# An introduction to the CELEBS community of practice

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# Evaluation of research-based courses

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| Rebecca LeBard: | 00:05 | I've used evaluation to improve my course and for teaching awards, and for promotion. And I'm going to talk a little bit about one of the initiatives I did and how I evaluated that and used it. So in one of my courses I implemented some research-integrated learning, and students could elect to do that if research was something that interested them, rather than doing a cookbook style of lab, which is what we often do. |
| Rebecca LeBard: | 00:35 | Those students, actually we used as a reference group in an Office of Learning and Teaching study that was conducted by the University of Queensland. So I was fortunate to have some honours students that were able to do some surveys on how those students learned in their research-integrated learning portion. |
| Rebecca LeBard: | 00:56 | We did an undergraduate survey of their self-assessment of their research and that was able to look at different gains they had achieved over the time. So we could find out if they felt that really experienced research, what their future plans were and what they'd gained from the experience. |
| Rebecca LeBard: | 01:18 | And for improvement of the course, this was really helpful in telling me, did the students feel more prepared for research in the future, going into honours as a post-graduate. We found out that they really did. They had a lot of learning gains in that area. So that evaluation helped me to see that the aim of research-integrated learning was met for our school. |
| Rebecca LeBard: | 01:43 | One of the other surveys that we did was roses, buds, and thorns. So that looks at getting students to say, what was something good, what was something not so good, and what was something that could be improved about the course. This is really good also for helping you improve the course, and some of the things that students suggested, we put in in future years. |
| Rebecca LeBard: | 02:07 | So I was able to use their quantitative results from the survey for applications for learning teaching awards and promotion, and I was able to use their qualitative also towards those awards and to improve the course. One of the best comments I got from students was telling me that the experience was something that treated them like a real scientist and not an untrustworthy school kid. |

# Evaluation of student feedback

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| Anne Galea: | 00:04 | How does all of this relate to the Rubber Brain? |
| Jackie | 00:08 | Okay. The Rubber Brain, we wrote originally as a textbook for our courses on psychological science of wellbeing and self-management but then we realized that our students, well we really actually wanted them to use this book in their everyday life. To help them achieve their academic and other professional and personal goals. We took another year to rewrite it in a more accessible form, and a more entertaining and engaging way. |
| Jackie: | 00:40 | We are still using that book in our courses but what the link is between that book and our research is that we actually include the testing effect, and the smart goal strategy that I was just telling you about in that book. It's full of evidence based strategies that will help students to manage their academic life, their personal life, their professional life, including those two strategies that we talked about. |
| Anne Galea: | 01:13 | Great. Thank you very much Jackie for your time today. It's been a very stimulating conversation. I'm sure it has been for our audience too so thank you. |
| Jackie: | 01:22 | Thank you. Thank you. |

# Evaluation of peer assessment

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| Adrienne Torda: | 00:05 | So in CELEBS we're always looking at ways in which academics have evaluated things they've tried in the classrooms, and you two have both evaluated peer assessments. Kar Ming, can you tell us what you've done? |
| Kar Ming Chong: | 00:17 | Yes, my peer assessment is within a team context, and my students work in teams like many other students and one important component of teamwork is peer evaluation and this is where team members are asked to evaluate each other's contributions. |
| Adrienne Torda: | 00:35 | And Nagisa, what've you done? |
| Nagisa Fukui: | 00:37 | One of the formal assessments for introducing Japanese courses is called an induction test, which requires students to perform a short role play in pairs, in front of a classroom. A tutor gives the individual evaluation while the students evaluate each other by choosing the top three performers in the class. |
| Adrienne Torda: | 01:00 | And how have you evaluated how the activity ran? |
| Kar Ming Chong: | 01:02 | I've evaluated the activity by looking at how students give marks to one another over the course of the semester to see the trend, it's going up or going down and also at the end of a semester, I collected a few survey type questions to ask them whether they liked the peer evaluation and what can be done to improve the peer evaluation too. |
| Adrienne Torda: | 01:23 | And Nagisa? |
| Nagisa Fukui: | 01:24 | I have conducted a simple survey to ask how they found the experience and also I interviewed some students to hear their voices in how they found that exercise. |
| Adrienne Torda: | 01:37 | And what kind of feedback did you get? |
| Nagisa Fukui: | 01:39 | I have received both really positive comments and negative comments. The most positive comment was they all felt like they are involved in the same event together, rather than just they took the test. That was a very good but then a negative comment was; (basically two negatives) one is that they are not confident to evaluate other students' performance. The other one is that the variation form I created had a certain criteria and that is not appropriate for them. |

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| Adrienne Torda: | 02:12 | And what kind of feedback did you get Kar Ming? |
| Kar Ming Chong: | 02:15 | The positive comments for my peer evaluation is that there is a need for it because students felt that it's a good outlet for them to voice their frustrations and also opinion. The negative comments is with the peer evaluation is that they find it hard to mark someone down because either they're embarrassed or fearful or whatever so there is a social aspect to it and the second thing is, sometimes you're not sure what is the calibration, in terms of how low they should mark them down. |
| Adrienne Torda: | 02:53 | Based on the feedback, have you changed the activity? |
| Nagisa Fukui: | 02:55 | Yeah, I have changed the actually, the variation sheet that they can use. I implemented the criteria the want to include, yeah. |
| Adrienne Torda: | 03:04 | And what about you Kar Ming? |
| Kar Ming Chong: | 03:06 | Yes I have, initially I do five rounds of peer evaluation during the semester, I've now reduced it to three. In addition to that, the first round is formative only where they get all the feedback, but no feedback in the second and third round where it's summative so they don't have the fear of retaliation from team members who receive the lower marks. |
| Adrienne Torda: | 03:29 | That's really interesting. Thank you both for giving up your time to come here today and talk about that. |
| Nagisa Fukui: | 03:33 | Pleasure, thank you. |
| Kar Ming Chong: | 03:34 | Thank you. |

# Evaluation of course innovation using before and after questionnaires

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| Adrienne Torda: | 00:04 | Today I want to talk about evaluation of some modules that I've created for one of my courses, and we've talked about evaluating courses and innovations in a number of different ways. And one of the best ways that you can do, is when you have a group that gets the innovation and a group that doesn't, and you can compare a whole range of outcomes, including engagement, knowledge gains, user experiences. But sometimes you don't have the opportunity to have two cohorts running simultaneously and even do a crossover with that. So often we have to do before and after evaluations. So that's what I did with this innovation that I introduced, which was a series of modules called the Class C modules. And how I did it, was that I setup a focus group, and during that focus group we actually got the students in, and we got them to work through all this learning for a couple of hours. |
| Adrienne Torda: | 00:58 | So rather than having a before and after that went over a couple of weeks, because you can imagine that when you do that evaluation, there are a whole lot of other factors that can affect student learning and student outcomes. So we tried to keep it in a very controlled environment, we had an entry quiz and we had an exit quiz. So we were able to get very well defined changes in knowledge gains from the before and the after quizzes. We also did an evaluation of their engagement, their experience and also the self-perceived knowledge gains that the students got out of this. So we were able in that very well controlled setting, to have a very good before and after evaluation that didn't get affected by the other things, such as student maturation and other courses that they may have been doing at the same time. Simultaneous to that, we also got a smaller number of students to do a verbal focus group. So we got them to speak with a facilitator who had some prompt questions that essentially ask them about the user engagement and the experience. |
| Adrienne Torda: | 02:07 | We were using a very new technology, so this was a fairly important aspect of our evaluation. We were using a virtual reality filming situation, so we wanted to know what aspects of that were great, what aspects that weren't so great. And we got a huge amount of information from the students because we had them in this very set environment. So that is what we ... It's |

a form of qualitative research if you like, but we used it as an evaluation of this innovation. So I just want to talk to you today about that because as academics, you can often set up these kinds of mornings, evenings, just a couple of hours to do a before and after. It doesn't have to be at the beginning and the end of a term. And so that's just another form of evaluation that we use in assessing our programs.

