting questions or observations in the student discussion forum or the 'online office' – a forum that I hosted to address any and all course-related queries and comments, conceptual or procedural. Finally, students were encouraged to bring a WiFi-enabled device to lecture so they could interact with me and each other through GoSoapBox (a Web-based classroom response system that allows students to answer polls I've created, post questions of their own, and use an anonymous 'confusion barometer' to indicate uncertainty).

From a pragmatic standpoint, perhaps the most important decision we made (and made very early) in pursuit of this goal was to adopt a robust learning management system (LMS), Moodle 2.7. It allowed us to design an inviting and easy to navigate online platform for the course. Prior to the redesign, we had used CECIL, the University of Auckland's bespoke (and now obsolete) LMS, which we used in a very limited fashion – the posting of lecture notes and a few course announcements (one-way communications to students by course staff). As detailed above, with Moodle we were able to facilitate more readily two-way communication between course staff and students, create opportunities for students to discuss amongst themselves, conduct online assessments of student learning, provide students with (more immediate) feedback on their learning and allow them to monitor their progress in the online Gradebook.

Given our interest in studying students' use of the foregoing digital affordances – 'action possibilities' as Gibson defined them – Moodle had one other strategic advantage over CECIL and most other LMSs: a strong learning analytics program. As described in the NMC *Horizon Report*, "learning analytics leverages student-related data to build better pedagogies, target at-risk student populations, and to assess whether programs designed to improve retention have been effective and should be sustained" (p. 24). Specifically, we employed the use of the Moodle Engagement Analytics Plugin (MEAP) that allowed us to readily access data on student login activity, viewing or downloading of course resources, posting of questions or comment in the discussion forums, accessing and completing of course assessments, and use the Gradebook, amongst others.

We used these learning analytics in two distinct ways: proactively (while the course was running) and retrospectively. With respect to the former, the scope of our use was very limited: we treated student login activity as a 'risk indicator' and reached out to students who hadn't logged on to the course website within the first two weeks of the semester. This modest intervention resulted in approximately half of the students we contacted initiating engagement online and the other half formally withdrawing from the course (as they were encouraged to do if they did not intend to complete the course). While we may have wished to retain more of those students, we were generally pleased with the result of this low-cost effort to engage students. However, our primary interest in the data we collected was for retrospective study. It is the results of these analyses – to which we next turn – that offer the most promise with respect to understanding students engagement with the digital affordances available and the impact of this engagement on their learning and achievement.

Questions, findings, and reflections

So, what did we discover from this redesign of EDUC 119 into a blending learning course and its implications for student engagement and achievement in large lecture settings? In this final section, I offer a brief summary of our results and what they mean as well as my reflections on the process and findings as a whole.

Here's what the data tell us: more 'clicks' = more total marks. That's oversimplifying matters, but not altogether inaccurate. More precisely, the data tells us that it is active-assessment related activity that is positively associated with total marks. In contrast, passive activity (i.e., non-active viewing or 'lurking' behavior), while correlated with achievement at the bivariate level, does not contribute any unique variance in total marks. That is, after we 'controlled' for important background and enrolment characteristics, only active-assessment activity remained a significant predictor of student achievement. This finding is not a surprising one – it makes sense that engagement with the digital affordances available would be associated with total marks earned, and that active engagement in assessment-related resources and activities would be the most powerful type of engagement.

Our findings also indicated that the final grade distribution for students in the blended offering of EDUC 119 was significantly different from the final grade distribution for students completed the course in 2012 (before the redesign was initiated). More specifically, significantly fewer students failed the course (i.e., 'Did Not Sit' or earned a D) in 2015 compared to 2012. The difference was very large difference (4.4% vs 15.6%, respectively), and one that we believe is attributable (in part) to the integration of digital affordances. Particularly important in reducing the number of course failures was our proactive use of the learning analytics related to students engagement with those affordances – allowing us to readily identify and reach out to students who weren't engaging in them.

It is also clear that there was significant (50%) increase in the number of A's earned in 2015 compared to 2012. Interestingly, there was not a significant change in the C's or B's earned. The resulting pattern suggests that the learning and achievement across the distribution of the grade range was enhanced: students who might have earned B's were able to earn A's instead and they were replaced by students

who might have earned C's but instead earned B's, and they, in turn, were replaced by those who would have earned a D or not completed the course. While we can't say with certainty that this shift was a result of the course redesign, the data presented here strongly suggest it played a role, a modest one, perhaps, but enough to lift some students out of failure and help others achieve excellence.

Finally, our data indicate that students' subjective experience in the blended course was overwhelmingly positive: 72% agreed or strongly agreed that it got them 'more actively involved' in the course and 74% agreed or strongly agreed that it made them 'feel more connected' to course lecturers. This is, of course, what we had hoped for in adopting a blended approach: that creating more opportunities for students to engage in the course would lead to more active involvement in it as well as a greater sense of connection to its lecturers.

