

Tertiary Teaching Excellence Awards

2011

Nomination for Rena Heap

School of Science, Mathematics and Technology Education

Faculty of Education

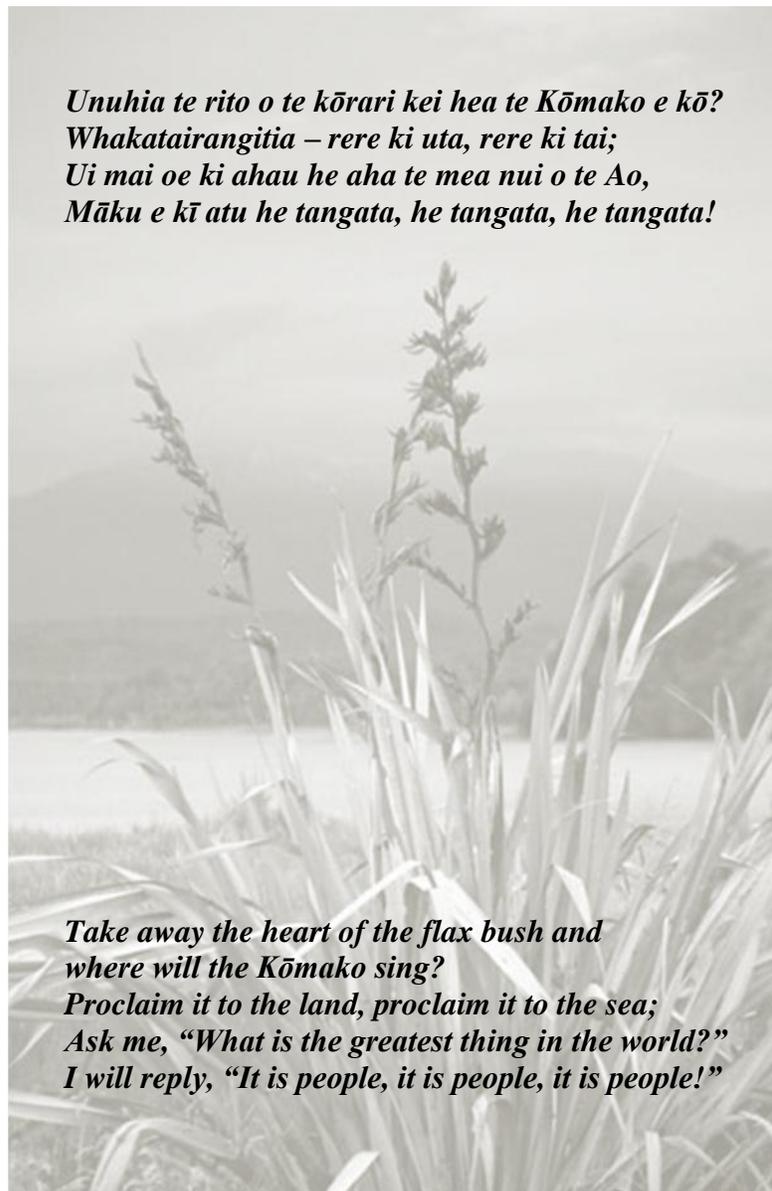
The University of Auckland



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1) Teaching philosophy



When I first read this whakataukī in the Social Studies curriculum document in 1997, it struck such a chord that I turned it into an A2 wall poster that I would lay eyes and heart on each day. It is often quoted elsewhere. But despite its familiarity, fourteen years later it resonates just as loudly.

It resonates because I am a teacher of teachers. Ask me what is at the core of my philosophy of teaching, and I will reply, it is people. It is the students that I teach, and the students that they in turn will teach. Valuing the students, valuing the science education they receive in my classes, and valuing the teacher education they encounter is the embodiment of my philosophy.

Teaching experience

This philosophy has taken me from the beginning of my teaching career in Primary classrooms, to becoming a tertiary educator in the Faculty of Education. My teaching background is critical for authenticity with our student teachers and lays the foundation upon which I build my engagement with them. I have been an educator for over 30 years and never grow weary of it; my passion and commitment have only deepened.

Since my appointment to the Faculty, I have taught science education courses across degree programmes and levels, in distance mode and face-to-face. I have taught a wide range of students including Graduate Diploma students, those enrolled in the Bachelor of Education and those who are taking a second chance at education through the Foundation Studies bridging course.

2) Valuing the students

I believe teaching is about relationships; a way of being with, and relating to others, not simply developing a repertoire of content-related delivery skills. It is critical to build effective relationships with students, to promote a learning culture which engages diverse learners and to encourage each student to feel they are valued and unreservedly accepted by me. It is upon this foundation that they can then meet the challenges and enjoy the delights of learning.