# Scholarly approaches to evaluating teaching

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| Anne Galea: | 00:03 | Hi, my name's Anne Galea, and this is Jacquie Cranney. Jacquie and I are both members of the CELEBS Community of Practice, and I'm here today to ask Jacquie a few questions about her work. |
| Anne Galea: | 00:14 | So, Jacquie, the first question I have for you is could you please explain to me the difference between scholarly teaching and SOTL, which is an acronym for the Scholarship of Teaching and Learning? |
| Jacquie Cranney: | 00:25 | Certainly. There has been some research around this area, and scholarly teaching is what we all should be doing as educators, and that is to continuous improvement of how we deliver our learning and teaching and assessment strategies for our students, in order to maximize the possibility that they will gain the intended learning outcomes. It's kind of like an intervention, or program, or treatment that we do as educators in our practice, and then assessing or evaluating whether or not that is effective, and engaging in looking at feedback and evaluation from peers or students, and continuously then responding to that feedback, and the behaviour outcomes, of course, and trying new things, and see what happens in the next iteration. That's scholarly teaching, and of course, really high-level scholarly teaching would be looking at the literature as well. |
| Jacquie Cranney: | 01:26 | What SOTL is, is where you actually plan ahead of time in a theory-based way, and think, okay, well I want this kind of effect in my program. I want to institute an educational innovation based on the research and the theory that's out there, and I'm going to go to the trouble of evaluating it appropriately with appropriate SOTL methods, and then I am going to report that back to the community at large. In other words, to actually publish the work that you're doing within your classroom to test theories, to try to improve the outcomes, or even doing correlation on survey research just to inform what the nature of the educational experience is, and how to actually improve that. |
| Jacquie Cranney: | 02:18 | The difference really is that with SOTL, you put yourself out there in terms of planning, and then reporting on your interventions. |

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| Anne Galea: | 02:27 | Okay, thanks for that clarification. I think it's a really important nuance to understand and appreciate. |
| Anne Galea: | 02:31 | So, why do we need gold standard for SOTL? |
| Jacquie Cranney: | 02:35 | I think the main challenge for us as academics, when we come from many different disciplines, we're not trained in undertaking educational research, unless, of course, you're in the School of Education. It's sometimes hard for us to get from our mindset of being a psychologist, or geneticist, or physicist, or whatever, to being in the mindset of undertaking research that's relevant to our students. I think the gold standards are there to help us, and in particular, if we're undertaking research, then we want to undertake quality research that's worthwhile, that's publishable, that has an impact, and so that's what the gold standard idea is about. |
| Jacquie Cranney: | 03:19 | We have to acknowledge that this is applied research, and applied research in the context of the classroom, or wherever that is, virtual or face-to-face, is extremely challenging, so any applied research is usually challenging in the sense that there are many practical considerations and constraints. You can't always randomly assign your participant, your student, to particular conditions, and also that there are huge ethical considerations as well. |
| Anne Galea: | 03:51 | Absolutely. |
| Jacquie Cranney: | 03:52 | Yeah. |
| Anne Galea: | 03:52 | So, what are the proposed gold standards, and can you comment on those in relation to your own research please? |
| Jacquie Cranney: | 03:59 | Sure. I'll do my best. The first standard is theory-based, and so that acknowledges quite often people have great ideas in their classroom, but they're not in contact with the actual research and the theory that's relevant to what they're thinking they will do. If you're thinking about SOTL, just as with any other research, you need to know what's come before and what's current. If you want to make an impact in that regard, then you need to go to the effort of actually engaging with the literature, finding out what's there. |
| Jacquie Cranney: | 04:35 | In terms of my own research, in terms of the testing effect, whereby it's been shown that the more the students tests themselves, or the educator provides opportunities for that, the greater the outcome in terms of the final exam results, et |

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| | | cetera. This is obviously driven by a lot of research in memory, in cognition, but there's challenge of doing things in laboratory, versus a kind of analogue situation, versus actually in the classroom, and that's where some of my work with the testing effect has been most impactful in the sense that I've kind of gone across all of those domains of research, but of course, the most challenging is when you actually do it in the classroom, but it's also the most meaningful, of course, because you're then influencing practice. |
| Anne Galea: | 05:26 | Okay. |
| Jacquie Cranney: | 05:28 | Theory-based is obviously important. Another one is longitudinal design, so this is in contrast to a cross-sectional. Really, it depends on what you're doing. For example, if you're looking at aspects of student motivational personality, or something like that, and looking at that in terms of the way they might be performing in a group or team situation, then maybe cross-sectional is okay. It really depends on the research question that you have, but if you are actually engaging in an educational innovation, then of course, it has to be, in some sense, long-term to really say, "Well, I did this particular teaching strategy at this time, and before that, the students were in this state, but after that, they were in that state," so you at least need to possibly look at pre-post factors, so that's what longitudinal is, but again, depends on the actual research question that you have. |
| Anne Galea: | 06:26 | Sure. |
| Jacquie Cranney: | 06:27 | True experimental design. This is where you randomly assign students to particular conditions. This is really, really challenging, but not impossible. Depends again on your research question, but in my research, the closest we've come to that is with the testing effect research, where we had a lot of classes in first-year psychology, and so we at least attempted, across the different conditions that we had in our research, to say it was not an individual student assignment, but kind of a semi-random class assignment, so that we had, across the conditions, just as many early morning ones as late afternoon ones. It's kind of semi-random, but not totally random. That's the closest I've come to it. |
| Jacquie Cranney: | 07:18 | Other researchers have been able to do this quite successfully, depending, again, on the research question that they're looking at by, for example, randomly assigning students to something that's happening on the learning management system. |