In closing, I want to offer a few brief reflections of the redesign process and the findings just described. First and foremost, the redesign of EDUC 119 required lots of thought, time and effort. I could not have done it alone and would strongly encourage anyone considering a similar undertaking to seek the support of others (particularly the kind of dedicated and knowledgeable professional staff that I have been so fortunate to have on my team). Second, there are several key principles of instructional design and learning that not only undergirded the choices we made in our redesign but also help explain the positive findings it yielded. Chief among these principles is that learners' motivation and engagement is enhanced when they feel or experience a sense of: 1) control, choice and voice in their learning; 2) belonging and social connection to other members of the learning community; and 3) efficacy or capability with respect to achieving the learning goals and tasks to be accomplished – in a word (or three), what Deci and Ryan call *autonomy, relatedness*, and *competence*, respectively. From a humanist perspective, these are basic, innate psychological needs, and all three can be enhanced through blended learning. Third, and finally, while work presented here is unique in the particulars of time and circumstance, it is not especially innovative or complex. At this point in time, the use of LMS's among postsecondary educators to organise and disseminate course resources is ubiquitous (and often mandatory). Though much less so, CRS's are widely used as well. In short, the technology is in place to effectively blend learning. It needs only to be harnessed thoughtfully in a pedagogically sound and developmentally appropriate manner.

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A multi-pronged approach to enhancing student engagement and achievement

Angela Tsai (School of Medical Sciences, Faculty of Medical Health Sciences)

This teaching case reports on my contribution as a 2015 CLeaR Fellow toward the theme of 'Student Engagement and Achievement'.

As the coordinator of a second semester, large (approximately 1,200 students) fundamental human biology course (MEDSCI 142 – Biology for Biomedical Science: Organ Systems), I observe that for many students the transition to first-year tertiary study is a challenge academically, socially and culturally. Our students present different abilities, skills, and levels of readiness (e.g. academic and social skills). They bring different attitudes, values and knowledge about learning (e.g. goals, commitments, motivations and expectations). The attributes of our learners are increasingly diverse (e.g. age, gender, socioeconomic background, ethnicity, and special learning needs), and learners have different levels of engagement with external commitments (e.g. family, work, community and co-curricular interests) (Tinto & Pusser, 2006). As students learn to adjust to new learning and living environments, they are expected to simultaneously navigate complex institutional administrative processes and pursue their academic endeavour.

And so, to address the Fellowship theme, I undertook four interconnected projects on academic support, feedback processes, clarifying academic expectations, and increasing student involvement. To do so, I collaborated with academic and professional staff across the University to help students overcome barriers to learning and further foster institutional conditions for student success (Tinto & Pusser, 2006; Tinto, 2010).

A. Personalising and contextualising academic support

Support is most effective when it is connected to the environment and context in which students are asked to learn (Tinto & Pusser, 2006). Although the University's student support infrastructure offers workshops on study skills, writing skills and exam techniques, these sessions are frequently very generic in design in order to cater for a broad spectrum of attendees who are studying a diverse range of disciplines. As such, the connection between the workshops and a student's courses tends to favour a focus on episodic assessment tasks (e.g. written assignments and test/exams). I saw a potential for academic support to more explicitly connect with the learning and teaching activities and resources embedded in courses. This would create additional and semester-long opportunities for students to practise perfecting their academic skills in the context of the student's enrolled courses.

There are tools to assess learning strategies and study skills which are also becoming increasingly popular and accessible to instructors and students. Tools such as the Learning and Study Strategies Inventory (Weinstein, Acee & Palmer, 2016) or the College Level Study Skills Inventory (Congos, 2015) are helpful in the initial diagnosis of broad-stroke skill deficits (e.g. concentration, time management, etc.). However, such tools stop short of showing students how they may overcome their learning challenges – at least not through making connections to a learning context that is transparently relevant to the student.

Thus, in the first project, I explored how MEDSCI 142 students may learn to approach engaging with the embedded teaching and learning activities and associated resources in a way that fosters their development of self-regulation and self-monitoring skills and to improve their learning. To investigate this, I undertook face-to-face discussions with students (referred to as 'Personalised Academic Interventions'), which were offered to all the students of MEDSCI 142 at the start of the semester. Students entering this second-semester course with a Grade Point Average (GPA) of 3 or lower (C+ or below) from their Semester One studies were sent personalised email invitations.

Each discussion lasted about 30 minutes and began with asking the student to reflect and nominate the learning challenges they wished to target. For example, "I run out of time to study before tests (I cram)", or "I think I understand/know things, but can't get them out in the test". The conversation showed the student how the teaching and learning activities and course resources could be used strategically to help them overcome the challenges they specified. To continue with more examples, the student could use the post-class exercises to develop a habit of regular revision; or they could contribute their proposed solutions – or other thoughts and questions arising from doing the exercises – anonymously on the class discussion forum as a non-threatening way of practising to articulate, express and ascertain the accuracy of their understanding. The course coordinator took an electronic copy of the written notes that were co-developed with the student during the session as a baseline for future discussions and/or to track learner progress while the student keeps the original (hard copy) as a reminder and reference.