I want to inspire student teachers to value the teaching profession they have chosen. Every teacher, whether in kindergarten or tertiary institution, is engaged in the moral, ethical and professional practice of developing people.

3) The students' voice

My students are in a unique position to critique my teaching. They have asked that their voices be acknowledged, so I have used comments from course and lecturer evaluations to speak to some of the attributes which I consider to be vital in teaching excellence.

Genuine interest, care and respect for all students

Rena is without any doubt the most exceptional lecturer we have experienced. She is caring, supportive, well prepared, very knowledgeable, and engaging. It is a rare privilege to have her as a lecturer. (EDCURRIC 610, 2008)

I never felt inadequate if I didn't understand something. This is the most profound learning that I'll take with me into my own class - how transforming it is as a learner to not be belittled by ignorance. How a class learning environment flourishes when the teacher genuinely responds positively. Rena's rapport with our class was unparalleled. (ACE 924.631, 2005)

Sound disciplinary and pedagogical knowledge

Rena has outstanding science subject knowledge, but she models good pedagogy by willingly admitting when she is unsure of something. Her enthusiasm was infectious. Her innovation was absolutely delightful. It is a shame there is not a Rena in every classroom. (EDCURRIC 260, 2007)

Rena certainly knows the science she teaches. And how to teach!!!! What was extraordinary is that... she empowered us with the confidence that we could all teach science even if we did not have her background. Her teaching is phenomenal!! (EDCURRIC 610, 2010)

A wide range of teaching methods

Hands on practical, concrete activities which really helped us to learn and understand in every lesson. A variety of activities in every lesson. ...explanation – not only of the activity but of why we use it, what pedagogy is behind it, what is says about teaching etc. (EDCURRIC 635, 2006)

I have been profoundly impressed and impacted by this course. In every session we saw different teaching methods and pedagogy. Brilliantly structured. Peer teaching gave authentic opportunity to teach (and discover the pitfalls). Thanks Rena. I hope I can inspire and engage my students the way you have me. (EDCURRIC 610, 2010)

Assessment that enhances learning

Actually working with children in our assignment made it a learning opportunity as much as it was an assessment of our learning. Practical and useful – but an embodiment of theory also. Best assignment task we've been asked to do all year. (EDCURRIC 610, 2007)

Passionate and enthusiastic

Our lecturer Rena Heap is awesome. She was very enthusiastic about maths – about maths!!!!¹ She made learning easy and understandable. Rena was really helpful, approachable and now I look at maths in a whole new way. (EDCURRIC 104, 2008)

¹ I teach science education, but have also taught mathematics education courses some semesters.

Engaging

Nobody ever missed science class. Not even to do assignments. Why would you? You learnt way more in class and certainly it wasn't the kind of learning you could catch up on using a friend's notes. (EDCURRIC 610, 2009)

Rena has been the most engaging and delightful lecturer that I have had. Science was riotously funny and hold your breath hush. Always learning. Always stress relief. (EDCURRIC 610, 2010)

Approachable – making time for students

Rena was an awesome lecturer; she always made sure you would understand every question before moving on to the next. She was very helpful in every way she could be. Always offered extra help. I cannot say a single bad thing about my learning in this maths class. (EDFOUND 15F, 2006)

Development of pedagogical content knowledge

This class went way beyond science. I learnt more about pedagogy and teaching and myself as a teacher in this course than in all the others. It has had a profound impact on my preparation to becoming a teacher. (EDCURRIC 115, 2006)

I learned so much about learning and teaching. This course was more valuable than just the curriculum content it covered in that it also showed how to raise student achievement. (ACE 924.531, 2004)

Supportive and inclusive learning environment

I would love to do this paper again. I found myself really excited to come to class to find out what was going to take place this time. Rena really found my kick button for motivation. What was great for me was the environment was so embracing I felt that I could say what I thought right or wrong. (EDCURRIC 610, 2008)

4) Design for learning

Teaching well is complex and challenging, so teaching others *how* to teach is doubly challenging. Beginning teachers need more than a set of activities, ideas, and techniques to help them become thoughtful teachers who understand the relationship between their teaching, and the quality of

student learning. In all the courses that I teach, I weave the threads of research, subject knowledge, pedagogical content knowledge and authentic assessment into a cohesive course.

