

Tertiary Teaching Excellence Awards

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Nomination for:

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I. INTRODUCTION

My teaching for each semester starts long before the students arrive. The structure and outlines of the various courses have been carefully considered and planned; assessment tasks have been reviewed and modified and activities and resources prepared. The course handbooks signpost a learning highway that I travel together with my students. I know that every class will be different and each student unique. In previous years, I have discovered that one science graduate has had years of experience as a zoo keeper and has an extensive collection of rare carnivorous plants. Another has introduced herself just minutes before the first session to tell me that she was profoundly deaf but that she didn't want a note-taker or signing help – she would lip-read. A grandmother has confessed shame-faced that she doesn't remember ever having studied science at all. My job as a teacher educator is to weave the individual contributions of my students together and support their collective journey towards being confident and capable teachers.



I am privileged to be teaching teachers in a tertiary institution. Every student who enters my classroom has had different learning experiences but they are connected by the common aspiration to become teachers. We share a vision of what it is to be an exceptional teacher – someone inspirational, knowledgeable and caring. They anticipate that I will show them the way but learning about teaching is a complex and highly individualised experience. Each student needs my support and encouragement to work their own way towards the vision. And as each student learns, they teach me and enrich my learning. For me, the link between teaching-learning is a symbolic representation of the reciprocal interactions between teacher and learner. An excellent teacher has the ability to create something deeply meaningful and enduring in those relationships for everyone.

The strength of my teaching is my commitment to look honestly and critically at all aspects of my practice. Are my teaching practices effective to the extent that all of my students feel valued and empowered to teach science? How well designed is each of my courses to accommodate the differing experiences, needs and abilities of my students? Do I assess what students know fairly and reliably and use this information to improve their learning? Do I seek my students' and others' evaluations and feedback in order to reflect on my practice from multiple perspectives? Ultimately, am I prepared to discuss the challenges, trials and tribulations with students and colleagues, to initiate conversations which deepen our understanding about teaching and learning?

Before I address each of these questions in turn, I will briefly outline my own pathway into teaching in a tertiary institution. When I graduated from the University of Auckland with a Bachelor of Science degree I was excited about teaching science to others. My interest was in helping students to make sense of the world – particularly biology. I entered the teaching profession as a secondary teacher eager to share my enthusiasm and love of science and biology with my students.

This interest sustained my teaching career for ten years. I developed many skills as a classroom teacher in state secondary schools teaching biology, science, health and physical education. I developed a popular sixth form certificate course, 'Human Biology: from conception to grave', in response to a decline in the number of students taking biology. As there were far fewer girls than boys opting to take physics and chemistry at senior levels, I designed and taught an optional girls-only science and mathematics course to fourth-formers to encourage their engagement with these subjects before they had to make curriculum choices at sixth form level. In the 1980s I initiated a network of secondary teachers with the focus on increasing girls' participation in science. The EQUALS=Science monthly meeting provided an opportunity to discuss innovative teaching strategies and research. It was a dynamic and vibrant professional network that had a positive effect on teaching for both girls and boys.

Having a family fostered my interest in early childhood education and I became an advocate of Play Centre, a parent-led early childhood educational organisation. I proudly completed formal early childhood training. When my children went to the local primary school I became actively involved in the Board of Trustees and am currently the chairperson of a primary school and a member of a College Board.

Through my children's early years (1993-2000), I taught part-time at the Auckland College of Education which merged with the University of Auckland to form a Faculty of Education in 2004. I have taught science education at all levels in the Bachelor of Education degree for primary and early childhood teachers. I also teach and co-ordinate the design and delivery of science education courses in the one-year graduate diploma programme for primary and secondary student teachers. My involvement in all aspects of the education system as a parent, administrator, learner and teacher gives me

multiple perspectives on the education system and enriches my teaching practice.

I care passionately about teaching. It is simultaneously the thing I know about, the thing I do and the thing I have chosen to research. My research has added a theoretical lens to my practice. My Masters degree explored women participants' memories of the nature and meaning of their school science experiences (Garbett, 2000). In my doctorate I analysed the effectiveness of peer-teaching to foster student teachers' confidence and competence to teach science and deepened my own understanding of what it meant to be an effective practitioner (Garbett, 2007a). Researching my practice underscores an ongoing commitment to improving my learning outcomes, and the learning outcomes of my students.

I aim to ensure that student teachers graduate confident in their ability to teach science in a wide range of settings, to all of the students in their classes. Teaching science education across early childhood, primary and secondary level graduate diploma and degree courses draws on all of the experiences I have had throughout my teaching career, all of the professional knowledge I have gained as a practitioner about how students learn, and all of the research capabilities I have developed as an academic. Forging a deeper understanding of what it is to be an effective teacher is endlessly rewarding and a never-ending mission.

Teaching

Since the amalgamation with the University of Auckland, I have revised the following courses which I coordinate and teach:

- EDCURRIC 610 Science Education (c.140 students)
- EDCURSEC 617 Teaching Biology Education (c.30 students)
- EDCURSEC 614 Teaching and Learning Science (c.50 students)

At the Auckland College of Education, I taught the following courses (I still teach some of these courses as 'legacy' courses for students who were enrolled prior to the restructuring of all of the University's qualifications in 2006):

- ACE 924.621 Teaching to Support Learning in Science (Early Childhood)
- ACE 724.755 Biology Education Years 11-12
- ACE 724.756 Biology Education Year 13
- ACE 924.531 An Introduction to the Curriculum in Science
- ACE 924.631 Teaching to Support Learning in Science (Primary)
- ACE 924.701 Creative Solutions to Issues in Science Education
- ACE 724.731 Teaching and Learning Science

II. GOALS

I see it as my responsibility to ensure that graduating students enter the teaching profession with a clear understanding of, and a commitment to, the critical role that they will play in enacting the link between teaching and learning. My goal is that they will have the confidence and capability to teach science in a meaningful way to the learners in their classrooms or early childhood centres.

For those students who come into the teaching profession ambivalent about science, with a limited educational background in science, or with an aversion to the subject, my aim is to help them to see that the possibilities to teach through science are endless. Children are fascinated by science and by the time my courses end, I hope that my students will share their fascination. Without this willingness to share science experiences, science becomes invisible in the curriculum.

Teachers who are insecure in their knowledge of science find it safer to revert to more traditional teacher-directed methods. They lack the rich subject-matter knowledge required to be responsive to students' thinking and to foster learning with understanding. I challenge my students to examine some of their own misconceptions in science through carefully planned activities and exercises and then help them seek answers and explanations to deepen their knowledge of the subject matter. Once their ability to engage students in one small area of science is increased, they will develop their own expertise in teaching and learning science.



Student teachers who enrol with a high level of science knowledge in specific areas need the opportunity and impetus to develop their pedagogical content knowledge. Student teachers with undergraduate, masters and doctoral degrees have already achieved a high measure of academic success. My goal for them is that they learn ways that to engage their students and fuel a lifelong love of learning about science.

My teaching is underpinned by a belief that learning is highly individual. While in essence the learning process may be the same, differences in background, prior knowledge, motivation and interests will impact on the sense that each individual makes of new experiences. A learner reconstructs their own knowledge by connecting new experiences to their existing understanding. In science, in particular, it is important that a teacher appreciates the range of students' pre-existing ideas in order to provide appropriate learning experiences that will challenge and direct their new understanding towards accepted science ideas, many of which are counter-intuitive. For example, it would appear that the Sun goes around a stationary earth on a daily basis. In fact, the earth spins on its axis. Unless a student is challenged to rethink their naïve view based on watching the sun rise and set, the construction of new knowledge relating to seasons and phases of the moon becomes increasingly difficult and confusing.



Similarly, all of my students have had vastly different educational experiences and each will make different connections throughout their journey of learning to teach based on their prior knowledge. For example, I remember leading a discussion about effective questioning techniques in which I was hoping to move from a discussion about the differences between closed and open questions to the importance of higher order questions. One student, with previous overseas teaching experience, interjected and told me that he expected his students to raise their hand if they knew the right answer to his question and that they would then be expected to stand before giving him the answer. Our discussion was being filtered through this prior experience. It was important to establish that while this might have been an effective questioning technique in his previous school, it was going to be ineffective, if not counter-productive, in New Zealand.