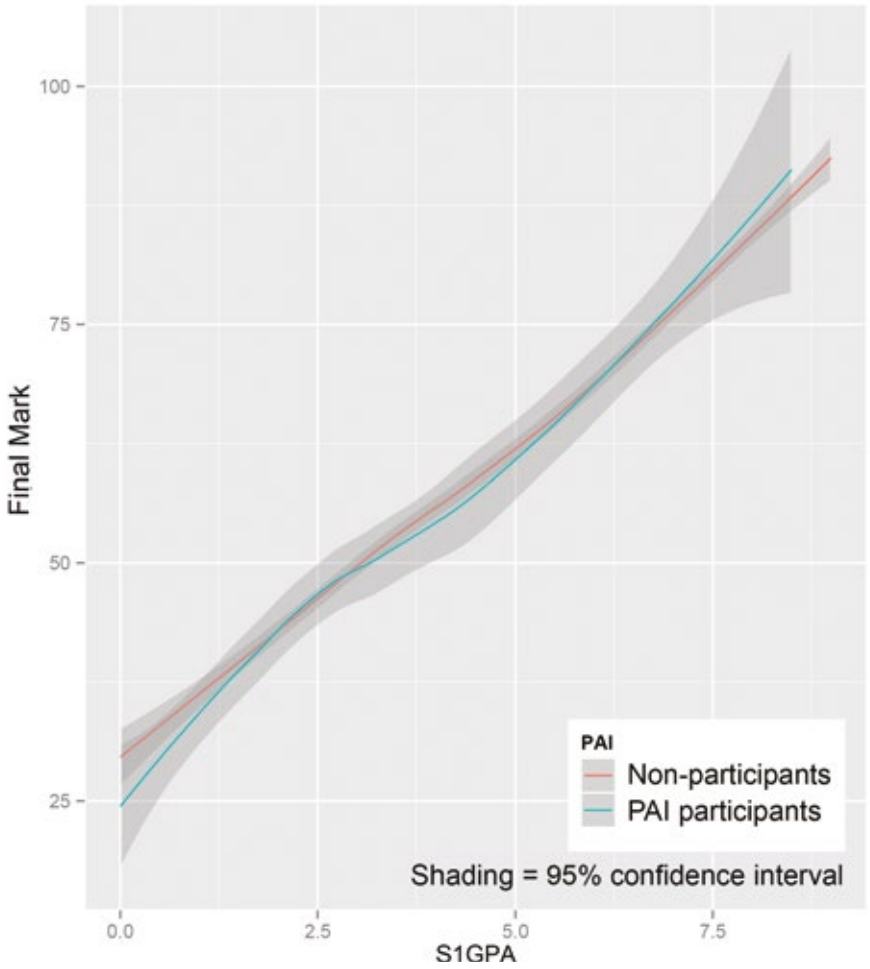
In essence, the conversation aims to increase learner awareness of the implicit educational purposes behind the designs of seemingly 'routine' teaching and learning activities and course resources. The learner is shown the intended impact on learning that follows purposeful engagement and is empowered to take control and ownership of how they choose to engage.

In 2015, 118 students took up the offer of a Personalised Academic Intervention (approximately 10% of enrolled students). On one occasion I facilitated 50 Māori and Pacific Island Admissions Scheme (MAPAS) students in a group tutorial setting. There was initially some concern that students who did not need help ('the worried well') might self-select to participate; this perception proved unfounded, as the

average GPA on entry to the course of participants was lower than non-participants (3.28 versus 5.18), signalling that participants were on average weaker students than non-participants.

While it is expected that this intervention will enhance the student's learning experience and have a positive impact on student achievement, it is difficult to assess its effects on learning outcomes. Confounders and limitations are inherent in uncontrolled studies such as this one (self-selection, non-independence, etc.). The long-term impact of the intervention on the learner and their learning outcomes may also only become visible much later on in their future study journey, since changing study approaches and habits/routines are a significant challenge and take time. Nevertheless, Figure 1 (which shows the final marks of GPA-matched participating and non-participating student counterparts) indicates that more refined analysis (for example, through partitioning the data based on GPA bands to account for participants being weaker students by nature) may help to surface less obvious trends and inform the design of future iterations of this intervention.

Figure 1: Students' GPA on entry to the course and their final mark at the end of the course. Participants: n=118 (10.2% of cohort); average S1GPA = 3.28; average final mark = 50.52%. Non-participants n=1042; average S1GPA = 5.18; average final mark = 64.13%



Despite the absence of clear quantitative evidence of a positive impact on the final mark, the immediate rewards include enhanced teacher-student relationships, promotion of distributed learning (versus mass cramming) practice and elevated metacognitive awareness: influences that have a positive effect on student learning outcomes (Hattie, 2009). Students report enhanced awareness of when they are defaulting to cognitively passive learning behaviours, and developing the ability to practise cognitively active learning behaviours (Stanger-Hall, 2012). Students also expressed they feel more 'positive', 'confident' and 'free to enjoy' [the learning].