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| Jacquie Cranney: | 07:32 | Large sample sizes, we know that's preferable. Not always possible, but you could always start with a pilot that might build up to a bigger sample. |
| Jacquie Cranney: | 07:41 | Diverse samples, that's really challenging, so across different institutions. It is possible if you're looking at, say, student attitudes, or educator attitudes, but almost impossible, I'd say, in terms of a particular intervention because you have to have a lot of people agreeing to do the same thing at different institutions. |
| Jacquie Cranney: | 08:03 | Advanced statistical techniques are always advisable. High standards of ethics. We're very lucky, I think, that we have very high standard ethics in terms of the committees that we have here at UNSW, so I don't think that's a problem here at UNSW. |
| Jacquie Cranney: | 08:19 | Finally, the last standard here is mixed method approach, so using both qualitative and quantitative data. I think that in educational research that's always advisable, so there's advantages and disadvantages to both of those forms of data, and so by, if you're able to fold in both kinds in your study, then I think you'll get the most out of it, the most understanding. |
| Jacquie Cranney: | 08:48 | With our research, we have mostly focused on quantitative. We haven't done a lot of qualitative analysis because that isn't my strength, but we have always found that by having the student voice in it, or allowing the student voice in my research, then that does inform us about how to interpret some aspects of the quantitative outcomes. |
| Anne Galea: | 09:17 | Okay. Thanks, Jacquie, that's really interesting, and helpful as well. I believe you've also conducted some research into motivation. I was wondering if you could talk about that, and how it relates to the gold standards as well. |
| Jacquie Cranney: | 09:27 | Okay, so most of my research with motivation has been with my higher degree students and honours students, and I guess the theoretical framework that we've utilized for the most part has been self-determination theory, and this is a very well supported theory that's relevant to educational contexts. It guides a lot of our curricular work for the last five years, or so. When we're actually designing and delivering the curriculum, we do consider aspects of, say, autonomous motivation and the psychological needs of autonomy, competence, and relatedness when we are designing the curricular. |

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| Jacquie Cranney: | 10:15 | Right now, we're looking at some of our courses in terms of that, and comparing the outcomes of particularly those psychological needs and wellbeing. Also looking at performance when we can, but there's always ethical issues about that, in terms of, say, some of the courses that were specifically designed around evidence-based self-management strategies, and then we're also looking at a sample who are outside of that course, and looking at the same outcomes. For the comparison of those two groups, obviously not randomly assigned. There's possibly the number is a little bit small in the actual course, who are responding to this research currently, but the numbers are high in the other course, but in any case, not totally random assignment, but nevertheless, theory-based and reasonable numbers enough that we think we'll be able to compare those outcomes of our strategies, our learning and teaching assessment strategies across those two groups of students. That's where that's going. |
| Jacquie Cranney: | 11:30 | We've also undertaken, in the past, some research on self-determination theory and goal-setting, and in particular, we have shown that the SMART goal strategy, which is talked a lot about in the business world, but also to a certain extent in the educational world. Very little empirical ... We haven't found any straightforward research that supports the SMART goal strategy, so we designed a study around that. It wasn't in the classroom, it was within the lab, but nevertheless, we found that with our first-year psychology students who employed the SMART goal strategy, they rated heir goal attainment, including academic class that they were doing, much higher than the comparison group who didn't employ the SMART goal strategies. |
| Anne Galea: | 12:27 | Okay, thank you. Lastly, how does this all relate to The Rubber Brain? |
| Jacquie Cranney: | 12:33 | Okay. The Rubber Brain we originally wrote as a textbook for our psychological science of self-management and wellbeing courses, but then we realized that we actually wanted the students to take this book and use it in their everyday life, and so we took another year to rewrite it in a more accessible form because we're academic writers, and we're not used to that kind of communication that's a little bit more accessible. Anyway, so we produced The Rubber Brain, we're using it as a textbook in our courses, and I guess, the link is that we want to be able to share our research, whether it's directly in the classroom, or outside of, but relevant to students, and so within that book, we discuss some of these evidence-based strategies |

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| | | that we've been working on, including the testing effect, as well as things like SMART goal strategy. |
| Anne Galea: | 13:32 | Great. Well, look, thank you so much for your time today, Jacquie. |
| Jacquie Cranney: | 13:36 | Thank you. |
| Anne Galea: | 13:38 | It's been very stimulating, and I'm sure it has been for our audience as well. Thank you. |
| Jacquie Cranney: | 13:41 | Thank you. Thank you very much. |

# Measuring good Teaching

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| Rebecca LeBard: | 00:04 | Hi Ian. As educators, it's important for us to evaluate our practice, so how do we measure good teaching? |
| Ian: | 00:13 | Well, classically we measure good teaching by looking at the outcomes; have the students jumped through the hoops at the end of the course, have the students engaged with the material, are they happy; all of these sort of things are measuring the students, and that's important, but there is so much more to being a good teacher, to being an effective teacher, than just measuring the students. |
| Rebecca LeBard | 00:36 | So what makes an effective teacher? |
| Ian: | 00:40 | I think we've got to think about the longer term. What is it about the student that changes as a result of spending time with the teacher, that the student as a person is maturing into their discipline. We come to that discipline, you and I from different disciplines, and we have a mindset that we're trying to share with the students, and we're trying to get them to become professional practitioners as well. That's, I think, the essence of effective teaching. |
| Rebecca LeBard: | 01:07 | So what would that look like in your area in engineering? |
| Ian: | 01:12 | In engineering, we'd be looking for engineering students that became practitioners that exhibited integrity, that exhibited respect for the knowledge base and respect for each other, that were conscious and aware of their own limitations of their knowledge, that were equipped to fill the gaps in their knowledge. I have a wonderful little theme that I carry through my lectures; I keep telling the students they need to be professionals that other people want to work with. |
| Rebecca LeBard | 01:38 | "That other people want to work with." I like that. Thank you for that summary, Ian. |

# An evaluation model for a new post graduate program

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| Rebecca LeBard: | 00:04 | Hi Lydia. You've been developing a Graduate Diploma in Psychology. Could you tell me a little bit about that? |
| Lidija Krebs-Lazendic: | 00:11 | Hi Rebecca, yes. In the School of Psychology, we are developing a new online program. It's called the Graduate Diploma in Psychology, and it will start early next year. The program will be delivered in 10 online courses. All courses will have the same structure, the same number of hours for lectures, tutorials, interactive activities. And each course will be delivered within a six weeks period, so it's going to be quite intensive work for our students. |
| Rebecca LeBard: | 00:47 | And as educators, an important part of our practice is evaluation. How do you plan to evaluate this new program? |
| Lidija Krebs-Lazendic: | 00:56 | The evaluation starts in the early stages of program development. This is when we are designing our content and they're planning our assessment. That part of it is curricular mapping, and curriculum mapping stages we are looking at how our learning objectives of the program are aligned with graduate attributes, and how each of these learning objectives is addressed in our assessments. |
| Lidija Krebs-Lazendic: | 01:25 | That's what I'm specifically interested in, and that's what I've done so far. For the later stages of the program, once when the program is being delivered to our students, we are going to evaluate the program outcome in four different stages using Kirkpatrick's evaluation model. Based on the model in the first stage we are going to evaluate students' reaction to the program and their understanding of relevance of the program content. In the following stages we are going to look at how they're developing knowledge during the program, and further on we are going to look at how they use that knowledge in their everyday life. |
| Lidija Krebs-Lazendic: | 02:13 | The long-term evaluation will be concerned with the results of the program long-term. |
| Rebecca LeBard: | 02:20 | So, what would success look like for you in setting up and delivering this new program? |