You teach as if you've glitter in your veins! You have inspired me to teach. You have reminded me of why I want to teach. You've enriched and equipped us all and challenged us to be true life-long learners. (EDCURRIC 610, 2008)

In order for any learning and teaching method to be effective, I must create a safe, supportive learning environment; socially, psychologically and academically. My most frequent question in lectures is, 'Does that make sense?', and I know from evaluations that students appreciate the chance to say that they don't understand.

Rena, you rock. Thank you for your patience, support and warm laughter at my many alternative conceptions. (ACE 924.631, 2004)

Fundamental to this supportive learning environment is truly valuing the cultural backgrounds and diversity the students bring. I am a New Zealand European, was born in the Pacific Islands, have a Niuean sister, a Samoan son-in-law and have studied basic te reo. Since rapidly increasing ethnic, cultural and linguistic diversity is a key feature of contemporary societies; my pedagogy must be culturally responsive. So, I welcome and use the wealth of different experiences that students bring.

Your eyes did not do the quick up-down with me in my hijab. You did not teach states of matter with all its eating during Ramadan. These are things about your teaching that I have observed and appreciated. (EDCURRIC 610, 2009)

Some of the specific strategies that I use to create a safe learning environment include: learning and using students' names (by end of first lecture); demonstrating interest in their learning; actively providing accessibility for students by being available in my office; and promptly returning phonecalls and emails. I believe these simple strategies foster an emotional engagement for students who are entering a challenging profession. Effective teaching begins with an effective relationship.

Rena is able to build a very positive rapport and strong connection with her students; she inspires confidence in her students; generates an environment where students feel safe to ask questions; and provides regular feedback about her students' progress. (Colleague, 2011)

In order to facilitate learner engagement, I use a wide range of learning and teaching methods in my classes. These include hands-on activities and investigations, small group work, group discussion, guest speakers, PowerPoints, role plays, ICT, co-operative exercises such as graffiti sheets and freeze-frames to cater for different learning styles. My lectures combine experiential and theoretical approaches and emphasise social interaction in small groups to fully engage the students in conceptual learning.



Using dry ice, at the start of a session on the particle nature of matter, as an intriguing 'hook' to engage the students and spark their interest.

Each session is introduced with the intended learning outcomes and an overview. I introduce a 'hook' early, which makes each session unique with a strong but different link to the learning intentions. If class members learn nothing else that session, they will recall the enjoyment of being absorbed in purposeful learning and will take this experience of engagement into their own teaching practice.

Fantastic, approachable lecturer. Rena was always passionate about what she taught and made learning easy and enjoyable. She used an inexhaustible variety of lecturing approaches, interactive activities, group work, whole class work, power points, videos, group investigations. Rena communicates well and developed a fantastic programme which was thoroughly enjoyed. Thanks so much Rena we will miss your smile and enthusiasm. (EDCURRIC 610, 2008)

I design all courses to maximise student participation and contribution, rather than perpetuate the stereotype of the educator as 'sage on the stage'. My courses provide as many opportunities as

possible for the students to teach as well as to learn. For example, in EDCURRIC 610 the first assignment is based on the students teaching a group of children and the second on peer teaching and evaluation of each other's teaching during lectures.

To be honest, I believe it to be the best designed course we have had by a mile. Assignments useful. Classes were practical and purposeful real context of teaching. Brilliant. (EDCURRIC 610, 2007)

Rena possesses scholarship in education that is translated into a transformative pedagogy; an ability to model pedagogical excellence; a commitment to an inclusive pedagogy and a delight in teaching and people that is evident in the classroom environment. But there is also an indefinable quality that makes a teacher unforgettable. Rena has this quality. (Colleague, 2011)

The cutting edge of chaos

At times, in order to create a learning environment that achieves relevance I find myself using a teaching initiative that places me at the cutting edge of chaos. For example, at the completion of an astronomy unit I wanted to involve the class in a different form of assessment to show them that pen and paper assessments are only one of many forms of assessment. The approach I adopted used situated narrative drama and a story-thread to consolidate and revise the students' understanding of the heliocentric model of the solar system.

This necessitated me dressing up as Galileo's housekeeper while the students transformed the room into a time machine by upturning and rearranging chairs and desks. Time travel music was then heard and psychedelic graphics were seen on the data screens. When the music stopped Galileo's housekeeper entered in frenzy as her 'master' had just been hauled before the Inquisition for refusing to recant his heretical notion that the sun was the centre of the solar system. She implored the time travellers to use all the materials lying around Galileo's laboratory to prove that his theory could be right. They had 10 minutes to build their cases before accompanying her to Galileo's trial. The room was rearranged into a court and Galileo's housekeeper appeared in a red graduation gown, masquerading now as a member of the high ranking clergy. Galileo's defenders presented very convincing and well-reasoned arguments in turn, but to no avail: he remained imprisoned.