A single 30-minute meeting is unlikely to have a lasting effect; on-going reinforcement will likely be required throughout a student's university journey. I have made connections with Student Learning Advisors with the intention of establishing a partnership and a potential source of on-going reinforcement. Advisors may find elements of this tool useful in their current practice; also, through the Advisors' interactions with other Course Coordinators, this approach may be modified to aid students in other courses and learning contexts.

B. Promoting effective feedback practices

In addition to the known educational benefits, receiving timely and regular feedback is a key factor in students' perception and experience of a course as being 'well-organised'. The project focussed on broadening the dissemination of existing feedback practices that are considered routine in some parts of the University. For example:

a) Promoting the use of **MCQ Results** to provide timely, personalised feedback on offline multiple-choice question (MCQ) tests to students.

MCQ Results allows staff to enter tailored descriptions or learning points for each question (thus preserving the question bank), and then to email the results to students so that they know which areas of the test they were weak in. The feedback also indicates the percentage of the class who correctly answered each question, which enables students to more accurately diagnose and reflect on their test performance (e.g. if other students also found a question difficult, or if the student read the question too quickly).

b) Promoting the use of **OMR Remark.** OMR stands for 'Optical Mark Recognition', and is a system where scanning of marked up test/exam scripts or markers' rubrics can be used to reduce the time and errors involved in collating marks and to efficiently facilitate the return of marked scripts to individual students as feedback. To find out more about this tool, please see my entry on the Business School's Learning Exchange blog (Tsai, 2015).

In the June 2015 meeting, the Teaching and Learning Quality Committee identified a general need for students to recognise and use the feedback they are provided. In addition to using assessment-related feedback to guide their study, MEDSCI 142 students also reported using instructor-endorsed comments and interactions (e.g. on discussion forums) to track their progress and understanding of the subject. Explanations provided by other students were a powerful and useful peer-teaching and peer-learning resource, empowering students to become co-constructors of their understanding. I continue to explore various ways both formal and informal feedback can be provided to (and used by) students to foster higher-level thinking skills and facilitate learning.

C. Making academic expectations clearer

The third project is still in progress. It arose from conversations with a subset of Bachelor of Science students (namely Pharmacology and Physiology majors), whose degrees are co-taught by the Faculty of Science and the Faculty of Medical and Health Sciences. While discussing the issue of academic preparedness and how we might go about making academic expectations clearer for incoming students, these students helped us to identify an oversight in the organisation that ultimately resulted in the interfaculty students missing out on the academic information sessions. This realisation echoed an area surfaced in the 2015 Colmar Brunton survey of students' transition to university life: students also felt they would benefit from more exposure to early academic advice and guidance to managing their academic workloads (University of Auckland, 2015).

Academic colleagues and professional staff from the Student Engagement teams at Campus Life and the Faculty of Science Student Centre, together with year 2 and 3 interfaculty students, are working to ensure the 2016 Orientation includes the interfaculty students. We also plan to offer clearer guidance regarding academic expectations and preparation using courses in these interfaculty programmes as context.

D. Involving students

Involvement is a condition for student success; when the student has a strong connection with their learning environment, they are more likely to persist and excel in their pursuit (Tinto and Pusser, 2006). Involving Year 2 and 3 students as 'academic advisors' in the 2016 Orientation event is a simple way of fostering connectedness with the institution. Students will be asked to share their insights with incoming first-year students, as well as to answer impromptu questions from the floor. The dialogue will be filmed and made accessible to students through the university's Online Orientation module.

Working with colleagues from Campus Life and the First Year Experience and Innovative Learning Teams from the Business School, we have also created short 3-minute videos of current students from across the University, sharing their insights/advice on a range of topics:

- Time-management: practical tips/apps/strategies used
- Making the most of their time (clubs, societies, volunteering, careers)
- Being honest with yourself about preferences for courses/choices
- Using Piazza and office hours for clarification
- Balancing studies with pastimes/downtime
- Seeking help from relevant places
- How to handle threshold concepts
- Reading strategies
- Lecture tips
- Doing a little every day/forward-planning
- Dealing with drafts/feedback
- Integrating with new peers
- Not choosing the 'wrong' specialisation too early
- Financial management
- Balancing work and studies
- Focusing on self-development

These videos will add to the existing pool for the Online Orientation and will also be made available to Faculty Student Centres for wider use.

Concluding remarks

The first year is where students begin to acquire the academic skills, literacies and develop positive patterns and habits of study that are necessary for them to be successful and independent learners in subsequent years of undergraduate studies and future professional practice (Kift, 2015). In addition to the joy of being able to invest in my students, it was particularly rewarding to work with academic and professional staff from other parts of the University toward achieving the common goal of enhancing student engagement and achievement.

I would like to thank Professor Helen Sword, Associate Professors Mark Barrow and Roger Booth for their nomination and encouragement throughout my CLeaR Fellowship. It would not have been possible to pursue the projects outlined in this report without their support.