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| Lidija Krebs-Lazendic: | 02:29 | That is actually the most important part of every educational program. A successful program is the one that has long-lasting effects and that provides students with knowledge that they can use in their professional life and that they can easily transfer into different work environments, long after the program has been completed. So this is our final aim and this is how a successful program should look like. |
| Rebecca LeBard: | 03:00 | Thank you. |
| Lidija Krebs-Lazendic: | 03:01 | Thank you, Rebecca. |

# Providing evidence of the impact of your teaching to assist you in applying for promotion

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| Adrienne Torda: | 00:04 | Applying for a promotion as an education-focused academic is actually quite challenging because what they do is benchmark you against everybody else. You actually have to provide evidence of impact of your teaching. |
| Adrienne Torda: | 00:19 | Now there's a number of ways you can do that, but the more data you have, the better, the more student feedback you have, not just about engagement, but also about user acceptability and experience, also about knowledge changes. If you can, you need to also follow that through to any changes that's now happening in the assessment level, or even in the workplace level. I had students writing back to me about the impact of what I had taught them now had on them in the workplace. |
| Adrienne Torda: | 00:50 | So any feedback you can get, either on mass via surveys, individually from your past students, or even when you do things like give lectures or talks outside your own faculty or you're invited to talk in the community, those things are all very helpful. Just remember, collect the evidence, put it all in an online folder so that then when you're actually going for this process, you know where to access it. |

# Assessing novel teaching tools that assist student learning in online health studies courses

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| Rebecca LeBard: | 00:06 | Husna you're also doing some work on a project at UNSW with online teaching. Could you tell us a bit about that. |
| Husna Razee: | 00:14 | Yeah. This project is actually a health promotion course, which is part of the Bachelor of International Public Health program. This is a PLuS Alliance program. |
| Husna Razee: | 00:26 | In the course that I am designing, I am trying to use principles of authentic learning. The idea is, we've created a fictitious country called Pombani. It's a fictitious country but the information that we are using actually comes from the PhD research of one of my students, Albie Sharp. We're using real data for this country called Pombani. |
| Husna Razee: | 00:55 | Students are exposed to three different families in this country. One family lives in the city; comes from a high socio-economic background. Another family lives in the city but is from a poorer socioeconomic background. The third family is from a rural area. |
| Husna Razee: | 01:15 | Within health promotion we want to teach them the concepts of social determinants and how social determinants influence health. How do we approach projects that are aiming to promote wellbeing? How do we address those social determinants? |
| Husna Razee: | 01:33 | Students go through this study within the 10 week period. We then get them to apply what they are learning, the concepts they are learning. They explore that country of Pombani, see what's happening within that so they get to feel it as a real-life scenario. I'm hoping that is going to engage them within the online scenario. |
| Husna Razee: | 02:03 | This is still a project that is in the pipeline, in a sense. The development is almost finished. I will be teaching it in term three, in 2019. I am hoping to be able to assess, again, how well is this engaging students? How well does it actually lead to learning? The plan is, then to think about what ways, what sorts |

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| | | of evaluation can be applied to this? Yeah, it's still in the planning process, the evaluation part of it. |
| Rebecca LeBard: | 02:39 | Yes. Thank you so much for sharing some of the interesting projects you're doing. Also, how we can think ahead about how we might evaluate students learning in different environments. |
| Husna Razee: | 02:49 | Yeah. |
| Rebecca LeBard: | 02:49 | Thank you. |
| Husna Razee: | 02:50 | Thanks. |

# Comparisons of some different ways to evaluate teaching

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| Elizabeth Angstmann: | 00:05 | I've been taking the same really large course for a number of semesters now. I've introduced a number of changes over those semester. I'm interested in knowing how these changes, which I've introduced, have affected student learning. |
| Elizabeth Angstmann: | 00:21 | In my courses, I've been giving them concept inventory tests. Which are little multiple choice tests, which test the understanding of core concepts. I give this right at the start of the course, before they have their first lecture, and then again after we've covered all the material in the topic, which is being tested. They answer these multiple choice tests on Moodle. I have a look at the differences of how they went before we taught it and after we taught it. From this I can calculate their learning gains and see if the changes that we've made have been effective. |
| Elizabeth Angstmann: | 00:53 | For example, a couple of years ago I introduced web stream lectures. I wanted to find out if this disadvantaged the students who were electing to learn online, as opposed to face-to-face. I could use this to compare. In the next couple of years, a new HSE is being introduced, so we can also look at how the concepts that the students have coming in changes if they've done the new HSE syllabus. |
| Elizabeth Angstmann: | 01:18 | Adie, what have you been doing in your courses? |
| Adrienne Torda: | 01:21 | What I wanted to do was create an entirely new module and add it into the curriculum as it stands. Nobody had done this before. What I originally wanted to do is something like you did, where some of the students did it and some of them didn't but that proved to be too problematic because of the variable learning in that latter part of our course. Instead of that, I did a before and after evaluation. |
| Adrienne Torda: | 01:44 | I actually had a focus group. We spent a whole evening, the students came. We did some knowledge testing before anybody had done any of the learning. Then they went through modules. They did a whole lot of learning activities. Then they did a repeat knowledge test at the end. I was able to compare the first quiz with the second quiz, the first run-through of the |

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| | | second quiz because they went on to do it a number of times after that. |
| Adrienne Torda: | 02:08 | I was able to look at learning gains there. I also had a separate focus group analysis of the actual experience of learning to look at things like engagement and things like that. |
| Adrienne Torda: | 02:19 | Rebecca, what did you do? |
| Rebecca LeBard: | 02:21 | I wanted to introduce a research experience into a course. Some of our students want to go onto honours or post-graduate research. They want experience in that area but not all of them. About 50 students, out of around 300, elected to do that. I gave them all a survey on their learning gains. |
| Rebecca LeBard: | 02:40 | It was really interesting to see that all the students felt similar in their interactions with their lecturer and their tutors, but those that had chosen to do the research stream, identified more as being a scientist, wanted to put more time into their project and felt more prepared for honours and research programs. |
| Rebecca LeBard: | 02:59 | It showed that the students that wanted something extra were getting what they wanted out of it but the other students didn't feel that they were missing out on that one-on-one time. |
| Rebecca LeBard: | 03:09 | We've all done something different, when we've looked at evaluating our teaching practice and our changes. Whether it's before and after or comparing two groups of students. There's a number of different ways you can do that. |
| Adrienne Torda: | 03:22 | Thank you. |

# Closing the loop – adapting and changing teaching in response to student feedback

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| Adrienne Torda: | 00:05 | So my name's Adrienne Torda and I'm an education-focused academic here at University of New South Wales. |
| Adrienne Torda: | 00:12 | I changed over to that role last year, but for many, many years before that I have been passionate about delivering the best educational experience I could. |
| Adrienne Torda: | 00:21 | What I did throughout my many years here was that every time I delivered something, I evaluated it and got feedback from my students. And this I did because sometimes I could tell that they weren't quite as engaged as I wanted them to be or as I thought they should be, and I wanted to find out what they liked and what they didn't like and adapt my teaching accordingly. |
| Adrienne Torda: | 00:41 | So over the years I did lots of changes to the content that I was delivering. And then more recently I thought about the format, and I realized that although we recommend textbooks for our students, they don't actually even buy textbooks, even in medicine. I did a survey which confirmed this: almost 50% of students don't even buy a single textbook in medicine any more. |
| Adrienne Torda: | 01:04 | So following on from that I developed a digital tool which was a condensed information toy that they could go online, they could interact with, and they could use, and I went on to survey and get evaluation on this and what kind of impact it had on their knowledge. I did other things like getting students to help me put together a podcast that was about topics they wanted, by them, delivered, put together, and I surveyed them about this and they loved it. |
| Adrienne Torda: | 01:34 | Then when this year I decided to go for a promotion it ended up that I had a lot of evidence about the impact of my teaching on students, purely from doing these evaluations. Not only could I show how good various things I was doing were but I could also show a trend over time. |
| Adrienne Torda: | 01:52 | So this is just one other reason why you might want to evaluate your teaching practices. |