In teaching, there are often multiple solutions to dilemmas and seldom is there one right answer that will hold true in all cases. Each of the students in their

classes or early childhood centres will have special needs and abilities and each of their educational settings involve different limitations and expectations. My goal is to challenge student teachers to construct their own understanding of what it is to be effective professionals in a complex environment without losing sight of their vision. As this portfolio demonstrates, I have developed successful ways of achieving these goals through reflecting on, and modifying, my courses, delivery, assessment and practices to support my students' learning.

III. FACILITATING LEARNING

Are my teaching practices effective to the extent that all of my students feel valued and empowered to teach science?

Facilitating learning about teaching is a complex process. Explaining exactly how I develop that link between teaching and learning on paper is difficult. Imagine the situation where 25 or more student teachers with differing needs and abilities are learning science content knowledge at the same time as they are learning how they might best teach that content knowledge to others (with differing needs and abilities). As the teacher, my role is to orchestrate a supportive learning environment so that each individual explores these dual learning objectives. However, given the dynamic interchange between teacher, learner, content and context, an appropriate way of teaching in one situation may be markedly different in the next.

It is a particular challenge to facilitate learning about science teaching for student teachers in primary schools. Primary school teachers are generalists and must be able to teach science as well as all the other curriculum areas. Student teachers enrolled in the science education paper are often enthusiastic about teaching science, with two out of three believing that they have sufficient knowledge to teach children in this age group at the start of their course. ‘How hard can it be to teach a 10 year old?’ is a typical response. Of course, this confidence belies the fact that, often, their own subject knowledge is limited and they are unaware of what they do not know, a point made by a student in an email to me in her first year of teaching.

I guess the depth of that science assignment helped me to understand that EVERYONE (not just students but also adults) has misconceptions about the world we live in and that we need to have these deconstructed so that we can construct a true understanding of the phenomenon via experiments, discussions and live simulations and whatever else - even then, they may still believe something contrary to scientific fact because their own theory is more believable to them.

Another problem is that primary student teachers see little evidence of science being taught effectively in classrooms when they are on practicum. Primary teachers are typically more comfortable with non-science learning areas and may avoid teaching science due to problems with resources (such as the time taken to assemble and to tidy them up), curbing enthusiastic, noisy children working in small groups and their own lack of knowledge and confidence in science (Education Review Office, 2004).

The onus, then, falls on me, and the science education courses that I design and lead, to enable and inspire student teachers to teach science in the sometimes difficult conditions that they will face in schools. The science education course must provide broad theoretical content knowledge and the opportunity to develop personal pedagogical knowledge.

a. Peer Teaching

To facilitate learning about science content and teaching science at the same time, it is important that student teachers take responsibility for teaching their peers science concepts during science sessions. Peer teaching is a strategy that I use in primary and secondary teacher education courses.



The philosophy underpinning peer-teaching has similarities in Maori culture to *ako* or reciprocal teaching. Literally meaning to teach and to learn, the term *ako* emphasises that:

The teacher does not have to be the fountain of all knowledge, but rather a partner in the “conversation” of learning. ... Reciprocal learning promotes a learning of knowledge-in-action as related to the traditions of the various cultural elements being taught. (Bishop, Berryman, Tiakiwai, & Richardson, 2003, p. 13)

However, sharing teaching time with students was a change that was unsettling for students and staff. There was initial resistance from other lecturers who were justifiably concerned that their teaching time was already limited and that to abrogate responsibility for 30 minutes was counter-productive. My sessions were not as tightly facilitated as they had been because students were given the flexibility to develop aspects to teach their peers that they thought were important. Some of them did not take the task seriously in the first iteration and took a less onerous option of preparing notes for their peers to study from.

I vividly remember a student teacher wondering aloud why I had stopped teaching them after I had explained a relatively simple idea and prepared to hand over to the student teachers to peer-teach. She said it was the clearest

explanation she had ever heard and asked why I didn't keep teaching them science. I reflected on this comment in my research journal.

I want my students to appreciate that they are learning more, and more deeply, about teaching than if I was spoon-feeding them ...they are teaching one another. This is not the most effective way of teaching content knowledge. I would do a better job of explaining concepts in many cases. (Journal, September; Doctoral thesis, 2007a)

Reflecting on my journal entry made me rethink my role as a teacher educator in facilitating their learning. Yes, I might do a more effective job of teaching science content but there was other learning taking place that I could not instigate or control by maintaining the authoritative mantle of expert teacher. Through peer-teaching, the student teachers began to explore their own identities as teachers of science. They practised skills of teaching - being enthusiastic, knowledgeable guides, prepared to listen to their learners and develop their understanding through presenting stimulating ideas and activities, questioning and explaining and redirecting the learning towards more scientifically acceptable ideas. As this comment from a student showed, it was not necessarily straightforward:

When you read it, it appears clear but then you tend to have a host of questions as you are teaching it. I thought I knew it well but I wasn't able to explain it very well as I was getting confused. (Student peer feedback; Thesis, 2007a)

While I stayed centre-stage as the expert science teacher I was denying student teachers access to this role and, in effect, gate-keeping. In order to facilitate their learning about teaching I had to step aside. I had to let them work at ways to activate the teaching-learning relationship.

My students understood. They could all teach it back to me. I made sure I had it sorted in my head. Now I understand it and I can teach it. (Student peer feedback; Thesis, 2007a)

Course evaluations are resoundingly positive as evidenced by the comments from an external review:

Science in particular is regarded as providing excellent preparation to be a teacher. Those teaching in this discipline are seen to be explicitly modelling good teaching practice in their delivery and use real-life experiences to which students can relate. In addition science is assessed in a variety of ways (theory-based, lesson based, diagnosis and peer teaching), which students find helpful for reflecting on the practice of teaching. Students commented that the "downstream" benefit of this experience is their eagerness to teach science during practicums. (Independent evaluation of Graduate Diploma in Teaching (Primary), November 17 2006, Supporting material)

In a more recent evaluation, 95% of the class were positive when asked 'Has peer teaching been a successful component of this module?' Their comments included:

- *It was very valuable;*
 - Yes, VERY much;
 - Yes. *Good learning off peers and having an experience at teaching science.*
- (Student evaluation, 2007)

I continue to reflect on how peer teaching has facilitated student learning in this and other courses. I have shared my practices with colleagues through in-house seminars and others are now using peer teaching in their subject areas. Through research and collaboration we are deepening our understanding of how, when and why to use this particular strategy most beneficially (see Garbett & Ovens, 2008; Ovens & Garbett, 2008).

Other teacher educators at the University of Waikato have implemented peer teaching in their science education courses in response to a paper I presented at a science education research symposium (Gabbett, 2006). We have had ongoing dialogue about peer teaching as they fine tune their teacher education programme.

[Your peer teaching presentation] was certainly an inspiration for us to make some changes which have been worthwhile (email Tuesday, 31 July 2007)

b. Team Teaching

I have also trialled another approach to teaching with a colleague in order to facilitate students' learning. A comment from a student summed up the dilemma we perceived in teaching about teaching:

I have no criticisms except you are both too good at making things look effortless (Student feedback, 2006)



We decided to team-teach two of our classes. Our intention was to act as the ‘experienced eyes’ in each other’s classes and to help the student teachers recognise and understand the teaching decisions we were making ‘intuitively’ as we taught. We alternated roles, one of us teaching and the other drawing the student teachers’ attention to those teaching decisions that they so often fail to notice; for example, standing in the ‘teaching spot’ at the front of the room to gain attention. We wanted to highlight nuances like increasing ‘wait-time’ to generate more participation by students; we wanted to make explicit why we had chosen a post-box strategy over a fishbowl debate, or a circus of experiments rather than demonstrations. We had the planning discussions that teachers often have in private in front of our students. We wanted them to be aware of how we were teaching them about teaching while we were teaching them science content.