I risked looking a fool if this activity had fallen flat. I felt vulnerable and well out of my comfort zone. At the end of the session I shared my vulnerability with the students and we discussed the risks involved if they tried something different in their teaching, e.g. in this case balancing these risks against the gains of providing an assessment that was much more engaging, productive and

memorable than a conventional pen and paper exercise. As the students had built their cases, I had assessed each group against the learning outcome of being able to explain day and night and seasons within a heliocentric solar system. Being a teacher requires patience, skill and being prepared to take risks. This time it worked.



Well that was extraordinary. I was busy in my group, using my little polystyrene models to explain day and night - Galileo needed me - when I had one of those 'aha' moments. I saw how you'd 'tricked' us. We were all so caught up, even as adults, in the whole story thing, that we were explaining and defending and all the while learning. We were having fun and you were assessing our learning. Just magic. (EDCURRIC 610, 2008)

Your honesty about your trepidation in acting before us and taking that risk was refreshing. We applaud you. (EDCURRIC 610, 2008)

5) Valuing science education

The need for science

Inherent in my teaching philosophy is the value I place on science education. Science has a powerful and pervasive influence on society, both in terms of the rapid advance of technology and the philosophical implications arising from its ideas. The potential benefits of this increasingly scientific (and technological) society will only be realised if we have a population with adequate scientific literacy.

Everyone can benefit significantly from a science education which enables them to make informed decisions about topical matters involving science, such as New Zealand's high incidence of melanoma, or whether they should welcome or resist genetically engineered crops. Such decisions require education for scientific literacy, but New Zealand's National Education Monitoring Project (NEMP) Science report for 2007 has raised concerns about students' attitudes to science, and the paucity of science programmes at the primary school level. It is against this backdrop that I am absolutely committed to showing student teachers the value and rich potential of science education.

The science I teach must be relevant and meaningful if it is to result in valuable teaching and learning. One of the innovations in which I have been involved, to meet this need for relevance, is developing the MoRST-funded website, the Science Learning Hub. This project, a national collaboration with colleagues from a range of New Zealand tertiary institutions, involves interviewing scientists, generating the supporting material to relate each context to the curriculum and working with web designers to produce video clips and site content. The Hub makes the work of New Zealand scientists accessible to teachers and their students and underscores its relevance to our lives. It is an invaluable resource for teacher education.

Rena has made an invaluable contribution to the Science Learning Hub project since it began in 2007. Since the launch of the Hub five years ago there has been a significant increase in traffic to the website with 44,000 unique visitors in February 2011 - 9,000 of these being from New Zealand. Contexts such as the Nature of Science section which Rena has developed are expected to ensure this trend continues. [Colleague, Science Learning Hub, 2011].



- HOME
- CONTEXTS
- SCIENCE STORIES
- NEWS & EVENTS
- THINKING TOOLS

CONTEXTS

CONNECTIONS

SCIENCE LEARNING HUB

The Science Learning Hub provides resources for teachers for school years 5-10.

Our resources for teachers explore the latest research in science and technology in New Zealand and are closely linked to the science curriculum.

The Science Learning Hub is developed by educators and teachers in collaboration with New Zealand scientists. The project is funded by the Ministry of Science and Innovation (MSI), formerly MoRST, and managed by the University of Waikato.



MY SCI

REGISTER FOR MY SCI



My Sci has been developed to help teachers use the Science Learning Hub effectively in their teaching practice. It offers ideas for teachers about how to use the content and

about using the Hub, insights from the writers, and more – we will continue to add new content to this part of the Hub.

[Register](#) now to access My Sci. It's free and easy to do.

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RSS 2.0



CYCLING AERODYNAMICS

This story looks at cycling aerodynamics, drag and rolling resistance. It shows...



SCIENCE MADE SIMPLE

These 15 short video clips are aimed at demystifying commonly used but little...



FIGHTING INFECTION

What's going on inside us when we get sick? What do germs have to do with us...

Screen shot of the Science Learning Hub <http://www.sciencelearn.org.nz>.

The need for pedagogical content knowledge

Student teachers need far more than knowledge of science concepts to teach well. They need also to develop appropriate pedagogical content knowledge (PCK), that is the ways of representing and ‘teaching’ the subject that make it understandable to others.