# Evaluating student essays using an innovative moodle based tool

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| Anne Galea: | 00:05 | Hi, my name is Anne Galea and I'm from the School of Biotechnology and Biomolecular Sciences. I teach biochemistry and molecular biology to a range of science, medicine, and optometry students. I'm also involved in curriculum design, course development, and also the design and development of a number of different online learning activities. |
| Patricia Arthur: | 00:27 | I'm Pat and I'm from the School of Optometry and Vision Science. I teach mainly clinical subjects. The first clinical course that the students have when they're studying optometry and vision science. I'm also a supervisor of the final year Pediatric Clinic. |
| Anne Galea: | 00:43 | Today Pat and I are here to talk to you about a tool we both use in our teaching. The tool is called the Workshop Tool in Moodle. It's used to facilitate peer review and teaching. |
| Patricia Arthur: | 00:55 | I use it, in the blind form for blind peer review. I also use it in the non-blinded form so that the students know exactly who's reviewing their work and who's work they are actually reviewing. |
| Patricia Arthur: | 01:09 | Which version do you normally do Anne? |
| Anne Galea: | 01:11 | I usually use the blind, or anonymous, form of the tool. |
| Patricia Arthur: | 01:14 | Right. I think you've got a lot more students than I have, haven't you? |
| Anne Galea: | 01:16 | Yes. We have an excess of 1,000 students in one of the courses I primarily use this tool in. What about you? |
| Patricia Arthur: | 01:23 | Yes. We've only got anywhere from about 80 to 100 but needless to say, once the tool is set up it's fairly automatic. |
| Anne Galea: | 01:32 | Right. |
| Anne Galea: | 01:33 | What are you actually using the tool for, in your courses? |

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| Patricia Arthur: | 01:36 | I have two functions. I use it for an essay. The essay is one of the few times that the optometry students actually have to research and write an essay. I also use it as video for clinical assessments in their second year. |
| Patricia Arthur: | 01:52 | Yours is an essay too? Yeah? |
| Anne Galea: | 01:53 | Yes. It is an essay. In our essay, we're mainly using it for our first year biology students. The main purpose of the essay is to introduce them to the features of scientific literature. Being able to find scientific literature. Being able to look at the different types of articles that are present and being able to navigate their way around it. Perhaps even understand a few of the features that they see in these scientific articles. |
| Anne Galea: | 02:20 | Pat, how do you use the Workshop Tool in that assignment? |
| Patricia Arthur: | 02:23 | Well, with the essay that the students write, what I found was that it actually was very, very difficult to mark. Mainly because you can tell they start the night before, finish at 2:00AM, and we get handed a piece of not particular good work. I was very tired of that and pleaded to someone from DVC to help me, which point Lorenzo suggested that I split it up into three different parts and have them blind peer reviewed. That they can then tweak their work up and give me a nice on at the end. |
| Patricia Arthur: | 02:58 | That's how I used it. I only had about 90 or so students. How did it work for you? |
| Anne Galea: | 03:03 | Right. We actually, over a few years, developed the assignment so that students would actually submit a draft essay. Then they would actually peer review one another's essays. Three to four essays each, they would peer review. They received that feedback from their peers and they used the feedback from their peers to actually improve their original draft essay. Then they would re-submit an essay, at the end, that would be marked by their expert tutor, who be the final mark for their assignment. |
| Anne Galea: | 03:36 | In addition to that, we also used the calibration facilitation in the tool. That would allow us to actually get the students to learn how to become a better peer reviewer. That meant that they could actually look at exemplar assignments, so essays that were written in the past that were either good, bad or intermediate. They'd get feedback on how they were actually |

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| | | marking those exemplars in the calibration aspect of that assignment. That also helped them to be a better peer reviewer. |
| Anne Galea: | 04:06 | We also used that calibration aspect to actually train our tutors to become more consistent markers across them, as well. |
| Patricia Arthur: | 04:13 | Right, 'cause every time the student reviews somebody else's work, they're learning, and learning, and learning. Then they can incorporate that into their own final effort. Yes, that's exactly what we found. |
| Patricia Arthur: | 04:25 | We found too, that the students were a little bit scared of it to start off with. In that, the reactions were, "Oh no. They're getting me to do three times, four times, more work by doing this." But by the time we got towards the end, they really appreciated the fact that it was much less stressful at that last moment, when they had to put it together. In fact, our marks showed it towards the end as well. |
| Patricia Arthur: | 04:51 | You've had good feedback on your process? |
| Anne Galea: | 04:53 | Yeah. Really good feedback. Like you, I was so surprised because I thought students would really balk at, and complain, about having to mark so many essays but, in actual fact, that was the bit they liked the most. They said that they found the peer reviewing process more valuable than actually writing the essay itself, seeing other students essays. |
| Anne Galea: | 05:15 | Our evaluation process has included a lot of surveys about what they thought about the whole process. What aspects they thought they benefited from the most. What aspects they thought were not that good. We got a lot of valuable feedback from doing those surveys. |
| Anne Galea: | 05:31 | How did you evaluate your project? |
| Patricia Arthur: | 05:33 | Right. Basically the essay had been run in it's actual format a couple of times. What was useful was that I was able to look at the marks from the non-peer review version with the peer reviewed version. Even though the range of marks was still basically the same, what I found was the median actually increased. The bulk of the marks moved up, which indicates that the quality of work was actually a lot better, when it was done in that way. Also, I had a much better time marking them as well because they were much better thought through. |

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| Patricia Arthur: | 06:10 | Even some of the students had, in fact, realized that they were completely on the wrong track when they were answering parts of the question. It's really a tool that allows students to self correct and monitor each other, as well as their own work. I'm definitely a fan. |
| Anne Galea: | 06:26 | Yeah. Absolutely. |
| Anne Galea: | 06:27 | Our tutors also agreed that, for the tutors that had been marking this assignment prior to us introducing the peer review element, that they noticed that the quality of the essays dramatically improved when they marked them. |
| Anne Galea: | 06:40 | But, unlike you, we also tweaked a few other aspects of the assignment so we weren't really able to compare the marks, as such, between the successive years but we did change the overall assignment, for several years, with that peer review process, using the Workshop Tool. Each time we'd change a different aspect of it and we'd use the feedback we got from the surveys from the students, to actually tweak those aspects. The bits they didn't like we made a little bit better based on their feedback. That was really helpful as well. |
| Patricia Arthur: | 07:09 | Right. |