We shared our findings at two conferences recently (Garbett & Heap, 2006; 2007) and were surprised at the interest it generated in the teacher education community. We have also presented our work in-house to colleagues at the recent School Research Celebration (Heap & Garbett, 2007).

c. Learning alongside learners

It is important to appreciate both sides of the teaching-learning relationship, and this prompted my decision to learn something new and difficult for myself.

I had wondered what I would learn about the difficulties student teachers faced when they are learning a new skill by putting myself in a similar position. It has been many years since I was a novice, struggling to assimilate theory and practice as a beginning teacher and my memory of what that was like is hazy. Even so it was a surprise when some of my students returned from an initial two week practicum experience and claimed, with bravado, that they could teach and that it wasn’t as difficult as they had thought, or as complicated as we had made it out to be. I knew these were audacious claims and I wanted to challenge the perception that learning about teaching was something that they would be able to ‘tick off’ by the time they had finished their course. I said to them ‘If teaching is so easy – perhaps I could learn to ride a horse?’

What was intended to start a conversation actually sparked a series of riding lessons! My horse riding project has strengthened our relationships immeasurably. It has deepened my appreciation of how vulnerable we are when we are learners and just how difficult it is to learn any skill that is modeled by an expert. I made a PowerPoint presentation to illustrate this particular point to the students and have included it on the supporting CD. What followed from this presentation in the class was a frank discussion of what it can feel like to be a novice and the difficulties we faced. The students commented:

It was nice to have a lecturer who is willing to admit that it has been a while since they were in front of a class and do something to help them remember

what it is like to learn and be scared about making mistakes. (Student feedback, November 2007)

It was helpful to know other people (you) were going through a similar process to us. (Student feedback, November 2007)

The horse riding analogy became part of our discourse as we discussed our respective efforts – theirs to teach and mine to ride. I believe it is important that teacher educators acknowledge that what we make look easy and take so much for granted is, in fact, incredibly difficult and challenging to accomplish. I am pleased that I have such vivid, and immediate, first-hand experiences of learning to share with my students. I am also pleased that I have had the confidence to admit to my students (and colleagues, see Garbett 2007b, 2008b) that we all have a great deal to learn about learning to teach.



It made it less nerve racking going out teaching, knowing you could relate to how we were feeling. (Student feedback, November 2007)

The message of the horse riding experience was that it's not going to be easy at first and it's OK to make mistakes, which was helpful to me. (Student feedback, November 2007)

Facilitating learning is highly dependant on being able to forge and sustain strong student-teacher relationships. In response to the question: "What was most helpful for your learning?" these students wrote:

Your honest assessment of my teaching – What I do well, what is missing. Very approachable and a joy to be in the classroom with. (Lecturer evaluation, 2007)

I really appreciated the friendly atmosphere of this class and the communication between lecturer and student. (Lecturer evaluation, 2007)

Dawn was an awesome teacher – very clear, open, helpful and supportive. The course was well structured and I found the assessment requirements realistic (Course evaluation, 2007)

The friendly classroom environment. You looked like you really wanted to be here with us, which is so important. Great job, thank you (Lecturer evaluation, 2007)

I hope that all my students know that when I am in the class with them there is absolutely nowhere else I would rather be!

IV. COURSE DESIGN

How well designed is each of my courses to accommodate the differing experiences, needs and abilities of my students?

In designing and coordinating science education courses I assume responsibility for ensuring that the teaching practices, assessment methods and content are highly relevant and consistent with the learning outcomes stated in the course descriptors. Every year I redesign or modify the courses I teach to better prepare student teachers to meet the expectations of the profession. New directives and policies such as the New Zealand Teachers Council Graduating Teacher Standards and National Education Guidelines or the implementation of curriculum documents (Ministry of Education, 1993, 1996, 2007) underpin the stated learning outcomes. I tailor each of my courses from these learning outcomes to suit students and stakeholders.

As an example, in 2003 I was asked to design three flexible delivery teacher education courses to meet the needs of early childhood and secondary student teachers who might not otherwise have had the opportunity to continue their studies at a tertiary level. Many of these students wanted to return to study but had dependent children to care for. Others wanted to improve their qualifications while they were working in the profession. Designing courses with little or no face-to-face contact presented interesting challenges. Initially I questioned whether teaching (so heavily dependent on relationships and interactions) could be taught through this medium. However, the course guides I designed included scenarios, activities, explanations and exercises for students to consider, reflect upon and respond to. As an aid, small packs of seeds and rocks were sent out with the early childhood course guides to encourage students to be involved in science activities. Web based discussion fora were established where students developed electronic support groups. The effectiveness of these early courses is evidenced by a proliferation of other web-based courses that have incorporated some of these features.

It is important that courses are also designed to take into account the needs of stakeholders. Linking with wider professional networks such as Team Solutions (a school support service), Biology Educators Aotearoa New Zealand, and the New Zealand Association of Science Educators has kept me abreast of current professional development foci for practising teachers. Implementing the National Certificate in Educational Achievement (NCEA) and embedding and exploring the values and key competencies which underpin the New Zealand Curriculum (2007) are current examples.

In 2007 I revised my biology course outline and assessment strategies to include a greater focus on NCEA in line with my own evaluation of the course. Informal feedback from students after their practicum experiences highlighted that there was considerable variation in the way that different school departments taught and assessed towards this qualification. Feedback received from secondary school principals involved in a recent programme-

wide review confirmed that some secondary teacher graduates felt under-prepared for dealing with NCEA. My secondary student teachers now complete an internally assessed achievement standard in line with the published criteria. Students peer-assess each other's work in marking panels. They then reflect on the issues, problems and solutions they have faced, both when writing for, and marking, the achievement standards, and discuss with practising teachers and students in schools the difficulties they have faced and possible solutions. The experience of actually completing an internally assessed achievement standard, marking and moderating a range of other students' work and reflecting on and discussing the process will address the concern I had that students were under-prepared.



V. ASSESSMENT

Do I assess what students know fairly and reliably and use this information to improve their learning?

I believe that assessment is an integral component of the learning process. It should be an ongoing source of valuable information for me and my students, rather than an arbitrary end point. Analysing assessment data in its many forms is a way that I refine my understanding of the teaching-learning relationship.

Formative assessment allows me to identify the next steps for teaching the class using a variety of strategies from simple pen and paper diagnostic tests to graffiti sheets. This form of assessment is important if I am to pitch the level of the lesson appropriately and establish learners' prior knowledge. In the context of science, when many of the terms have different commonly understood and scientific meanings, it is important to establish common ground. For example, when I discuss animals it is important to clarify that this term encompasses more than mammals, pets or farm animals to me and other scientists. Students often classify birds, insects, fish and humans as something other than animals. Similarly, asking students to think about all the drugs they know may result in only Class A narcotics being considered rather than including other drugs such as caffeine, aspirin and ventolin. In a teaching vein, if I want to initiate a discussion about open-ended practical activities or problem solving, it is important that we have a common understanding of these terms too.

After students have completed activities, I review the effectiveness of my teaching. This may be through asking students to share their ideas in a pair or larger group or reporting back to the class. I may ask students to write, draw or demonstrate their ideas. I use this information to refine my approach or to revisit ideas that I feel have not been understood. I can also use this information to feed forward into future discussions.

I also use assessment to motivate students to engage in learning (and to give them a final grade). Well designed assessment tasks can foster students' confidence and competence to meet the intended learning outcomes for a course. However, students may see assessment tasks as an impediment, barrier or end point. By analysing student teachers' responses to summative assessment tasks I have found that the flaw is often in the design of the task. In the following case study I outline one such problem, the solution and end results in the context of an early childhood course. It highlights the importance of assessing what students know as an authentic and integral part of the learning process.

In an early childhood setting, the curriculum is intended to be driven by the child's interests as they emerge – in the sandpit, by a puddle, or hunting for mini-beasts in the garden (Ministry of Education, 1996). The teacher has to be prepared to seize the teachable moment.