Rather than teaching to a deficit model with the aim of imparting as much science knowledge as possible, I use science content to model the complexity of PCK development. This is a challenging task as I need to weave the development of content knowledge together with pedagogical approaches that will help our students make their knowledge accessible to their students. For example, I could talk about and give detailed instructions on how to make exploding cannons with plastic soft drink bottles, vinegar and baking soda – or we could all make it and do it. Doing such activities is much more effective pedagogically because it allow students to make purposeful links between teaching and learning.

PCK has arisen from the dry pages of educational texts and been seen running rampant in Rena’s lectures. An inspiration to be part of this class. (EDCURRIC 610, 2008)



This look of sheer delight was not at the camera – but rather in seeing the ‘sparks’ in a melting ice balloon.

To facilitate the development of their PCK, student teachers need opportunities to reflect on their developing understandings of science knowledge, and opportunities to apply these understandings in classroom practice. Peer teaching, where students take turns in teaching their small group of

peers for 20 minutes each session, is an innovation of a colleague's which has become an integral part of my sessions.

Peer teaching was brilliant. We planned and taught our peers – and then received their constructive feedback. A brilliant approach to scaffold us into teaching. Incredibly valuable, purposeful and instructive. We learnt about ourselves, our strengths. And picked up ideas from each other's. (EDCURRIC 610, 2010)

6) Valuing the teacher education students encounter in my science classes

Research-based pedagogy

As a teacher educator I undertake research and draw on it. I am compelled as a professional to create opportunities to refine and strengthen my teaching by researching my practice. When introducing initiatives I assess their effectiveness; think about how to apply them in other settings; and share the results with others. My research has fallen into two broad strands - science education and teacher education - both of which inform and refine my teaching practice.

Research on science education

My Master's research with tertiary students on the nature of science (as the new and underpinning strand of the recently introduced New Zealand Science curriculum) has informed my teaching in every course, my approach to developing courses, and my doctoral studies.

This research/teaching area has grown into a national research platform involving firstly the Hub and secondly collaborative tertiary education research projects with colleagues from my own and other tertiary teacher education providers. For example, one research/teaching initiative using the Hub has been the development, of a third-year option paper within the BEd programme which uses the 'You, Me and UV' context material from the Hub as its only resource and has the nature of science as its focus. We have researched this course and its implementation over two years. Findings have been disseminated nationally and internationally at conferences and a paper reporting the research is under review for international publication.

Rena has made significant contributions to the wider tertiary science education sector in the area of primary science education. Her ...research has not only informed her own teaching but has contributed to the knowledge and practice of primary science teacher educators nationwide. [Colleague from Victoria University, 2011].



'You, Me and UV' images from the Hub.

Research on teacher education

I want to teach student teachers how to teach science. But even more than that, I aim to teach them how to teach. The paradox is that good teaching looks so effortless and hides the skillful ways in which the expert teacher makes the lessons seem so smooth. Teachers' professional knowledge is recognised as largely being tacit, so no amount of 'apprenticeship by observation' on the part of the student teachers will be sufficient. I need to make the tacit *explicit* by purposefully creating opportunities for my student teachers to see inside my teaching, to enable them to see beyond just 'doing teaching'.

Rena inspired me deeply not only in her chosen subject, but in teaching as a whole. I have taken so very many of Rena's teaching concepts into my own classroom, including the interactive lessons and connecting the student and their learning with the 'real' world around them. I can now clearly see how Rena helped me to learn to a much deeper and more thought provoking level, which in turn has helped me to become a better teacher myself. (Former pupil, 2011)

‘Modelling’ even exemplary teaching practice is not sufficient to help prospective teachers to think in more complex ways about teaching. Rather, they require access to the thoughts and actions that shape teaching and need to be able to see and hear the pedagogical reasoning that underpins the teaching students are experiencing. To achieve this objective a colleague and I team-teach a single class, with both of us present for each session.



Summing up together at the end of a peer teaching session.

One of us teaches while the other ‘unpacks’ the pedagogy for the students. Working as a team, we make explicit the implicit ‘teacherly’ decisions that may otherwise escape their attention. We have shared this research in-house, nationally and internationally at conferences and published in international journals. Some colleagues have made use of this strategy in their own classes.

Gillian Frankcom and I used the teaching deconstruction method in three Mathematics Education courses at The UoA. Our students were unanimously enthusiastic about this method, with many saying it was the most useful feature of our lectures. Gillian and I have been extremely impressed by the teaching deconstruction method, and will continue to use it in the future. (Colleague, 2011)

This research highlights for me how valuable it is to teach what I research and to research what I teach. My students realise that teaching is much more than well-rehearsed scripts, routines and effective classroom management. Sharing my research endeavours with my students allows them to see research in action and to appreciate the benefits of making research an integral part of their own practice.