# An 8-step evaluation cycle to improve pharmaceutical courses

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| Orin Chisholm: | 00:05 | In this short video, I would like to take you through the processes that I followed to transform the Master of Pharmaceutical Medicine Program. |
| Orin Chisholm: | 00:14 | This program was originally delivered as a traditional distance education program, with students completing work individually. Only interacting in a weekend intensive session on campus and a few telephone based tutorial sessions during the course. |
| Orin Chisholm: | 00:32 | The program is now delivered fully online, with student interaction, participation in webinars, online discussion forums, and group work activities. Ensuring that students gain maximum benefit from their educational experience. |
| Orin Chisholm: | 00:50 | I'd just like to go through the different steps. There are about seven different steps that I undertook to transform this program. They're applicable to anyone looking to transform their courses as well. |
| Orin Chisholm: | 01:01 | The first step was a review of the existing program. I conducted a thorough review of the program. I reviewed the advisory board composition. You might also want to review the mission, vision and values for your program. If you have neither of these in place, then I would suggest that you put these in place for your program. |
| Orin Chisholm: | 01:23 | The second step is benchmarking. You need to benchmark the program against other competitors, both national and international competitors. Given the increased globalization of the education marketplace these days. This will ensure that best practice is identified and then used in the development of your new program structure. |
| Orin Chisholm: | 01:47 | The third step in the process was conducting a stakeholder survey. Firstly you need to identify the appropriate stakeholders for your program. Current students, alumni, current permanent or casual lecturers that teach into the program, workplaces where your students will move into after they've completed their studies, your advisory board for the program. You need to then develop questionnaires about the current course and what |

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| | | the stakeholders most want to see in a revision of the course. Distribute that to your different stakeholders and get their feedback. |
| Orin Chisholm: | 02:27 | Once you do the stakeholder analysis you need to do a gap analysis. You need to perform this based on the feedback from your survey, plus your own review of the literature and your own experiences in teaching the course, advice from course developers and your program advisory board. You should start, at this stage, developing your program level learning outcomes for your revised program. |
| Orin Chisholm: | 02:55 | Your gap analysis will cover, not only the content, but also the skills that you want to develop in your students. As well as the type of course that you want to deliver. For example, do you want to move from a face-to-face course to a blended course or to a fully online delivery mode? |
| Orin Chisholm: | 03:13 | The fifth step in the process, is course development. This is one where you spend a lot of time. Once you've identified the broad scope for the program, you need to work on the development or re-development of all of the individual courses that go into your program. You need to gather an expert team together. Program staff, casual or permanent lecturers, educational developers, industry representatives, your advisory board members, alumni, and current students can all feed into the course development process. |
| Orin Chisholm: | 03:47 | The second final step is formal approval of the course. You need to put the course through the universities formal approval processes, through [AMES 00:03:56], to ensure that it meets the text or requirements for program degrees in Australia. The course AMES, learning outcomes, assessment tasks and a general overview should be outlined for each course, within your program, by this stage of the process. |
| Orin Chisholm: | 04:14 | Then, the final step in the whole process is implementation. Now you need to have a really good plan for the delivery of your course. Getting the appropriate casual lecturers on board. Reviewing all the content. Developing a Moodle course site. Pre-recording lectures, if they're required. Papers, and textbooks, and other videos that you want to refer students to. These all need to be developed during that implementation phase. Then you need to deliver the course to the students. |
| Orin Chisholm: | 04:44 | Once the course has been delivered and delivery is under way, you can start reviewing the course again. Going back to the beginning of that cyclical process. Review and identify steps that |

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| | | need to be addressed. Any issues that arise during the delivery of the course so that you can improve future delivery of the course. |
| Orin Chisholm: | 05:04 | As you can see, this renewal process is circular and provides continuous improvement structure to course development. I hope that you'll be able to apply these different steps to the re-development and development of your own courses and programs. |

# Evaluation of a novel way to build online courses

Elizabeth Angstmann: 00:05 I'm the first-year physics director. So, the context that I teach into is mainly very large first-year courses. Some of them are blended and some of them are online. The tool that I mainly use to evaluate the effectiveness of my courses is concept inventory tests. So, concept inventory tests are great because they actually measure the learning of the students and I think that's what we should really be focusing on improving, the learning of our students. So, how concept inventory tests work, is before you teach the students a topic, you give them a multiple choice test about the important concepts in that topic. After you finish teaching the concept, you give the same test again and you compare the results with the pre-test and the post test. And from that you can tell how much your students have learned. Other measures that I use to evaluate the effectiveness of our results is student engagement by looking at what resources they've used and for how long, and also student results.

Elizabeth Angstmann: 01:13 So, some of the things that I like to measure with these concept inventory tests are gender differences between the students. So, in physics we have problems with the number of female students. We don't have many female students coming in. We would like to increase that number to improve the balance between male and female students. And also when female students do come in, they tend to know less when they come in and they tend to learn less in most physics courses. The other things I measure with concept inventory tests are the effectiveness of online courses. So, I want to find out, are we disadvantaging students by offering them a lot of materials online and running purely online courses. I also evaluate any changes that I've made. So, I've been running these concept inventory tests for quite a number of years now. So, whenever I make changes to the assessments or the resources that we supply to students, I check if this has had an effect on the concept inventory tests.

Elizabeth Angstmann: 02:18 So, the results I've found so far, one of the results that I was very excited to find was that students were not doing worse in the purely online courses. We have a online course which I developed called Everyday Physics and another physics course which covers similar concepts but is delivered mainly face-to-face. I could compare the learning gains from these two courses

and I found that the learning gains in the online course, were actually slightly higher than in the face-to-face course. Another exciting result was that the girls actually learnt more in the online course than the boys. So, it's not that we're disadvantaging the boys. What we found was that the girls knew less coming in, but then in the post-test at the end, the boys knew just a little bit more than the girls, so we were decreasing the gap between them.

Elizabeth Angstmann: 03:15 I was able to apply this, knowing that online courses were as effective as face-to-face courses. It gave me confidence to introduce a fully online degree last year to teach high school science teachers physics. I've given a number of talks at conferences about the findings that I've made and this has had some impact. There's a number of institutes looking at introducing a course similar to our online course, Everyday Physics, as a result of that. I've published a small number of papers, but my main focus is on applying what I have learnt to improving the courses the I deliver, to improve the learning experience for the students. So, I think that as EF staff members, this should be our main focus rather than on publishing the papers.