Many of the students in the early childhood degree are mature women with limited or negative images of science. Many of them 'dropped' science at the earliest opportunity at school and they approach the subject as though it is something to be endured rather than enjoyed. After reflecting on my first year of teaching the early childhood course and studying the students' assignment work, I realised that the assessment tasks were structured in such a way as to work against student teachers being able to teach in developmentally appropriate ways with young children and did little to engender any enthusiasm for science as a rich context for learning.

In an earlier assessment task, student teachers were asked to interview three or four young children to find out what they knew about the causes of day and night. This was an attempt to contextualise learning about how to teach science in authentic situations but in prescribing a narrow focus the student teachers resorted to interviewing young children to find out whether they knew the 'right answer'. Students tended to use a traditional question-and-answer format which guided both the interviewer and interviewee to respond in a culturally-accepted routine of interaction and questioning patterns. Unfortunately, such a strategy was ultimately unhelpful in establishing what the child knew or understood about the topic – a difficulty compounded by student teachers' own lack of subject knowledge.

To improve the assessment task, I made it more open-ended and repositioned it later in the semester. I redesigned the course to engage the students in wide-ranging, practical, hands-on, science education workshop sessions. I encouraged them to compile a science-rich and relevant resource kit around which they could either initiate science experiences or develop such activities alongside children in play. This resource kit became the foundation for a new assessment task - a portfolio of ideas which many student teachers found invaluable. They then completed the second assessment task with the children's interests as the context, taking their cue from the children and exploring science opportunities as they arose in any early childhood setting.

The assignments helped my learning a lot - made me look deeper into a variety of science concepts in my own time and way (Student comment, 2007 University course questionnaire)

Informal feedback from students suggested that working with children's interests alleviated many of the difficulties they had faced previously. The student teachers were more confident when they engaged in topics of interest to the child, rather than having to follow their lecturer's directive. The children appeared more open and guileless in their responses and the student teachers were more relaxed in exploring children's ideas, rather than focusing on a narrow, prescribed 'right' answer. The quality of dialogue, as indicated in recent assignments, is more spontaneous and rich. Reworking the assessment tasks has motivated students to engage in professional learning rather than just to go through the motions of completing a task.

As an example, a student teacher observed a 4-year old tapping rocks against a table and putting them into piles. When the teacher asked her what she was doing she said: 'They're not quiet,' pointing to one group and 'I can't hear these one'. The rocks were being systematically classified by the sound they made; loud rocks in one pile, soft, quiet ones in another. This child-led activity developed into an extensive geology project, enthusiastically assisted by my student. They became so engrossed that she asked to hand in her assignment in instalments. She wrote in an email:

Don't worry about the grade, I just think this has been so good for me to see the response, especially from the input of the family too. It's just too good not to share with someone. (22 October 2004)

In another example, a student teaching in a rural early childhood centre sought permission to bury some weathered sheep bones in the sandpit. When the children arrived on Monday morning and started their usual excavations they were amazed to discover "fossils". Having uncovered such treasures they spent many hours deciding which bones went in which positions and eventually decided that they had discovered a dinosaur. The bones of *Tyrannosaurus sheepi* were duly threaded together and hung on the fence for all to admire. It became the backdrop for adventures and the focal point for storytelling. As you can imagine, many children were inspired and my student was feted as a great archaeologist. In marking her assignment, I gave her full credit for developing such a creative and innovative project which integrated science, technology, art and drama. It went far beyond the limitations of the previous assessment task.



Compared to the dry assignment –‘explain what causes day and night’ – the new assessment regime is liberating and exciting for student teachers. It provides them with the opportunity, confidence and ability to create or recognise rich learning opportunities as they arise serendipitously in the sunshine, by a puddle, during a digging expedition or wherever. To ensure that science education is a meaningful and relevant engagement between teacher and learner it was necessary to change assessment practices. Re-designing the assessment task to enable student teachers to construct their own understanding about pedagogically appropriate ways to teach science has created significant and valuable learning opportunities for all involved. The assessment tasks are now better aligned with early childhood student teachers’ learning outcomes. As I mark their assignments I am delighted to see that the task gives them the licence and wherewithal to work so comfortably and confidently alongside young children to develop their science understanding. The course has developed into one that the students genuinely look forward to.

In the 2007 evaluation of the course, every student agreed or strongly agreed with the following statements:

- The assessment measured my learning fairly
- The course has enabled me to enhance my practice
- Assessment tasks were effective aids to learning
- The course helped motivate me to learn
- The lecturer increased my interest in the subject
- Overall I was satisfied with this course

More than 90% of these students agreed, or strongly agreed, with 15 of the 18 course evaluation statements.

VI. EVALUATING LEARNING

Do I seek my students' and others' evaluations and feedback in order to reflect on my practice from multiple perspectives?

Evaluating my effectiveness as a teacher honestly and critically is essential if I am to create something truly meaningful in the nexus between teaching and learning. This commitment is most evident in my secondary teacher education classes where I am focused not so much on teaching science or biology content knowledge but on pedagogical content knowledge – ways that teachers make their own repertoire of knowledge accessible to learners.

Most of the secondary student teachers who enrol in teacher education courses have little experience of teaching beyond traditional 'chalk and talk' methods. My secondary student teachers are science graduates. They have invariably been successful learners at secondary school – capable of passing internal assessments and external examinations. Unfortunately this is not the case for many of the secondary school students they will teach.

In my classes, I stress that teachers need many different strategies so that they can engage students of different ethnicities, interests and abilities. My students need to experience what it is like to be engaged in student-centered activities, such as a cooperative jigsaw activity or a fishbowl debate, to appreciate the learning that these strategies afford. Insisting they engage in new teaching strategies as learners is a way for me to breakdown their preconceived ideas. Afterwards, we discuss such questions as 'How could they have modified a strategy to suit a senior class at the start of the year to introduce new information compared to the end of the year when their aim is to revise?' 'How could we have used the same strategy where we needed more classroom control – perhaps with a junior class on a Friday afternoon?' 'What other topics could we have taught through this strategy?' 'When is a particular strategy more effective?' Teasing out the positives and negatives from their perspective as learners and as teachers enables them to develop their repertoire of pedagogical content knowledge. I model how I am prepared to work with their ideas to modify strategies to better suit their expressed needs.

Asking students for formative feedback via a Critical Incidence Questionnaire (Brookfield, 1995) is a way for me to evaluate the effectiveness of my approach. Each week students are asked to jot down when they have felt most engaged, distanced, surprised, affirmed and confused. For example:

Most surprised: To be honest every thing has come across well with positive outcomes in each activity and got us thinking and discussing ideas and problems we may face. Also your passion and energy for the topic is outstanding which makes bringing in the information very easy. (CIQ, August 2007)

Most surprised: How enjoyable the class is – it's so different from the lectures/tutorials that I had for my undergraduate degree. (CIQ, August 2007)

I analyse their feedback and report the positive and negative comments. The majority of students are very positive about my teaching approach but there are areas of variance. For example, a number of students commented that they felt most distanced when I gave them a pen and paper diagnostic assessment task. They commented;

Most distanced: *Pen and paper survey – showed my ignorance.* (CIQ, September 2007)

Most distanced: *Pen and paper survey because I felt embarrassed about how little I knew.* (CIQ, September 2007)

In reporting this back to the students, we discussed how I could have modified the strategy to make it less threatening and how they could use a version of this diagnostic method to engage students in their own classes. Their feedback initiates discussions about the importance of using a variety of strategies to engage all of their students but that no one strategy is effective for all.

Most engaged: *The job description for body organs – brilliant method for pushing the memory to get information.* (Student feedback, November 2007)

Most distanced: *Job descriptions – nothing wrong with it but I just didn't enjoy it.* (Student feedback, November 2007)

When I am teaching I am constantly looking for signs that the students are engaged and making sense of new information. I often draw their attention to the clues that I am reading as I am doing this but it is difficult to pinpoint the subtle nuances in body language and tone of voice that I tune into as an experienced teacher. By making explicit the feedback that I am acting on I give them access to the sort of information that they will need to inform their own decisions as teachers.