I like the way you show how real and relevant research is to our teaching. Using research that is already out there to inform our teaching – and also doing research ‘on’ ourselves, looking at my own teaching with research eyes, seems very doable. (EDCURRIC 610, 2004)

Team teaching cannot be funded as a teaching model for all classes, so I have trialled using GoogleWave and laptops to allow me to make my teaching decisions explicit to the students while solo teaching the majority of my classes. When the students recognise a ‘teacherly decision’ they record it on their laptops and it appears in real time, as a speech bubble, on the data screen. I also use GoogleWave technology in other courses, for the students to comment on aspects of the nature of science they observe. All the students’ comments are stored and can be revisited out of lecture time. Students can upload YouTube videos, graphics, and other videos as they choose - and they do so. This year I will be trialling iPads instead of laptops.

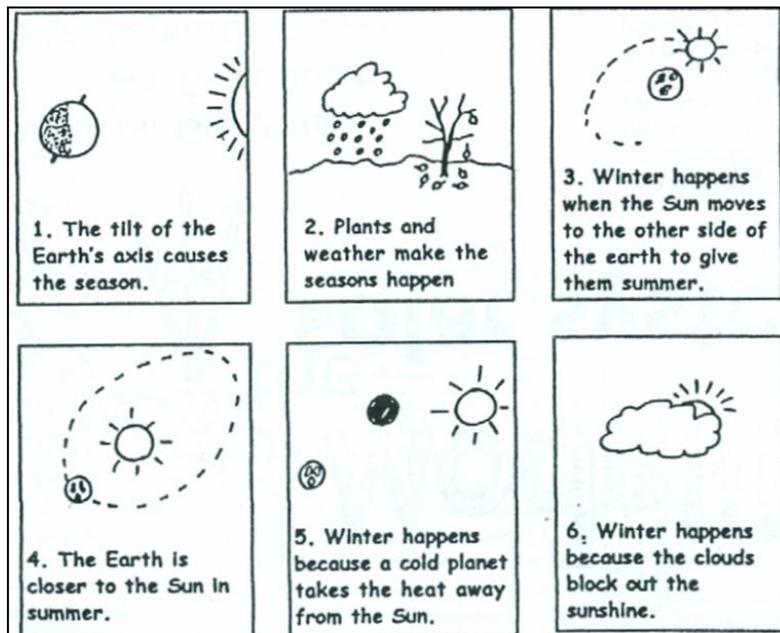
Rena’s use of Google Wave... was the perfect opportunity, and space, for learners to record, and share with Rena and classmates, their reflections about what the Nature of Science meant to them as they encountered authentic science experiences in their classroom work. ...Moreover, Rena did the ‘hard work’ of thinking through the pedagogical implications of these new technological methods to ensure students clearly benefited in their learning from the introduction of these technologies – rather than simply adopting technology for the sake of being innovative with no clear learning purpose. (Colleague, 2011)

7) Assessment for teaching and learning

I design each assessment task to be a valuable learning experience as well as to evaluate whether the students have met the learning outcomes of the course. Pedagogically, I have found learners to more deeply engage when they become aware of their own beliefs and knowledge. To encourage awareness of prior knowledge I use a wide range of formative assessment tasks such as pen and paper questions, debates, concept cartoons, Kibble cards and approaches such as the situated drama of Galileo.



A concept cartoon assessment task on electricity. The students select the character with whom they agree and then try to reach a consensus as a group.



A Kibble card assessment task on the cause of the seasons. The students identify each card as true or false.

As a class, we also critique and evaluate these means of formative assessment so that they think reflectively as teachers rather than just ‘do the assessments’ as students. In their own teaching practice, establishing their students’ prior knowledge will be critical if lessons are going to meet the needs of individuals. Knowing their current understanding of a topic is essential to structuring a lesson to meet learners’ needs on a daily basis, in all curriculum areas.

Very useful to see so many different forms of assessment. It was interesting to experience firsthand how much more engaged I felt with the session when I’d done this formative assessment activity and could see what I didn’t know. (EDCURRIC 260, 2007)

The formal assessment tasks are intended to be relevant, authentic and an integral part of learning. I stress that the grade is not as important as the learning – it is not assessment purely to assign grades, it is assessment for learning. Each assessment task is modified to incorporate latest research findings.

8) Evaluating teaching and learning

To improve my teaching I seek feedback from colleagues and students. I intentionally create feedback loops and listen to them. I have no one way of evaluating my teaching and learning. Instead I reflect on formative and summative lecturer and course evaluations from the students, student surveys and questionnaires as appropriate during a course, peer evaluations and critical self evaluations.