# Evaluation of a novel way to build online courses.

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| Carol Oliver: | 00:05 | I have three fully online courses and the benefit I have with those courses, one in science communication and two in astrobiology, is that they're all electives. I have the benefit that when the students enrol in my course I can assume that they are interested in that subject. I find when students come into the course they have the mentality of rote learning and expecting a final exam. I need to change them from that perspective into one of learning and enjoying the learning and retaining what they've learned in the course. |
| Carol Oliver: | 00:40 | None of my three courses are there any final exams and the reason is because I don't want them to rote learn. The kind of feedback I get from the students is that it's the first university course that they've come across where they've actually enjoyed the learning and retained the information. The tools that I use for evaluating the impact are multiple. I use the essay method but I also use in one case a virtual field trip, where the students explore fields that I couldn't otherwise take them into. |
| Carol Oliver: | 01:14 | They can collect samples and they have to bring those back in terms of pictures and analyse those samples individually and then they compare notes with other students. I get them in a group situation even though they're remote students and online. My courses are built on the concept of education through exploration. I built them on the basis of what are the final outcomes I want to get from each of my courses and I make that very, very clear to the students where those outcomes are. |
| Carol Oliver: | 01:45 | How do I tackle that? Well, I build my courses backwards. I build them backwards because I need the other assignments to build on the way forward to that final assignment that covers the whole course. I use my assignments as learning opportunities and I build the content around those learning opportunities. |
| Carol Oliver: | 02:05 | Why do I do that? I do that because I can see that a few years ago the interaction of the students was kind of fairly constant, a fairly normal curve. Today what I see is students clustering around the three assignments and therefore I can't change the way students do things but I can change the way I do things and |

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| | | the way I do things is to say those are the learning opportunities. |
| Carol Oliver: | 02:31 | How do I evaluate my courses? Well of course I have data, which we all have access to, but I also asked for the Excel sheets, all of the data, all of the lines of data. This is hundreds of thousands of lines of data. Then I figure out the questions that I actually want to ask of the course and I have scripts written so I can interrogate that data and I can compare year on year how the course is improving. I combined that with the feedback from the students. Hopefully each year I'm improving those three courses. |

# A discussion of transformation in teaching through reflection on feedback

Rachel Thompson: Hello, I'm Rachel. I'm a senior lecturer at the University of New South Wales and I teach in the medicine program. I teach medical students very early on in their university career some difficult concepts. I teach them statistics and evidence based practice as part of the quality of medical program within the medicine course. Currently I use online evaluation including quizzes and formative feedback in adaptive tutorials to evaluate my overall curriculum and I also have the opportunity to have summative exam questions within the courses that I teach with them.

Rachel Thompson: During the early days of my teaching I discovered that the students were failing. They were failing around threshold concepts. These are the difficult troublesome concepts that students find hard to get past, but once they do get past them it's like a transformation. They suddenly see the world and they see statistics in a whole new ways. These are really important concepts that I needed the students to understand. During the evaluation they were failing exam questions, between 15 and 30 percent of them during [a whole cohort would fail my exam question on statistics in significance.

Rachel Thompson: This was not right, so I identified, I went into my curriculum, identified where all those threshold concepts were and I started teaching to them, focusing around them, trying to remove any of the barriers in terms of their learning and disengagement, such as numeracy, using language, using visuals to actually help them through that learning. I used [00:02:00] online evaluations to make sure that I actually could see within each of those concepts whether they'd got it and because I was using adaptive tutorials and are now using them across the whole of my course, I can actually see where each of those students themselves have not got the question right.

Rachel Thompson: If they don't get it right they get given feedback and they can come back around again and I can actually see that for the whole of the cohort. This gives me amazing information. It gives me information that can help me re-evaluate my teaching and it can also give me information right now in a class so I can run these classes and I can immediately say look, a lot of you are getting this result wrong, what is it that you don't get and actually take that into another level of teaching. The result has been really good.

Rachel Thompson: In terms of exams, exam question I set I now get an average of about eight and very few, eight out of ten, I guess that's about 80 percent and in terms of the failure rate that's really gone down to being quite minimal, below five percent. For me that's good. Exam questions aren't the whole story though, I actually see

the students engaging, I see them being interested in the adaptive tutorials. They love quizzes, they like doing them, so it's a win/win [00:03:30] scenario.

Rachel Thompson: What's the impact been on my teaching and on my students? Well, in terms of the teaching I have changed the whole of my teaching in terms of transforming it across the whole curriculum. I now evaluate as I go along and I react to that evaluation and can feedback directly to students. With all this around threshold concepts, it's changed the way I've taught and it's changed the way that students react to my teaching.

# Flipping student and teacher led evaluations

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| Kim Snepvangers: | 00:16 | The title of our presentation today is, Flipping Student Led with, alongside and to Teacher Led Evaluation, and we're interested in synergies of valuing care and reciprocity in higher education. |
| Arianne Rourke: | 00:33 | The end goal we see is focused on improving the student experience in higher education, achieved through valuing teacher case based knowledge, which is a creative and iterative process, rather than a linear causal relationship where X equals Y. For Shoreman, it is a teacher's theoretical acquisition of case based knowledge through an involving set of situated experiences, devised to enhance wisdom of practice that is essential to the learning enterprise. |
| Kim Snepvangers | 01:04 | Working iteratively involves working collaboratively, using reciprocal synergistic relationships where disciplinary knowledge and appropriate pedagogies are inexplicably linked, emergent and meaningful in an encounter, rather than predetermining all possible educational outcomes and evaluation prior to engaging with learning. |
| Kim Snepvangers: | 01:32 | We believe that there should be a more mutual and continuous interaction between disciplinary content and pedagogical knowledge, that involves care, events, mutual support of learning about teaching, and learning practices. |
| Arianne Rourke: | 01:50 | We argue for a community level of evaluating teaching, rather than an individual evaluative process that tends to focus on the blame game currently in practice in many higher education institutions. |
| Kim Snepvangers: | 02:05 | We shift importance to developing a community of learners, where there is active reflection for the learner on their own and other's experience of learning, making the learner more aware of their own actions and the resulting consequences. The learner in this scenario, is both the student and the teacher. Instead of focusing on the individual teacher and the short term frames available for what is typically atomized feedback from students within semestarised structures, we focus on communities of practice of teachers as learners, where students |

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| | | work as partners with academics across longitudinal timeframes. |
| Arianne Rourke: | 02:47 | One recent case study that demonstrates our vision, is our Teaching International Students or TIS project, captured in a distributed facilitative framework that encompasses activities, events, resources, and a growing inclusive community of practice. |
| Kim Snepvangers: | 03:05 | In terms of example of evaluative practice based structures, the impact and outcomes of the TIS project on developing teacher case based knowledge, are evaluated through a range of qualitative measures. Some of these include high level positive educator Led evidence that does not rely on one-off surveys, and instead explores other ways of longitudinally capturing qualitative data that takes into account the organic, iterative nature of learning and teaching, such as the number of participants, motivation, and willingness to transcend into generational, professional, academic, and cross-disciplinary boundaries. |
| Arianne Rourke | 03:51 | Feedback about new insights and practical strategies used as a result of participating in the Teaching International Student project, includes activities, discussion forums, and good practice showcases. It also includes evidence of shifting practice through pre and post reflection survey data within and outside each activity and event. Resource development to enable teacher discernment of good practice through presentation of teacher case studies, archiving and community feedback through learning management system sights, and programs, PowerPoints, and other visual learning artifacts, are other examples. |
| Kim Snepvangers: | 04:37 | We're also interested to demonstrate ways of capturing and disseminating holistic, new career development learning in professional education practice through showcasing, evaluating and the adaption of good practice in a variety of disciplinary contexts, through demonstrating how participation and engagement into these activities events can represent for example, a teaching case for promotion, career development learning, and annual career conversations. |
| Arianne Rourke: | 05:07 | To conclude, using the idea of currency in terms of resources and value adding, we propose that higher education institutions would greatly benefit from developing teacher case based resources in terms of cultural, ethics and care, alongside typically high cost, technological systems at scale to evaluate learning and teaching. |