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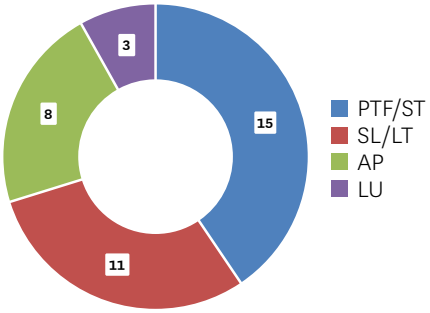
Establishing a community of interests for staff using technology in teaching & learning

Li Wang (Libraries and Learning Services)

As a 2015 CLeaR fellow, I have interviewed 37 teaching staff including 15 professional teaching fellows (PTAs) or senior tutors, 11 lecturers or senior lecturers, 8 associate professors and 3 staff members from faculty elearning units.



The research found that teaching staff have used many different types of learning technologies in their teaching and assessment. Below are some example technologies that are used by University of Auckland teaching staff that I found from this research, arranged pedagogically.

All the faculty teaching staff that I interviewed expressed that they are willing to share their experiences of using the technologies. However, they felt that a community of interests for staff using technology in teaching and learning does not exist at the University. Below is some feedback from the participants:

- In the last two years I have gone a long way round understand how to use Turnitin as a marking tool. I am happy share what I have done wrong so others don't need to repeat mistakes....I don't know who else is interested in this.
- I am developing an online course and really want to learn what tools people are using to engage students online, but cannot find these resources at University. I don't know who I ask.
- Fast feedback is essential in their learning and technologies have helped me to provide it as fast as I can. I have over 1000 students submitting assignments on Friday. By Monday, they all received feedback. I am happy to share with others. ....
- I went to CLeaR workshops mainly for meeting other people, sharing what they are doing.
- MCQ Results is a wonderful tool and I strongly recommend all teaching staff to use it. I don't mind sharing it with others....

After class exercises	· Peerwise · Best choice · Oasis
Classroom engagement	· Video clips · Online clickers e.g. QuickClicker · Smartboard
Fast assignment feedback	· Turnitin GradeMark · MCQ results · Crowdmark
Language assistant	· Grammarly · Turnitin eRater · Vacabprofiler
Peer review	· Peerwise · Turnitin PeerMark · Aropa

The findings showed that most participants are keen to share not only *what* technologies are being used in teaching and learning, but also case studies on how they are being used and who have used them.

In order to establish a community of interest at the University for staff using technology in teaching & learning, I make the following recommendations to achieve this purpose.

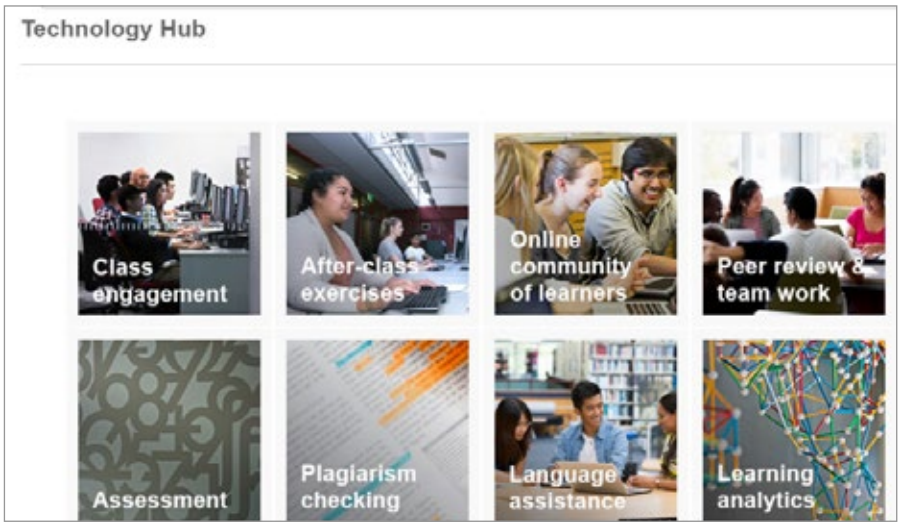
Recommendation 1: Establish a Teaching Technology Hub

The Teaching Technology Hub can be initially created by the Learning Support Services team led by Dr Li Wang. The identified technologies used by teaching staff, associated case studies and teaching staff contacts will be added to the Hub. The technologies can be organised pedagogically e.g. class engagement; peer review; assessment; learning analytics; etc. Each technology page can be owned by a teaching staff member who has introduced, developed or used the technology. This means that they can edit, add or remove resources on the page.

All teaching staff (including faculty teaching staff, librarians, learning advisers and CLeaR teaching staff etc) can access and view the Teaching Technology Hub.

Below is a draft of the first 3 pages of the Teaching Technology Hub idea.