Despite my experience and careful preparation, things rarely proceed exactly as planned and there are plenty of opportunities for them to learn through my mistakes. I am prepared to discuss the effectiveness of the strategies realistically and pragmatically. I tell them how I feel when the discussions go in a different direction to what I had thought or when a science experiment doesn't work as intended. My students have commented in their feedback:

We have learned different teaching strategies which are helpful in order to reach all students.

It made me think about how I teach. ...for professional development the FEEDBACK was best.

I also evaluate my effectiveness at the end of a semester with course evaluations. I study aggregated results and read the students' comments carefully. In this way the courses are always evolving to better suit the students' needs. A summary of these evaluations is included in Appendix B.

VII. PROFESSIONAL DEVELOPMENT AND LEADERSHIP

Ultimately, am I prepared to discuss the challenges, trials and tribulations with students and colleagues to initiate conversations which deepen our understanding about teaching and learning?

The kernel of the bright orange karaka berry is highly toxic, unprocessed, and if eaten the victim is racked with pain and doubled over with convulsions. But, if you steep the berry for weeks in fresh running water or cook them in steaming hot pools for days, the kernel can be ground up and the resulting flour made into a sort of bread. There are no records of how Maori developed this method of preparing karaka bread. Intuition or common sense must have driven them to persevere until its potential was realised. One thing is apparent, once they had discovered that the kernels were edible they must have communicated their methods widely.

The same must be true for disseminating advances in teaching. Promoting teaching as a scholarly endeavour necessitates acting as a go-between between practitioners and academics. I have been fortunate to be able to connect the academic task of conducting research with supporting my own professional development. For me teaching and research should inform one another, and best practice needs to be shared widely.

I have played a part by contributing to national and international journals (see Garbett 2003a, 2008a; Garbett & Tynan, 2004; 2007, Tynan & Garbett, 2006; 2007). I am always flattered when someone takes the time to respond to published articles. The conversations that are started through email have been stimulating and offer the possibility of opening new avenues of research.

As an early-career academic, I really enjoyed reading your paper in HERD. The honest way that style [sic] that you addressed issues that many new researchers face in academia was refreshing, and as I am also interested in this area of research, quite informative. (email from an Australian academic in response to Higher Education Research and Development journal article)

*Your article also made me think about the kind of Action Research that is most formative to us when we are teaching and how that is also not always supported very well by the university's expectations for faculty workload.
(email response to an article in the Journal of Early Childhood Teacher Education)*

Reviewing articles for national and international early childhood journals and editorial duties as a board member of the American-based Journal of Early Childhood Teacher Education are positions that I see in teaching terms. I endeavour to couch my critique in positive terms that will foster learning opportunities.

Presenting research at national and international conferences (Garbett, 2003 b;c; 2004a; b; c; d; 2007d; e;) and at in-house symposia (Garbett, 2007b, 2008c,) is an extension of my role as a teacher. Despite an anxiety about presenting at conferences, I place high value on the opportunities afforded by

being part of robust discussions about ideas. Often someone will draw attention to another piece of research that I may not have seen or make a comment that sparks another line of thought. Whether it is as a writer, reviewer, speaker or discussant that I participate, I consider ideas should be made public for the collective good of the profession.



My latest research initiative focuses on provisionally registered teachers' experiences in their first years in the profession. Although this research is in its initial stages, my aim is to better prepare student teachers for the reality of teaching in secondary schools. The first year of teaching is stressful and time consuming as these emails from provisionally registered teachers indicate.

Teaching has been pretty full on... All I seem to do is teach, eat, sleep, plan then start over again. But I am having heaps of fun... I got a 7th form Bio class and they are awesome!... they're all fighting for seats up the front.
(Email from provisionally registered teacher, 20 February 2008)

To be honest, I feel so stressed and rushed right now that I hardly find the time to think about teaching strategies and constructive learning. Overall it is more about surviving than about thorough planning of wonderful interactive and constructivist lessons. (Email from provisionally registered teacher, 2 March 2008)

I hope that this research will shed more light on what I can do to ease the transition for my future student teachers.

VIII. CONCLUSION

It has been a rare pleasure to update my teaching portfolio to support my nomination for a Tertiary Teaching Excellence Award. The opportunity to reflect on my practice over the last 15 years has called to light some wonderful memories. My student with a penchant for carnivorous plants was loving teaching the last time I met him. My deaf student is now studying towards being a New Zealand sign language tutor, teacher-aiding and parenting! She is truly remarkable. I hope that the grandmother is still enjoying her status as a science expert with her grandchildren. So many students have enriched my teaching-learning relationships.

At the start of some semesters I have asked my students to draw pictures representing themselves as teachers. Often, their responses include the teacher as a travel guide – pointing out landmarks of note and driving their tour party from one sight to the next. Others see themselves as gardeners - nurturing, hoeing, weeding and cultivating the new generation. Others are sailors navigating uncharted waters, sales-reps selling knowledge - these images speak volumes. My favourite representation is of the teacher as a wizard. A teacher's magic is in the threads that bind learners and teachers together through their interactions and relationships. In this portfolio I feel as though I have tried to draw those gossamer threads with a thick pencil and the results are disappointingly clumsy.

I believe that I will always have more to learn about teaching but that prospect inspires me every day. The learning journey that I accompany my students on is always thought provoking, challenging and deeply rewarding for all of us. The link between teaching and learning can be tenuous and fragile but in the hands of an excellent teacher it has the resilience to engage learners in a life-long journey of unlimited potential.

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APPENDIX A: REFERENCE LETTERS

Support letters are attached from:

- Dr. Antje Lisken-Kleinmans, former student
- Nicholas Major, former student
- Rena Heap, Faculty of Education, The University of Auckland
- Dr Gregor Lomas, Faculty of Education, The University of Auckland
- Jeanne Sheehan, Faculty of Education, The University of Auckland
- Jodie Delany, Assistant HOD Science, Marcellin College

31 Sierra St
Glendowie
Auckland

February 29th 2008

To whom it may concern

This reference supports Dr. Dawn Garbett's nomination for the Tertiary Teaching Excellence award. I have recently completed my Graduate Diploma of Teaching (Secondary) course at the University of Auckland and Dawn was our outstanding teacher in biology and science education.

Dawn's focus was always to teach us how to teach. She never just lectured to us. She taught us to think critically about teaching and learning. She did that by modelling supportive classroom practice and encouraging us to try a wide array of teaching strategies. This was highly effective for a number of reasons:

- Although we were often familiar with the science content, Dawn put us in the position of our future students and made us experience the strategies from this viewpoint in order to appreciate which strategies to use, and when, in our own classrooms.
- We were thoroughly engaged in Dawn's classes. For me, "doing it" means that I won't forget what I have learned. It is like the difference between cooking a meal and reading a recipe in a cookbook.
- Dawn also helped us realize our own weaknesses and limitations and encouraged us to share our strengths and knowledge through teaching one another. This was particularly fruitful because we were specialists in many different fields of biology (e.g. molecular biology, genetics, ecology etc.).

Our learning experiences were deepened through reflective class discussions, during which we evaluated the strategies from both students' and a teacher's point of view. I had experienced a very traditional, transmissive teaching style both in school and at university in Germany. I knew from my own experience that this is not necessarily a very effective or successful way of teaching. Dawn's classes equipped me with the necessary teaching tools to adopt a different teaching style that engages learners in relevant and meaningful ways.

Dawn established an excellent relationship with us (her students). She kept her professional distance but at the same time she was always approachable, warm and positive. Dawn shared her enthusiasm for teaching and helped us all to graduate as confident beginning teachers.

Since starting my job at Macleans College I have used several strategies to engage my students in learning biology including a domino starter and a role play.

I know that others in the class would willingly endorse this nomination because Dawn has been an excellent teacher.

Yours faithfully

A. Lisken-Kleinmans

Dr. Antje Lisken-Kleinmans
(Provisionally Registered Teacher 2008)

12th March 2008

Reference for Dawn Garbett

Dawn taught me for biology for the entire year and science for part of the year of my teacher education, during which time we learned a great deal about strategies for learning, and differentiation. Many of the strategies and tips that were given to us in class have made their way into my teaching practice.