# Evaluating undergraduate research experiences

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| Rebecca LeBard: | 00:06 | A common theme is undergraduate science is teaching students to think like or be a scientist. This led me to introduce a research-integrated learning stream into an advanced biochemistry course and to evaluate its effectiveness. The innovation provided 50 interested students from the course with a research experience instead of the traditional cookbook-style classes. I designed the curriculum to ensure that both streams shared a set of technical and non-technical skills, and I wrote assessment tasks that addressed the elements that were common to the two streams. The students in the research-integrated stream carried out experiments in their weekly laboratory classes to look at a metabolic pathway in yeast and how it's regulated. Before each class, the methods were optimized on controls by the technical staff, but otherwise the results remained unknown to both the staff and the students until the lab was finished. And this aspect was key to the authenticity of the experience. |
| Rebecca LeBard: | 01:16 | I evaluated student learning using a post survey. This comprised by the students in the research stream and also those that were not in the research stream, in the traditional stream. The survey tool was an undergraduate research student self-assessment survey, which is really designed for internship-style research experiences, but was effective in this context also. It investigated skills acquisition, awareness of the practice of scientific research, and future plans. Questions on the theme of thinking and working like a scientist showed the research-stream students reported the highest frequencies of good and great gains for displaying data in a scientific format and communicating the outcome of an experiment. When looking at professional identity, such as whether students have a sense of belonging and ownership of their research activities, there was a significant difference between the research students and the traditional cohort for the items, engage in real-world science research, try out new ideas or procedures on your own, feel responsible for the project, and work extra hours on the project. |
| Rebecca LeBard: | 02:35 | The research-stream students reported the highest percentage of gains for the items, engage in real-world science research and feel like a scientist. When looking at personal gains related to research work, in gains and skills, the research-stream students |

reported significantly higher gains for understanding what everyday research work is like and keeping a detailed lab notebook, a practice that was encouraged but not assessed for them. No significant differences were reported between the groups of research and non-research students for interactions with their lecturer, their tutor, and their peers, both inside and outside of class. Of interest, the research stream students reported significantly higher gains for the item, my research experience has prepared me for postgraduate research including honours. This evaluation demonstrated the experience was successful, with learning gains suggesting students in the research group gained an increased confidence in their abilities as a scientist. The assignment, a desire from my school that students enter an honours or postgraduate year more prepared.

Rebecca LeBard: 03:54 Reflective responses or qualitative data from the research stream were analysed to give feedback on the course, for further iterations. They focused on identifying the aspects that were either a help or hindrance, and from this two-thirds of students suggested an improvement, and some of these suggestions I implemented in subsequent years. These included more time for explanations and discussions. Over a third of the students described gaining a personal benefit from the experience. They reported skills acquisition, including technical and nontechnical skills, like using literature and writing a laboratory report. Many students, more than 50%, made comments related to experiencing real or authentic research and their appreciation for its challenges. It was only by evaluating this innovation both qualitatively and quantitatively, that I was able to gain useful feedback for subsequent iterations, able to demonstrate its success, and get data that I could use successfully for promotion and teaching awards.

# Evaluation through curriculum mapping

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| Rebecca LeBard: | 00:05 | I teach a large first year biology course called Molecules, Cells and Genes. This has an enrolment of around 1000 students. I evaluated how quantitative skills are taught within this course. |
| Rebecca LeBard: | 00:18 | A proficiency in quantitative skills is essential for being a biologist. By quantitative skills, we mean possessing an ability to use mathematical thinking, and apply statistical methods, and within the context of biology. The Australian Council for Deans of Science recognizes that quantitative skills is important, not just in biology, but across the sciences and has designated this as an essential outcome for graduates. |
| Rebecca LeBard: | 00:47 | My motivation for evaluating quantitative skills in my first year course is that, unfortunately, studies have shown that in biology we're not meeting this outcome. We aren't embedding quantitative skills effectively and our students aren't leaving university confident and proficient. |
| Rebecca LeBard: | 01:05 | I developed a usable methodology to map quantitative skills, in the curriculum, that looks at the pedagogies used to teach them, the number of occurrences students have for learning and how to show this chronologically. The data is collected quickly and in a manner that is easily shareable. I completed this work as part of my Masters in education, in higher education, supervised by Professor Stephen Marshall at UNSW. |
| Rebecca LeBard: | 01:34 | I've used it to evaluate, not just my own course, but a colleague's course. I've presented on it at a biological sciences forum. I've had interest from other institutions. |
| Rebecca LeBard: | 01:47 | These are the data sources that I consult to identify whether quantitative skills are present or not. The quantitative skills I was looking for, when I piloted this methodology in my course, were from a published list assembled in a project at the University of New England. They identified 43 quantitative skills across their STEM curriculum. They developed this list by consulting with the literature. Other sources, such as the New South Wales High School Certificate Curriculum and consultation with other STEM academics. |
| Rebecca LeBard: | 02:25 | That was the list of quantitative skills that I've used. As a theoretical framework I used the student scented race model. |

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| | | The race model categorizes a course into four components. Resources, such as lectures. Activities, so things students due such as tutorials and practical classes. Support materials and evaluation. This enables me to describe the pedagogy of how a quantitative skill is taught. This is an improvement on previous approaches to curriculum mapping in biology. |
| Rebecca LeBard: | 03:03 | Once a quantitative skill is identified, I record details of the occasion for learning. The race component, the week of delivery and any other comments of interest. It provides information to me about whether students are simply taught a skill in a lecture or whether they have the opportunity to practice and develop this skill. Whether they get feedback and how it is then evaluated. |
| Rebecca LeBard: | 03:30 | This information is useful because we can use it to inform curriculum design. For example, a colleague used this prior to doing their digital uplift of their course and got valuable information from it. |
| Rebecca LeBard: | 03:45 | The methodology I developed for mapping quantitative skills allows the data to be collected in a way that can be used in learning design representation. This means I can see how the student experiences the quantitative skill. What is the sequence to their learning? I can present that in a way that's easily shareable. |
| Rebecca LeBard: | 04:08 | I adapted a method for representing learning design by Sue Bennett of the University of Wollongong and aligned this with the race model. Visual portrayal of learning design is useful as it allows us to communicate complex data in a shareable way that's clear and concise. For example, when I collected the data on how probability, as a quantitative skill, is taught in my first year course. By showing it visually, I can see immediately that students first see the quantitative skill or come across it in a lecture. They then have support provided by an online video simulation and worked examples in that. However it's evident that the students have no opportunity to further practice this skill with feedback. It's then assessed before they've had that opportunity. |
| Rebecca LeBard: | 05:00 | I hope this has shown how curriculum mapping is a useful evaluation tool to provide feedback on how a skill is taught across a course or developed within a program. It is also useful for benchmarking courses, such as comparing a skill taught across similar courses within a discipline or between institutions. |