How often do we see reflective teaching in practice? Rena epitomises it. How rarely do we see lecturers taking real risks? Rena did weekly – and that probably had more of an impact on my views about teaching than anything else in this course. Without her willingness to take risks we would never have seen drama in astronomy, puppets in geology, live Auckland orchestra in snails. This is an unforgettable course. (EDCURRIC 610, 2008)

Feedback from students

The formative and summative assessment tasks throughout the course provide the students with feedback on **their** learning but they also provide **me** with invaluable feedback about my teaching. I use students’ performance in assessment tasks as a lens to look at my own teaching.

I also provide opportunities for student feedback on my teaching during the course. I have found this to be a positive experience for me and for the students. For example, I have used Stephen

Brookfield's Classroom Critical Incident Questionnaire. This questionnaire poses five questions which in essence ask the students at what moments in the lecture they were most engaged, distanced, affirmed, confused and surprised. (Brookfield, 1995)² I analyse and reflect upon the class' responses and feed back to the class how this is going to change my practice. In this way, I am modelling reflection to these prospective teachers.

She does something with our feedback!!!! And it works. I was sure that no lecturers ever looked at them!! I'm probably learning as much from seeing Rena's critical reflection-in-action as I am from having all my misconceptions about science being dull as dirt turned upside down. (EDCURRIC, 2008)

At the end of a course I use University of Auckland lecturer and course evaluations, summarise, and reflect upon the suggestions for improvement in the qualitative comments.³ The following semester, I inform the new students of the changes I will be making.

Some specific recent suggestions for improvements that the students have given me and the action that I have taken after critical reflection and consideration are;

- First assessment task too late in the semester for feedback to be optimal → the first assessment task is now 2 weeks earlier.
- Noisy class next door which at times drowned out your voice → got a lesson from a drama friend on voice projection, and moved rooms.
- The class was so large that neither of you knew our names → I now learn as many names as possible by the end of the first session, and print off class photos from CECIL.

Summarising the issues and the steps taken does not do justice to the critical reflection which takes place within that process. For example, my belief had been that knowing the students' names was not important to them as adults in a tertiary institution. From comments on an evaluation I had to confront this belief. Clearly to this student, and probably many others, it is important that I know their names.

² Brookfield, S.D. (1995). *Becoming a critically reflective teacher*. San Francisco: Jossey-Bass Publishers. p.108

³ Prior to 2006, the ACE evaluation forms were used.

Self evaluation

At the end of each lecture, and at the end of a course, I schedule time to ensure that I review my teaching and the course and lecturer evaluations, particularly the qualitative comments. This personal evaluation has given rise to several new directions.

I wanted to promote a learning culture which engages diverse learners more effectively and so undertook a year-long te reo course to demonstrate respect in my practice for te reo Māori me ngā tikanga-a-iwi. Reflecting on areas I saw as being the most problematic for primary teachers in addressing the requirements of the primary science curriculum (and most needed in my own lecturing practice), prompted me to research the nature of science for my Master's thesis - and currently for my doctorate. The need to prepare students to teach in a technologically changing environment has led to upskilling, researching and incorporating new technologies including COWS (computers on wheels), Google Wave and Shareflow. Discussing with a colleague about how difficult it is to teach about teaching has led to a research partnership looking at team teaching.

Course evaluations

In the years I have been lecturing I have received consistently positive feedback from the students. The following table of formal student evaluations gives an indicative sample from a range of classes I have taught. I value this feedback from all classes, and in particular from the foundation classes as these are students who have failed these subjects at school and may be negative towards mathematics and science. Reviewing feedback allows me to analyse my strengths and weaknesses, and to shape the direction of my professional development.