I am now in my second year of teaching, currently at Tamaki College, a decile 1A, co-educational college of 709 students. I teach junior and senior science, and have been able to use some of the things Dawn taught me in all of my classes, especially some of the strategies and tips for dealing with differentiated learning styles, as I encounter these frequently within my teaching.

Dawn was friendly and helpful, and gave us plenty of encouragement to us all through the year, enquiring after our practicum experiences and also following our progress post- graduation.

Dawn helped me realise I was heading into the right profession. The subjects we studied within the class were geared to what we were likely to experience in a school, and helped me to think how to put across the science to students with very little prior knowledge. I came from a biological laboratory background, but had little experience of teaching the subject, despite being very aware of the theory involved. My classes with Dawn helped me to prepare for students who might know very little, or might know quite a lot, and showed me that there is frequently the need for several paths to the same outcome!

On a personal note, Dawn has remained one of my friends since I finished my course, keeping in touch with what we are all up to. I enjoyed training to become a science teacher (and I enjoy being a science teacher!) and I can honestly say that Dawn has made both things easier and more fun, by arming me with the kinds of skills to help transfer my knowledge to my students.



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March 2008

To Whom It May Concern

It gives me great pleasure to provide this reference for Dawn Garbett. I have lectured in science education with Dawn for the last five years: for the last two years in the School of Science Mathematics and Technology at the University of Auckland and for three years prior in the Science Department of the Auckland College of Education. Over these years I have seen Dawn demonstrate a genuine excellence in teaching.

Dawn's teaching always promotes student engagement and effective learning. This is evident in the outstanding student feedback Dawn receives in each of her courses. I can also attest to this personally as Dawn and I team taught two classes in 2006. Over the duration of this team teaching, I was able to observe the innumerable ways in which she engaged students and consistently scaffolded effective learning.

I have been privileged in my lecturing here at the Faculty of Education to be able to use research findings, teaching innovations and resource materials produced by Dawn. These are exemplary. Dawn's PowerPoint presentations that I use with my third year Bachelor of Education students are inspirational – and are unfailingly given a spontaneous round of applause as the final slide is shown. I have also included articles by Dawn in the readings book for the science courses I co-ordinate. Dawn has made her research available to others which has facilitated significant changes in the science education course content.

When I began teaching at this institution, Dawn's advice was invaluable in making the transition from classroom teacher to teacher educator. On an academic level Dawn has provided unfailing encouragement and astute critique of my ideas and writing as I have commenced and completed a masters degree and begun the doctoral journey.

Dawn is totally committed to her personal professional development and critical reflection. This is manifest in the content of her doctoral thesis 'Science teacher education; Fostering confidence and competence' in which Dawn deeply reflected on her own teaching practice. Many of us profess professional development and critical reflection, but to write a doctoral thesis with this at its core soundly demonstrates this commitment. Dawn's enthusiasm for her doctoral studies was inspirational.

Dawn demonstrates leadership and teaching practice within the University, as is evident in her recent promotion the Associate Dean Teaching and Learning. This leadership is also typified in Dawn's own teaching practice, in the ongoing changes Dawn has implemented in the courses she co-ordinates and teaches. I have seen this personally in the Graduate Diploma of Teaching (Primary) science course, which Dawn co-ordinates and I have taught. Here, for example, she has implemented an extremely successful peer assessment strategy which has since been adopted by colleagues in this institution.

Dawn's wholehearted commitment to teacher education, at all levels from early childhood to secondary, enhances the reputation and standing of teacher and professional education at the Faculty of Education.

REHeap

Rena Heap
*University of Auckland
Faculty of Education*

March 2008

To whom it may concern: Dawn Garbett

Dawn joined the Auckland College of Education full time as a senior lecturer in 2001 prior to its amalgamation with the University of Auckland and the establishment of the Faculty of Education in late 2004. Over this period of seven years a consistent feature of her work has been a focus on quality teaching and the ongoing examination of her own practice. This has led to a deep understanding of her teaching practice and the way that specific components combine to constitute effective pedagogy.

As a consequence she has developed and then integrated significant new approaches within her own practice – such as the small group peer teaching by students in 2002 and a form of team teaching in 2006 that aimed to make explicit the teaching techniques being used by lecturers to pre-service students. This expertise has been shared with, and adopted by, colleagues both within the institution and in other tertiary providers.

Her ability to teach successfully to a variety of client groups is evident in the pre-service student evaluations from Early Childhood students in the Bachelor of Education programme, Primary students in the Graduate Diploma programme and Secondary students in Graduate Diploma science and biology courses (her specialist subject) which rate her teaching (and the courses she takes) very highly.

Dawn's appointment to Principal Lecturer (equivalent to Senior Lecturer above the bar) prior to amalgamation was largely a recognition of her teaching excellence with 2 of the 4 criteria being directly related to her teaching; 'Designs for quality learning', and 'Critically reflects on own practice to improve the quality of teaching and learning'.

The ongoing programme of research undertaken by Dawn, including her doctorate (2007), maintain a focus on the examination of her own and collegial collaborative practice and student learning. Thus her research informs what she teaches and how she teaches as well as having a wider professional and research audience.

Her appointment in early 2008 as Associate Dean Teaching and Learning in the Faculty of Education is further evidence of the recognition of her expertise in this area from her peers, particularly in providing leadership, and the esteem in which it is held.

Dawn's teaching practice, research on teaching and learning, and leadership in this area constitute a level of sustained excellence which I take professional pleasure in recommending her most highly for your consideration.

Yours sincerely
Dr Gregor Lomas
Head of School of Science, Mathematics and Technology Education

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6 March 2008

To whom it may concern

Support for Dawn Garbett for a Tertiary Teaching Award

I have worked with Dawn during the past eight years as a colleague in the Graduate Diploma in Teaching (Primary) programme, especially as a member of the Graduate Diploma (Primary) Qualifications Committee. I have found Dawn to be an extremely successful teacher and course co-ordinator; this has been confirmed by a number of sources. I wish to support Dawn's application for sustained excellence in teaching as I believe she has worked in a consistent and on-going manner to develop, revise and refine her teaching over the years. She has always striven for excellence.

During my two years as Head of Programme the external and internal quality assurance audits of the programme have signalled that the science course designed and developed by Dawn is of very high quality. There is sufficient external evidence to support Dawn's success in course design and implementation. In the 2006, following external programme monitoring, feedback from the New Zealand Teachers Council programme monitor stated in the supplementary notes that the science course Dawn had planned and implemented was exemplary and excellent preparation for teaching. Student feedback to the monitor at that time actually suggested that science should consider applying for a teaching award. This is high praise indeed from students in the programme who traditionally have extremely high expectations of what they need to learn in preparation towards becoming a teacher.

Student feedback during programme evaluations over the past two years puts science as one in a trio of 'top' courses of the fourteen papers in the programme. I expect this to continue to be so. Spontaneous feed back I have had from students over the years reveal that they are excited by the science course and Dawn has transmitted her passion for science teaching to students. Passion is an important precursor for successful teaching and it is quite evident that Dawn is able to reach the diverse range of student teachers in her classes; this includes those that are ambivalent towards or even scared of science. In reaching these student teachers Dawn models 'best practice' that researchers such as Alton-Lee (2001)¹ deem as necessary for the success of diverse learners in primary and secondary classrooms- and in this particular case, the tertiary sector.

¹ Alton-Lee, A. (June, 2003). *Quality Teaching for Diverse Students in Schooling: Best Evidence Synthesis*. Policy Division of the Ministry of Education.

Another major reason for the successful science course in the Graduate Diploma Programme is that Dawn has focused on the scholarship of her teaching. Her Doctorate thesis centred on teaching and student learning in science, and the information and understanding emerging from this research has resulted in Dawn being able to build evidence-informed practices to increase student achievement. Over the years students' academic success in the Graduate Diploma in science course has steadily improved and last year all those who completed the programme passed. Pedagogical principles based on sound research underpin the science courses Dawn has developed and these give strong coherence and guidance to course content, structure and pedagogy.

During my communication with Dawn it is evident that she thoroughly enjoys the research/practice nexus and the positive outcomes arising from this. She displays enthusiasm for teaching her students and the science curriculum.