Page 1:



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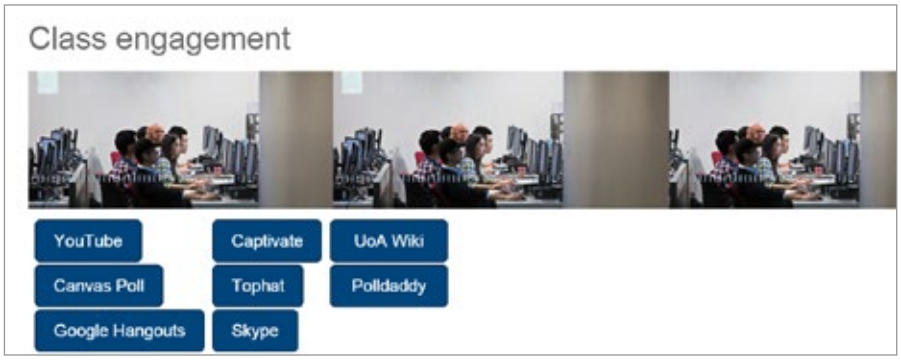

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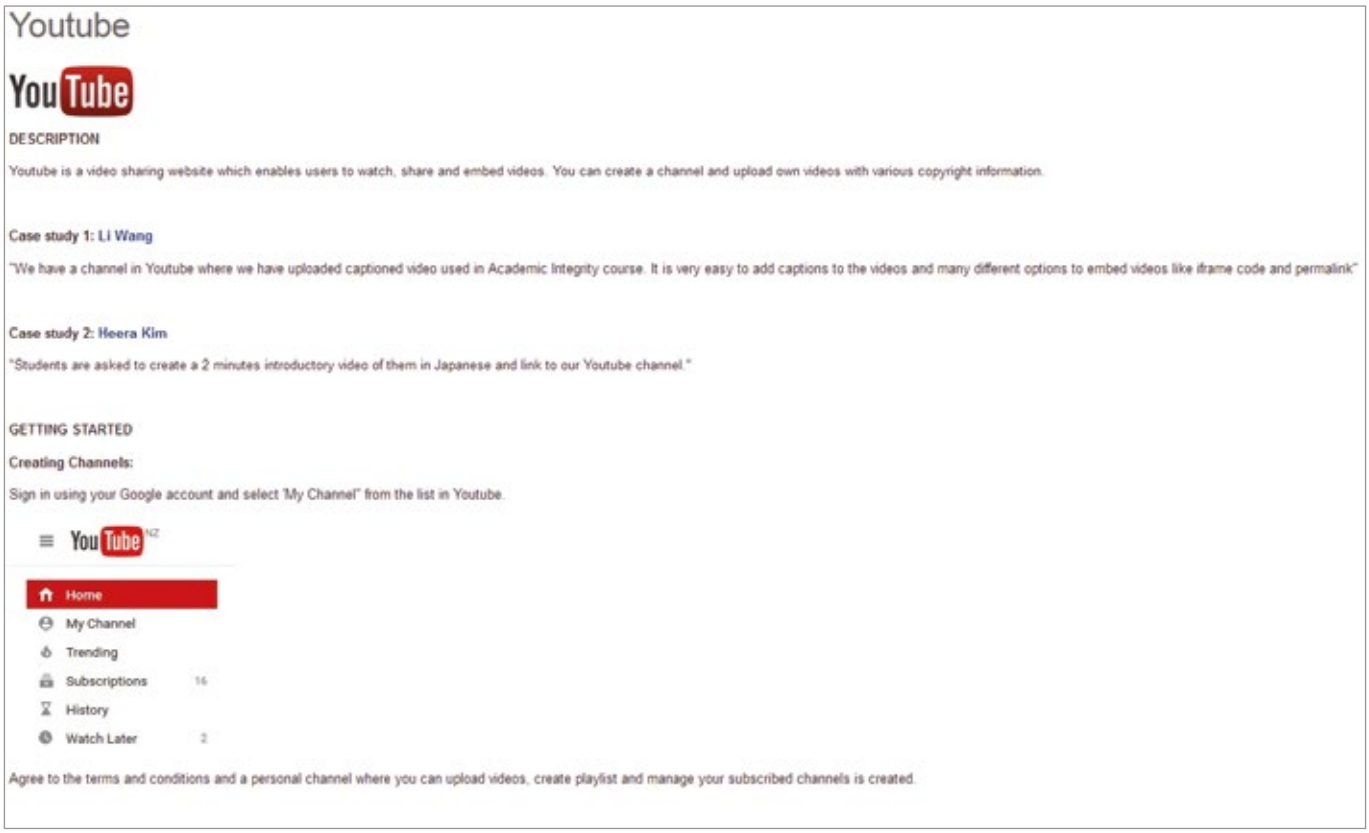

Each case study will be presented in short message format. 'Ted-talk' style short videos could be introduced at a later stage. One or two webinars could also be added under each category for teaching staff to share their experience.

Contribution and maintenance:

Once the Teaching Technology Hub is established, the experienced technology users (faculty teaching staff) can be invited as page owners in order to edit, update and maintain their own page in the Hub and to ensure that the resources are updated regularly e.g. at least once a semester. Teaching technology related webinars associated with certain technologies can be added to the site by the page owner. The faculty Teaching and Learning Showcases can also be added.