9) Sample of Student Evaluations 2006-2010

Course / Year	EDFOUND 15F 2006 (Foundation)	EDCURRIC 635 2007 (Post Grad)	EDCURRIC 104 2007 (BEd)	EDCURRIC 610 2007 (Post Grad)	ACE 924.621 2007 (BEd)	EDCURRIC 610 2008 (Post Grad)	EDCURRIC 610 2009 (Post Grad)	EDCURRIC 610 2010 (Post Grad)
No. of Responses / Class Size	25 / 27	46 / 51	31 / 33	19 / 22	35 / 35	49 / 50	72 / 72	55 / 56
Agree and Strongly Agree (% of students)	A+SA	A+SA	A+SA	A+SA	A + SA	A+SA	A+SA	A+SA
The lecturer was well prepared for the lectures	100	100	100	100	-	100	100	100
The lecturer stimulated my interest in the subject	96 ²	100	100	100	100	100	100	100
The lecturer was enthusiastic about the subject	100	100	100	100	100	100	- ¹	-
The objectives of the lectures were clearly explained	100	100	100	100	-	100	100	100
I was clearly informed about how my learning would be assessed	100	100	100	100	100	100	-	-
I received helpful feedback on my learning progress	100	-	100	100	94 ²	100	-	-
The lecturer was easy to approach for help outside the class	100	100	100	89 ²	100	94 ²	100	100
The lecturer responded to students questions in a constructive way	100	100	100	100	-	100	100	100
The lecturer provided effective resources for learning	100	100	100	100	100	100	-	-
Overall, the lecturer was an effective teacher	100	100	100	100	100	100	100	100
The lecturer presented the course content in an interesting manner	-	100	100	100	100	100	100	100
The way the lecturer presented material assisted my understanding	¹ Blank spaces reflect a change in the required and/or supplementary questions asked each year.						100	100
Used educational technologies in ways that supported my learning	² Remaining % under A+SA, where less than 100%, were marked as N/A (not applicable).						100	100
The lecturer stimulated my engagement in the learning process							100	100

10) Professional development and leadership

I have an ongoing commitment to professional development to build on strengths and address weaknesses. I take opportunities to develop my teaching and learning through attending courses, seminars, workshops, and national and international conferences.

Taking a leadership role on committees that can inform teaching practice is important to me. I am Faculty representative on the Postgraduate Qualifications Committee; and School representative on the Equity Committee, Teaching and Learning Quality Committee and Primary Practicum Advisory Group. I am also a research ethics reviewer and advisor in the Faculty of Education and use this role to support and teach others in ethical practice.

I have coordinated a range of courses across numerous levels and contexts, assuming a leadership role by incorporating the findings of my research and teaching practice.

Outcomes from Rena's research and scholarship are being used by her colleagues within the Faculty to make significant and informed changes to significantly enhance teaching and learning. (Colleague, New Zealand Association of Science Educators, 2008)

Research and innovative teaching practices need to be shared within our own institutions, but also more widely within the profession. I have presented (both in science education and in teacher education) at national and international conferences and at in-house symposia and have developed collaborations with colleagues nationally and internationally – from the Science Learning Hub with New Zealand colleagues to a collaboration with UK tertiary educators on strategies to develop dialogic teaching in our students.

Leadership has also involved mentoring new staff.

Thank you for your tireless help and endless support this year. I have really appreciated it and know I have been a vastly improved educator because of it! You are a champion. (Colleague, 2005)

Thank-you for being such a sensational mentor in equipping me in this transition into tertiary education. Your dedication to your profession is inspirational. (Colleague, 2006)

Rena is calm and supportive in a way that instills confidence. She encourages flexibility and innovation, provides constructive suggestions for improvement and an atmosphere of mutual support and sharing within her team. Rena was a major factor in my decision to return to a science lecturing position in 2010/2011. (Colleague, 2011)

11) Concluding thoughts

I teach because I believe ardently that all children and all societies have the right to an education which enables them to reach their potential. My goal is that in my teaching practice I will inspire and equip student teachers to give to their students a high-quality education.

It is an awesome privilege and a commitment we all make as teachers to make a difference in the lives of our students. 'In the end, our work lives its ultimate life in the lives it enables others to lead.' (Elliot Eisner)

In collating the students' University evaluations I came across this poem, penned by one of my students.

*When we've
Retrieved the ice balloons from the windowsill
And the orrery from Galileo's lab.*

*When we've
Found the rocks the puppets swallowed
and washed the lolly cake/sedimentary rocks pots,
When the lilies are all dissected
And the reflections filed away,
The peer groups have finished peer teaching
and we've eaten all the sherbet, ice-cream and butter.*

*Then we'll have drinks
And thinking back on the semester we'll see
Rena passed us a nifty head fake:
We thought we were just plain having marvelous fun
While all the while she was teaching us
to teach ourselves
how to teach.*

(Student, EDUCURRIC 610, 2008)



Ferran's El Caracol Mifasol, The Snail's Journey, played by a member of the Auckland Philharmonic Orchestra.



Parallel or series circuits in the house plan?



Demonstrating subduction.



A heliocentric or a geocentric solar system?



States of matter with an ice hand.



Continental drift in action.



Cooking up a model of an igneous rock.....



.....and a model of a sedimentary rock.

***Ko koe kei tēnā kīwai, ko au kei tēnei kīwai o te kete
You at that and I at this handle of our kete.***