Supporting Dawn's scholarship and passion has been her ability to draw on her experiences as a classroom teacher to consider and reflect on which theories and practices in teacher education will help advance the quality of teaching and learning in the classroom. This has supported student teacher learning about why and how to teach science so they can emerge from the programme to become effective practitioners. Having read exemplary student science assignments during internal moderation processes, it is evident that students have been given sufficient opportunity to investigate their understanding of science knowledge, science teaching and children's learning in authentic contexts of their own choice.

As a result, student agency to teach science has gained momentum. Last year, during practicum visits to classrooms, I observed a significant number of student teachers implement highly successful science lessons that motivate and engage children. Students have gained confidence and competency to teach science to a degree that has not been evident in the past. This is an exciting and important development as traditionally science has often been a neglected subject in primary classrooms because teachers do not feel they have the knowledge to teach it successfully (personal communication from a school Science Advisor).

Dawn has taken a critical friend role and shared her visions of 'best practice' with course co-ordinators during Graduate Diploma Qualification Committee workshops. She is reflective about her practice and is willing to share the successes as well as the failures, complexities and challenges with colleagues. This year I have asked Dawn to present her course, its content, aims and purposes at a meeting of primary school deputy principals that work in partnership with this programme.

I have confidence in Dawn's ability to work effectively with colleagues to assist in the implementation of programme innovations. In her newly appointed role as Associate Dean of Teaching and Learning I have asked Dawn to act in a consultative capacity to assist with aspects of pedagogy in the Graduate Diploma in Teaching (Pry) programme. I feel she will be able to advise effectively on the challenging aspects of addressing the new pedagogical requirements found in the newly mandated New Zealand Curriculum 2007 (Ministry of Education, 2007) and draw on her research and experience to do so.



Jeanne Sheehan
Head of Programme
Graduate Diploma in Teaching (Primary)
Faculty of Education
The University of Auckland

6 March 2008

To Whom It May Concern,

I was a student studying for my Graduate Diploma of Teaching (Secondary) at the former Auckland College of Education (now amalgamated with the University of Auckland) in 2003. Dawn Garbett was my Biology lecturer that year for two papers - Biology Education (Years 11-12) and Biology Education (Year 13).

Dawn's job was to prepare us for teaching Biology to secondary students and our studies focused on two main areas - subject content and teaching strategies. Although Dawn admirably taught us both, her strength definitely lies in teaching strategies. I still remember being warmly welcomed into the classroom with a sunny smile during my first lesson with her. We were immediately put at ease with her relaxed teaching manner and the comfortable atmosphere which Dawn has obviously fostered (and mastered) over the years. This in itself is a benchmark by which I have judged myself as a teacher. I have tried to develop an inviting and relaxed atmosphere in my own classes just as Dawn did with my class five years ago.

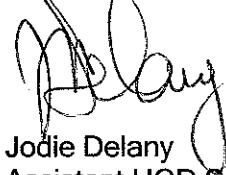
Many lessons had her regaling us with her own personal teaching moments. These vignettes often served as wise words of advice when dealing with certain situations in the classroom or when teaching some of the more sensitive subjects that are covered in Biology. The idea of students being able to freely laugh in a class with their teacher whilst learning is something else that I have learned from Dawn and try to encourage in my classroom. Not only does it personalize one's teacher but it also eases some of the stress and burdens that all students carry at one time or another.

The teaching experience that Dawn brought to our classroom was greeted eagerly by us students. We were given various ideas which could be utilized to teach a single concept in a number of ways. Furthermore, many of the strategies that Dawn showed us could be redesigned to teach multiple concepts. Many lessons involved us hunched over tables as we worked our way through various card and paper activities, giggling as we went and quietly thinking of who we could test the same activities out on that night at home. I, myself, have successfully employed a number of these strategies in my classes over the last few years and have the same weathered cards given to us by Dawn herself to prove it.

Since my graduation from ACE I have kept in regular contact with Dawn. She has met up with me for quick chats when observing trainee teachers in my school and checked in at other times with e-mails. Upon taking up a Human Biology position in 2006 she was the first person that I turned to when I needed resources. In fact it was my needing her advice about catching up on senior Biology standards which led to the yearly visit to her office where she mentioned that she had been nominated for a Tertiary Teaching Excellence award. I am honoured to be a reference for Dawn for this prestigious award.

Dawn's official title is Principal Lecturer Teacher Education. The Collins English Dictionary states that a lecturer is someone who uses "a method of teaching by formal discourse". Dawn is this but she is so much more. The same dictionary asserts that a mentor is "a wise or trusted adviser or guide". In 2003 Dawn was my lecturer but from that year and till this day I think of Dawn Garbett as my mentor.

Yours sincerely,


Jodie Delany
Assistant HOD Science
Marcellin College

APPENDIX B: TEACHING EVALUATIONS

i. Student Course Evaluations

Table 1 provides a sample of the results from the Student Perspective Surveys conducted on some of the courses that I taught at the Auckland College of Education. Students were asked approximately 30 questions and to score their response on a five point scale (5 strongly agree, 1 strongly disagree)

Table 2 provides a sample of results from course and lecturer evaluations on some of the courses that I teach at the University of Auckland. Students are asked up to 18 questions and to indicate their response from five possible choices (strongly agree to strongly disagree). These responses are then converted to a score out of 10 and the percentage of students who agree or strongly agree.

Table 1: Evaluation scores for selected questions, Auckland College of Education

Question	924.621 2002 Score /5	924.631 2002 Score /5	724.756 2004 Score /5
The lecturer communicates effectively	4.9	5	4.5
The lecturer is challenging and motivating	4.8	4.1	4.8
The lecturer makes clear the objectives of each class	4.4	4.6	
The lecturer encourages class interaction	5.0	4.9	
The relationship between the lecturer and the class members is very good	4.7	4.9	

These questions were not asked as part of this survey.

Table 2: Evaluation scores for selected questions, University of Auckland

Question	EDCURSEC 617B 2006	EDCURSEC 617B 2007	EDCURRIC 610 2007	EDCURSEC 614 2007
Overall, I was satisfied with the quality of this course		8.59 96%	9.47 95%	8.10 87%
Overall, the lecturer was an effective teacher	8.09 82%	9.46 100%	9.38 100%	8.79 90%
The lecturer was enthusiastic about the subject	8.82 100%	9.67 100%	9.75 100%	9.44 94%

ii. Feedback to students about course evaluations

I think that it is important that students know that the evaluations that they complete are used in the further development of all aspects of my teaching practice. For example, in 2004 I presented one group of students with the following information about the previous years' evaluation:

Each year I ask our students to comment on aspects of the course so that we can improve our practice. This is a summary of the 2003 evaluation

- *98% thought the course had increased scientific knowledge*
- *95% enjoyed the hands-on approach to the sessions*
- *95% thought that they had a range of strategies to use in teaching science*
- *91% thought that their science knowledge was adequate to teach science at primary level*
- *88% thought confidence in teaching science had improved*

Evaluation of Assignment 1 (Micro-teaching)

- *95% thought it had helped them to understand children's ideas in science better*
- *86% thought the task improved their confidence in planning*
- *24% thought the assignment was too difficult but 44% thought not*
- *41% thought the time taken to complete task was comparable to other modules while 45% disagreed*

Students concerns

- *Huge assignment*
- *Due date - too late*
- *Checkpoint problematic*
- *Too much choice*
- *Some had difficulty finding children*

Students positive comments

- *Learnt heaps*
- *Beneficial*
- *Good assignment*
- *Excellent*
- *Totally relevant*

Evaluation of assessment task 2 (Theory and pedagogical content knowledge)

- *85% thought it helped them understand fundamental science concepts better.*
- *88% thought it gave them practical ideas to use in the classroom.*
- *61% thought working co-operatively encouraged deeper understanding and was a positive aspect but 20% disagreed.*
- *58% thought they learnt a great deal from their peers but 15% disagreed*

- Only 27% thought that testing them on only one question was a fair indication of what they knew, 47% disagreed

Students' positive comments

- Reduced workload
- Opportunity to explain and discuss
- Others helped clarify concepts
- Working smarter, not harder
- Theory brilliant

Issues with Assignment 2

- Test was stressful, too much pressure
- Some just passed on written information
- Time to get together at the end of the year impossible
- Worried about being given the wrong information

What am I doing with the feedback?