Piazza or yammer may be set up as part of the Hub for teaching staff to ask questions online and to help establish a community of practice.

The proposed roles and responsibilities of Libraries and Learning Services

Library and Learning Services (LLS) has initiated the Teaching Technology Hub and also worked very closely with faculty teaching staff on curriculum integration of academic and information literacy.

Below are the proposed roles and responsibilities of LLS:

- Establish the initial Teaching Technology Hub site in collaboration with page owners, The Director of Teaching and Learning, ITS and CLeaR.
- Lead and communicate with all the Hub page owners to ensure that they share and contribute any new technologies used in teaching and learning. For example, organising meetings with the Hub page owners each year.
- Promote the Hub to all faculty teaching staff.
- Stimulate and contribute to the community of interest by moderating, reminding the page owners to answer questions or share new technologies used via e.g. PIAZZA or Yammer.

The proposed roles and responsibilities of Teaching Technology Hub page owners:

The technologies identified from my research are all used by University of Auckland teaching staff. Each technology can be displayed on one page so that the users of that technology can be invited as page owners. Many potential page owners were identified from my research and more page owners can be encouraged to join as and when they use new technologies.

Below are the proposed roles and responsibilities of page owners:

- Edit, update and review the Hub resources on their page at least once a year.
- Promote the Hub to their faculty and other faculties.
- Participate in regular Hub meetings (e.g. 1-2 per year).
- Contribute to the community of interest by answering questions or sharing new technologies used via e.g. Piazza or Yammer.
- The above responsibilities should be counted as their academic service contributions.

The Teaching Technology Hub can be reviewed by the page owners and LLS at the end of each year in order to determine if any improvement is needed.

Benefits of the Teaching Technology Hub

There are many benefits for establishing and maintaining this Teaching Technology Hub:

- The Teaching Technology Hub will be an online showcase for teaching staff to present what they are doing.
- Teaching staff can share the latest technologies that are used in teaching and learning by their colleagues.
- A centralised Hub will save teaching staff time searching for or asking others what technologies can be used to improve teaching and learning.
- The Hub will enable teaching staff to communicate with others about the technologies they have used and how they have used them. Sharing experiences can help others avoid repeating the same mistakes.
- The Hub will provide an opportunity to identify and encourage elearning champions within faculties to share their experiences with the University community.
- The Hub can be used to promote any new technologies that the University has subscribed to so that they can be used more widely to support teaching and learning. For example, during my interviews, many teaching staff didn't know that the University provides a site licence to the online survey tool Qualtrics.
- The Hub will help form a community of interests on the pedagogical application of technologies among University teaching staff. This will help to establish a culture where people are confident applying new technologies in their teaching and encourage the use of new technologies in teaching and learning.
- Use of Piazza or Yammer in the Hub will enable teaching staff to ask and answer questions, share ideas, and raise any issues using technologies in their teaching and learning. This will save teaching staff time trying to solve issues that others have already dealt with. All

participants at my interviews expressed that they are happy to share the tips with others.

- The proposed Hub will be different from the FMHS' Teaching & Learning Hub and the Teaching PLUS website which focuses on learning design principles and provides useful tips. It is also different from CLeaR's elearning showcase of innovative educational websites and its webpage linking to information about various University of Auckland-developed elearning software tools.
- This Hub will not only list the pedagogically arranged technologies but also include associated case studies or University of Auckland stories of using the technologies, and the contacts of those who have used the technologies. This was highly recommended by the participants in my research interviews.
- Ongoing maintenance is challenging for any website. However, distributing and delegating ownership of the Hub pages to staff should ensure the Hub remains up-to-date.

Recommendation 2: Set up lunch time sessions for teaching staff to share new technologies

Research showed that a hybrid approach with face-to-face professional development opportunities and online resources is the best solution for promoting using technologies in teaching and learning (Elliott et al., 2015; Brook, 2010). Many participants in this research also appreciated the opportunity to meet with others at face to face sessions.

It is recommended that regular lunch time sessions (e.g. 2-3 times a year) are offered to introduce the Hub to teaching staff and to share new technologies used in teaching and learning at the University of Auckland. These lunch sessions can be organised by LLS in collaboration with CLeaR.

Recommendation 3: Promote the Teaching Technology Hub and the lunch time sessions via various channels

Various channels need to be used to promote both the Teaching Technology Hub and the lunch time sessions in order to form a community of practice. These channels could include:

- VC's update emails
- Faculty road show
- Email via Canvas
- Canvas homepage
- Canvas training
- Subject librarians promotion
- CLeaR emails

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Leveraging mobile devices for science learning

Anna Yang (Physics, Faculty of Science)

Teaching and learning stand to benefit immensely from recent advances in consumer electronics, and especially from the range of sensors now incorporated into mobile phones and tablet computers — cameras, microphones, accelerometers, gyroscopes etc (Frohberg, Göth, & Schwabe, 2009; Karnad, 2014; Kukulska-Hulme, 2010; Laurillard, 2007). In this teaching case, I describe how, in 2014 and 2015, my colleagues and I have developed, implemented and evaluated a tablet-based experiment in the first-year physics teaching laboratories.

The challenges that we wanted to address are improving student engagement and facilitating scientific inquiries in standard laboratory sessions. Traditional physics labs are typically procedural 'cookbooks' aimed at achieving an already known outcome (Hofstein & Lunetta, 2004; Trumper, 2003). Although the traditional experiments reliably demonstrate physical principles, many have begun to lose relevance for incoming students. Furthermore, the processes of science are dynamic and iterative, and outcomes are not pre-determined (University of California Museum of Paleontology, 2016). We wanted both to provide relevance by which students could readily engage with the physics, and convey an understanding of scientific inquiry closer to how physics is actually done.

To achieve these goals, we developed tablet-based experiments. Using a tablet brought consumer technology into the classroom, communicating everyday relevance. For the first experiment, we decided to use the built-in camera to implement video-based laboratory work (VBL). VBL has deep roots in time-lapse and high-speed photography, and has, since the 1990s, been applied to motion analysis in physics teaching (Zollman & Fuller, 1994). VBL approaches to motion analysis have been shown to help students bridge concrete motion to the abstract graphical representations that physicists use to analyse and understand trajectories (Beichner, 1996; Beichner & Abbot, 1999) Early VBL implementations required substantial equipment, namely, video cameras, digitisers, and desktop computers. Today's mobile devices provide all of the necessary hardware in a compact, lightweight package.

We still needed to develop an activity that students could complete in a standard three-hour laboratory session, and an app that would both capture videos of moving objects, and provide tools for analysing these videos.

For the app, we created Lablet — an open-source Android-based programme that is optimised for a reasonably large tablet screen. We have designed the app with three audiences in mind: (i) *students*, undertaking formal laboratory work, (ii) *anyone interested* in exploring physical phenomena, and (iii) *teachers* wanting a platform in which to develop customised learning activities and automated marking for numerical exercises. Currently, Lablet supports three built-in sensors: camera, microphone and accelerometer. Moreover, it has been designed to operate in two modes: 'single experiments' for independent users to take measurements and analyse data, and 'lab activities', for users to follow scaffolded activities where data collection, analysis and exercises are integrated. The app can be downloaded from Google Play for free (Zeidler C., van Wijk, Easther, & Yang, 2016); all project code is available for use, modification and sharing (Zeidler, van Wijk, Easther, & Yang, 2016). In terms of programming language, the app is coded in Java and the scripts for lab activities are coded in Lua.

For the activity implementation, we asked students to self-organise in groups of three, and we provided each group a tablet computer, pre-installed with Lablet, as well as items such as a metre ruler and a tennis ball. Students would be asked to exit the laboratory, use the camera functionality in Lablet to record videos that exemplify particular motions, including projectile motion and free fall, and subsequently analyse the videos in Lablet for group discussions on mechanics – all within the three-hour laboratory session. To evaluate the perception of the newly introduced activity, we invited students and teaching assistants to complete anonymous surveys developed by the 'Advancing Science by Enhancing Laboratory Learning' team at the University of Sydney (Pyke, et al., 2010). In the most recent student evaluation collated, we received 406 responses from a class of 576 students. The results showed that more than 70 % of the respondents either agreed or strongly agreed with the following question items:

- "This experiment increased my understanding of physics."
- "I found this to be an interesting experiment."
- "This experiment helped me to develop data interpretation skills."
- "The experiment provided me with the opportunity to take responsibility for my own learning."
- "Working in a team to complete this experiment was beneficial."
- "The demonstrators offered effective supervision and guidance."

Teaching assistants also welcomed this new approach in their responses. While the initial reception is encouraging, we aim to address the question on the impact of Lablet on student learning gain in the coming semesters.

Since we started, Lablet has been through three major cycles of development. Our development process is often inspired by class observations, user feedback, research literature, and continuing developments in mobile technologies and science education; the developed features are then consolidated or changed based on subsequent class observations and user feedback. Following on Lablet's success at introductory level, it has also been very recently deployed in the third-year physics laboratory to enhance the data acquisition in a classic experiment aimed at determining the gravitational constant (van Wijk, 2016).

Within the department, the project has become a catalyst for reflection, collaboration, and improved practice at many levels. For staff: classroom experiences and teaching insights were exchanged; expertise across departments and organisational units were brought together. For students: the Lablet mobile application provided the link to familiar technology and the means to learn kinaesthetically, socially, iteratively.

We greatly appreciate the University for funding us by a Learning Enhancement Grant 2014; our many colleagues, teaching assistants staff and students in Physics for trials, critiques and encouragements; fellows and staff at the Centre of Learning and Research in Higher Education (CLeaR) for guidance, support, and manuscript assistance; Faculty of Science Communications and Marketing as well as University Media Productions for producing our first Lablet video; and lastly, Mason Ng, Fang Ou (Rachel), Ana Snjegota, and Peter Sorrenson for participating in the video production.

If you would like to chat about project details, improvements, potential development or adaptation, feel free to contact me or any of the project members:

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