- Maintaining hands-on approach but refining course content and delivery to improve student confidence.
- Assignment 1: Suggesting topic choices, informal feedback offered at checkpoint, possibility of using Normal School children, due date earlier in semester.
- Assignment 2: The theory appears brilliant but we need to refine our practice to help students gain full benefit. This is the focus of ongoing study.

iii. Student surveys undertaken as part of my Doctorate

These are the results from the 2004 cohort taken from my PhD. This is not an official University course evaluation but one that I had designed to evaluate the effectiveness of the teaching and learning.

Table 3: Student teachers' responses to statements in the final evaluation questionnaire (n = 91)

Statement	Strongly agree (%)	Agree (%)	Neither (%)	Disagree (%)	Strongly disagree (%)
My science knowledge was adequate to teach science before I started this module	6.5	26.1	25	35.9	5.4
My scientific knowledge has increased	57.6	31.5	7.6	3.3	0
My confidence in teaching science has improved	56.5	41.3	2.2	0	0
I feel <u>less</u> confident to teach science than most other subjects.	1.1	7.6	12.0	53	25
My science knowledge is adequate to teach science at primary level	41.8	52.7	4.4	1.1	0
I have a range of strategies to use in teaching science	31.5	59.8	4.3	4.3	0
I feel more enthusiastic about teaching science than most other subjects	26.1	39.1	21.7	12	1.1

Seventy-eight percent of the student teachers disagreed or disagreed strongly with the statement that they felt less confident to teach science than most other subjects. Reframed, this implies that three out of four student teachers felt more confident to teach science than most other subjects. Two out of three student teachers were more enthusiastic about teaching science than most other subjects. Enhancing student teachers' confidence and competence to teach science appears to have been a successful, (but hardly unexpected), outcome of the module.

In the November 2004 questionnaire, student teachers were asked to respond to a number of similar questions to those asked in July in order to give some indication of their perceived confidence compared to other subjects. The results from July and November are recorded in the table below. There were between 69 and 75 valid responses to the statements in July and between 80 and 91 in November. The figures are valid percentages of the total valid responses.

Table 4: Responses to similar statements in July and November

Statement	Date	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)
Science is as important as maths and language	July	27.3	62.3	10.4	0
	Nov	40.0	46.7	13.3	0
I am/should be enthusiastic about teaching science	July	21.3	69.3	9.3	0
	Nov	42.0	58.0	0	0
I need to know a lot of science content to teach it well	July	17.8	67.1	15.1	0
	Nov	12.5	53.4	33.0	1.1
Science is a collection of facts that have to be learnt	July	0	34.7	58.7	6.7
	Nov	3.4	14.9	56.3	25.3

Of significance is the strengthening of opinion that science is as important as mathematics and language with 10% more student teachers agreeing strongly with the statement in November than did in July. Enthusiasm for teaching science increased over the module from 91% to 100% of valid responses.

APPENDIX C: PUBLICATIONS

Theses

- Garbett, D. 2007a, *Science Teacher Education: Fostering Confidence and Competence*, unpublished doctoral thesis, Monash University, Australia
- Garbett, D. 2000, *Of Science and Women: A Group Memory Work Project*, Unpublished Masters in Science Education project, Curtin University, Australia

Refereed Journal Articles

- Garbett, D. 2008a, Assignments as a Pedagogical Tool in Learning to Teach Science: A Case Study. *Journal of Early Childhood Teacher Education*, 28, 1-12
- Garbett, D. and Tynan, B. 2007, Storytelling as a Means Of Reflecting on the Lived Experience of Making Curriculum in Teacher Education. *Australian Journal of Early Childhood*, 32, 1, 47-51
- Tynan, B. and Garbett, D. 2007, Negotiating the University Research Culture: Collaborative Voices of New Academics, *Higher Education Research and Development*, 26, 4, 411-424
- Tynan, B. and Garbett, D. 2006, Would We, Could We, Did We Collaborate? Mutuality and Respect, *M/C Media and Culture Journal* 2, 9, available at: <http://journal.media-culture.org.au/>
- Garbett, D. and Tynan, B. 2004, Preliminary Findings: Early Childhood Student Teachers' Perception of their Confidence and Competence, *Journal of Early Childhood Teacher Education*, 25, 67-74
- Garbett, D. 2003, Science Education in Early Childhood Teacher Education: Putting Forward a Case to Enhance Student Teachers' Confidence And Competence, *Research in Science Education*, 33, 4, 467-481

Conference Presentations

- Garbett, D. and Ovens, A. 2008, Peer-Teaching: Towards a Self-study of Sharing Teaching Time, *American Educational Research Association* (New York, March 2008)
- Garbett, D. 2008b, ELITE Horse Riding 101, *Self Study of Teacher Education Practices Conference* (Herstmonceux, August 2008)
- Garbett, D. 2008c, Peer Teaching: Shifting the Focus of the Learning Community, Faculty of Education Doctoral Symposium, Auckland, April 2008
- Ovens, A. and Garbett, D. 2008, Peer Teaching as a Means of Fostering Confidence and Competence in Teacher Education, *Self Study of Teacher Education Practices Conference* (Herstmonceux, August 2008)
- Garbett, D. 2007b, Making the Unseen Explicit – a.k.a. Team Teaching, *School of Science Mathematics and Technology Education Research Celebration* (University of Auckland, November 2007)

- Garbett, D. 2007c, Science Teacher Education: Fostering Confidence and Competence, *Faculty of Education Research Seminar day* (University of Auckland, February 2007)
- Garbett, D. 2007d, Enabling Serendipitous Teachable Moments through Reconsidering Assignment Tasks for Student Teachers, *International Conference for the Association of Science Education ICASE and World 2007 Science Teaching and Education* (Perth, July 2007)
- Garbett, D. 2007e, Peer Teaching: Situating Learning in Science Teacher Education in Meaningful Contexts, *International Conference for the Association of Science Education ICASE and World 2007 Science Teaching and Education* (Perth, July 2007)
- Garbett, D. and Heap, R. 2007, Team-Teaching as a Means of Teaching and Learning About Teaching Science. *Australasian Science Education Research Association (ASERA)*, (Fremantle, July 2007)
- Garbett, D. 2006, Anticipated and Surprising Findings: Fostering Confidence and Competence to Teach Science Education, *Science Education Research Symposium*, (Hamilton, December 2006)
- Garbett, D. and Heap, R. 2006, A Preliminary Analysis of Team-Teaching as a Means of Teaching and Learning about Teaching, *Science Education Research Symposium*, (Hamilton, December 2006)
- Garbett, D. 2004a, Researching Practice as a Teacher Educator, *Australian Association of Research in Education* (Melbourne, November-December 2004)
- Garbett, D. 2004b, How do Scientists Explain where the Sun goes at Night? An Analysis of Student Teachers' Exploration of Young Children's Ideas about Day and Night, *Fifth Annual New Zealand Science Education Research Symposium: Recognising the Potential of Science Education Research* (University of Auckland, December)
- Garbett, D. 2004c, Self-Study in Teacher Education Practice: Science Assessment and Peer Coaching in Focus, *New Doctoral Research in Education Conference* (University of Auckland, November 2004)
- Garbett, D. 2004d, Science, Serendipity and The Sandpit, *Fourth Politics of Early Childhood Symposium* (Auckland, September 2004)
- Garbett, D. 2003b, Duh, I Thought I Knew That: Science Education for Early Childhood Student Teachers, *Fourth Annual New Zealand Science Education Research Symposium: Focusing on Current Issues*, (Christchurch College of Education, November 2003)
- Garbett, D. 2003c, Student Teachers' Science Knowledge: A Little is a Dangerous Thing, *Seventh Annual New Zealand Early Childhood Research Network Symposium, pre NZARE/AARE conference*, (Auckland, November 2003)